JUMS

JUNIOR MANAGEMENT SCIENCE

Junior Management Science

Success Factors and Development Areas for the Implementation of Generative AI in Companies

Julian Anton Meyer

Technical University of Munich

Abstract

With the significant increase in public interest in ChatGPT since its breakthrough following the public release in November 2022, an expanding array of application possibilities is being discovered. This heightened interest is also reflected in economic contexts and for businesses. These Generative AI (GenAI) models are believed to have the potential to contribute trillions of dollars in value to the global economy. Now, pioneering companies face the challenge of successfully leveraging this Generative AI technology to their advantage, positioning themselves successfully at the forefront of AI. The adoption of Generative AI proves to be neither straightforward nor simple for companies and is associated with various challenges. Within this thesis, these challenges will be identified by conducting a multiple-case study involving expert interviews. Practical insights will be obtained to identify the decisive factors for the successful adoption of Generative AI, and these insights will be translated into a hands-on implementation framework for companies.

Keywords: ChatGPT Enterprise; Generative AI; GenAI; GenAI adoption; GenAI framework

1. Introduction

1.1. ChatGPT versus Turing Test

> *"I PROPOSE to consider the question, 'Can machines think?'"*
>
> Turing (1950, p. 433)

To date, a question one could argue to be answered with yes, at least partially. However, how one argues this is partly a matter of interpretation and definition. Especially since Turing, in this context, is using "intelligence" as a synonym for "the capacity to think" and human rational (Hanna, 2023, p. 2). Intelligence may be defined by others very differently, hence the subjectivity in this argumentation. The 'Turing Test' or the 'Imitation game' was proposed by Turing in 1950 to assess the intelligence of computers based on generating human-like responses (Turing, 1950, pp. 433-434). Despite widespread criticism of the test, it represents a central, thought-provoking idea. An idea that would still concern people to this date: can computers have real human-like intelligence, or do they already have it, and what are the consequences?

The test involves a covert interrogation game with three players, one of whom is replaced by a computer. The computer would pass the test not based on the correctness of the answers but rather if the human interrogator could not reliably distinguish the covert written responses of the human from those of the computer (Turing, 1950, pp. 433-441). Since the test relies on written human-like responses, it is especially interesting in this context regarding the current developments in the field of Generative AI (GenAI) models such as ChatGPT, which can indeed produce human-like texts.

Can a state-of-the-art chatbot like ChatGPT 4.0 pass such a test? There is no clear answer to that, it depends on the type of test. An example approach to answer this question resulted in answering with "No, it cannot pass the Turing Test" (Hanna, 2023, p. 8). However, it is important to note that the original Turing Test from 1950 did not provide specific guidelines for conducting the test; it was more of a thought experiment by Turing. Nonetheless, current GenAI models cannot pass various machine-human-like tests and benchmarks, yet they come dangerously close, or should one rather say, unsurprisingly close?

One could argue that current GenAI models are indeed capable, as proposed by Turing in 1950, of "understanding and speaking English." This is unquestionably a reality. How should one navigate this reality? How does one manage the associated risks? How can GenAI be leveraged? These questions will be explored within the scope of this thesis from the perspective of businesses. Due to the novelty of this technology, companies still face numerous challenges in the successful adoption of this technology. A framework for integrating these GenAI technologies will be developed, enabling companies to effectively harness this reality to their advantage.

1.2. GenAI's economic potential

From an economic perspective, why should companies even consider incorporating GenAI into their business in any form? What economic potential does this technology represent?

An estimate by McKinsey, identifying 63 GenAI use cases across 16 business functions, suggests that GenAI could have an annual total contribution of $2.6 trillion to $4.4 trillion. 75 percent of this value comes from four use cases: Customer operations, marketing and sales, software engineering, and research and development. Furthermore, after accounting for overlaps and considering additional beneficial impacts on knowledge workers' activities, the total sum could grow to $6.1 trillion to $7.9 trillion annually. (Chui et al., 2023, pp. 1-10)

The potential impact is enormous, but it remains a potential. To gradually unlock this potential, companies must now evolve towards incorporating GenAI technologies into their practices, simultaneously engaging in and managing risks, and overcoming challenges associated with it. However, there is still no unified approach or generally known blueprint on how companies can perform this transformation. This will be explored in the framework of this thesis by identifying the strategic, organizational, and technical factors that influence the successful deployment of GenAI in companies. The focus lies on Large Language Models such as ChatGPT and their implementation and application within the framework of corporate processes. Particular attention is given to gathering the utmost practical insights to ensure high relevance in the results.

2. Literature Review

2.1. Overview of current literature on GenAI

The following section provides a brief overview of the current research status regarding GenAI, specifically ChatGPT.

A recent study by Liu et al. from 2023 analyzed the current development of ChatGPT-related research. Figure 1 illustrates the monthly publication counts of ChatGPT-related papers as well as the cumulative daily submitted papers on arXiv (an online archive of scholarly articles) from 2022 to April 2023. It demonstrates a significant upward trend, indicating the growing and sustained interest in ChatGPT-related research. (Liu et al., 2023, p. 2)

As this demonstrates only general results regarding the topic of ChatGPT, it provides a good indicator of the overall interest in GenAI, but not specifically in the subtopics. Liu further categorized her analysis results based on the types of publications related to ChatGPT. This allows for a more detailed insight into the distribution across various fields.

As Figure 2 depicts, Computation and Language is by far the largest field in this database on GenAI. Machine Learning, Computers and Society, and AI are the next largest fields. There are many other areas, but they are relatively underrepresented. Particularly, the field of Applications, which is of interest to this research paper for analyzing the use cases and integration strategies for companies, is only weakly represented. (Liu et al., 2023, pp. 2-3)

The consequences concluded from these findings are presented in the subsequent methodology chapter in the introductory part. To address this research gap, the Methodology chapter will elaborate on how and through which methods this thesis aims to contribute.

2.2. Insight into underlying principles of Large Language Models

For a thorough analysis of how companies can successfully integrate GenAI models into their business processes, it is crucial to understand the underlying architecture of the most prevalent type of GenAI models: text-based models such as ChatGPT. They are based on Large Language Models (LLMs) combined with an easy-to-use interface through which humans can prompt requests. The primary goal in the research and development of Language Models (LMs), especially LLMs, was to improve their effectiveness in handling Natural Language Processing (NLP) tasks. (Chang et al., 2023, p. 7)

Defining LLMs works best by first explaining what a model and an LM is. A model, which in its base is a set of rules or math equations, in this specific case a LM, is designed to understand, replicate, and generate human language, achieved by computing probabilities of subsequent word series (Chang et al., 2023, p. 4). Foregoing text is analyzed by the model, most commonly by the n-gram model (Brown et al., 1992, pp. 467–480), and represents the input to a distribution model to obtain an output value that most accurately predicts the next words of a given sequence.
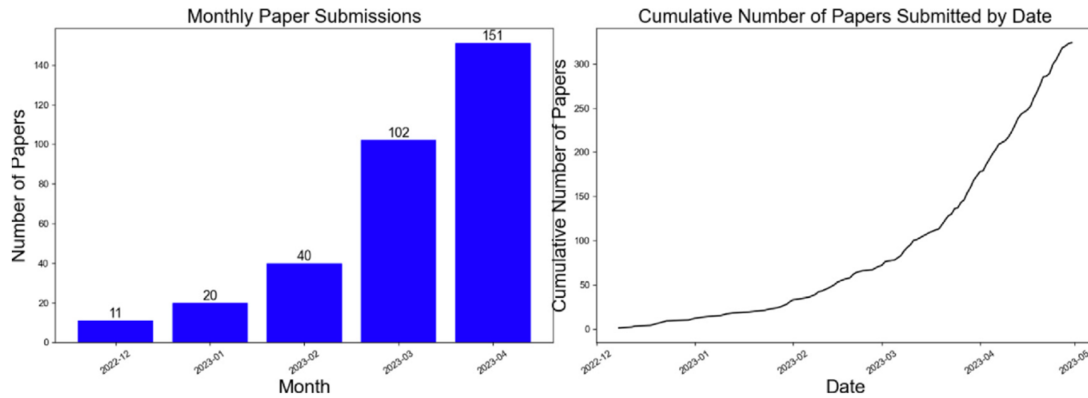
Figure 1: Graphical representation of ChatGPT-related research (Liu et al., 2023, p. 2)
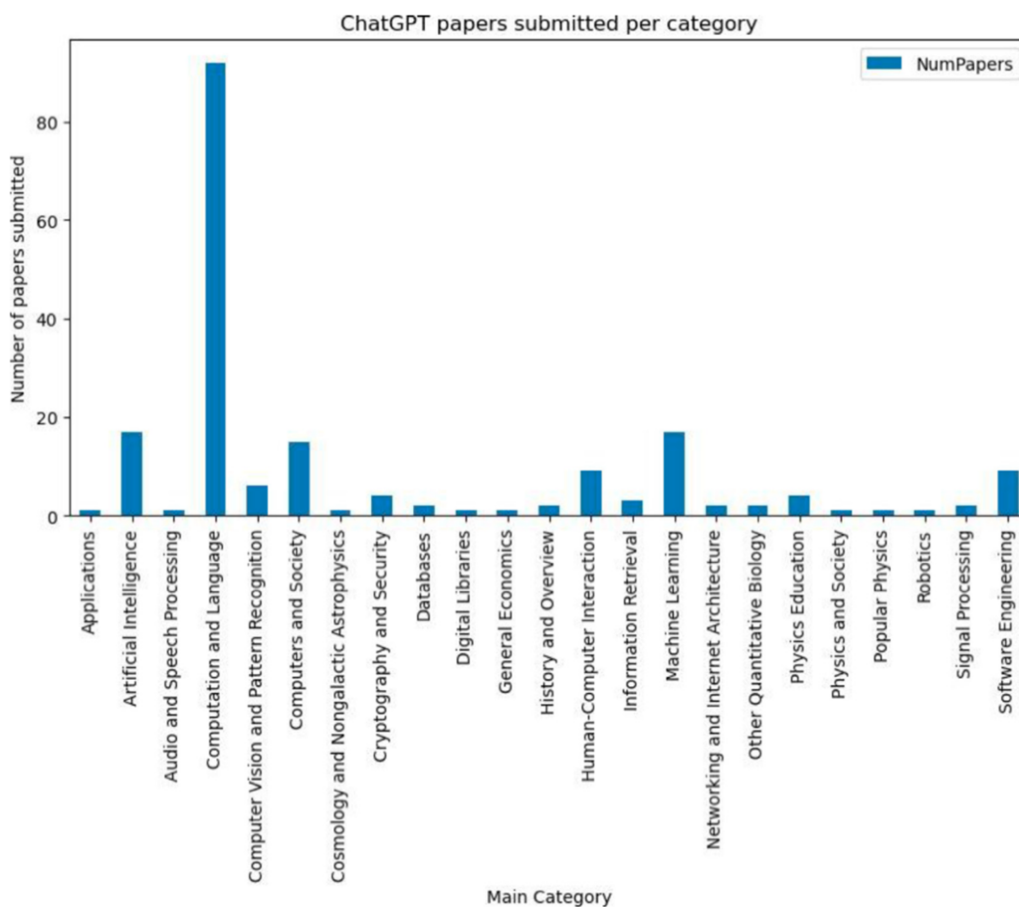
Figure 2: The distribution of ChatGPT papers submitted across various fields (Liu et al., 2023, p. 3)

Problems faced by basic LMs are phenomena such as compositions of complex linguistics, rare words, and overfitting issues. (Chang et al., 2023, p. 4)

A far more advanced version of basic language modeling that not only remarkably improves on these weaknesses, are LLMs. Trained on a massive amount of data, hence the word "Large", as well as utilizing derivations of the 2017 newly introduced transformer architecture (Ozdemir, 2024, pp. 36-43), LLMs are capable of far more complex and versatile tasks

and deliver significantly more sophisticated results. They are based on many different principles, with one principle standing out: 'Attention', which enables them to recognize context in language. No matter how the different LLMs are derived from the original transformer architecture, they all operate on a similar working method: **Distributing attention to previously assigned tokens.**

To break that apart, first, it is important to understand the terminology of the token. "A token is the smallest unit

of semantic meaning, which is created by breaking down a sentence or piece of text into smaller units; it is the basic input for an LLM. Tokens can be words but also can be "sub-words," [. . .]. Some readers may be familiar with the term "n-gram," which refers to a sequence of n consecutive tokens" (Ozdemir, 2024, p. 37).

The objective is to comprehend and correctly interpret the relationship between the tokens assigned to the input text. The key is to combine and weigh as precisely as possible the semantic meaning (basically, word definitions) and context (with the surrounding tokens) to generate the most contextually rich token embeddings conceivable. This is where the power of transformers comes into play. They utilize attention calculations to achieve this complex counterplay, shifting attention between word definitions and contextual correctness (Ozdemir, 2024, p. 43); Something usually only intuitively achievable by humans.

As seen in the example in Figure 3, contextual awareness is essential for understanding Natural Language (NL). In the first sentence, "ruler" is intended to stand for a measurement tool, compared to the second sentence, where it is in place of a leader or commander. Distributing attention between the semantic meaning of words and the context of surrounding tokens allows the LLM to differentiate between these two sentences, which is critical for advanced Natural Language Understanding (NLU).

2.3. Large Language Model providers

There are many different GenAI models built upon LLMs, such as GPT-4, Bard, LLaMA 2, PaLM 2, BloomberGPT, and Claude, to name a few. The chronological release of these is shown in Figure 4. The variety of LLMs is extensive, giving a good overview of recent developments. However, an LLM can manifest itself through multiple Application Programming Interfaces (APIs). For example, the Azure OpenAI service and the OpenAI ChatGPT Enterprise offer run on the same underlying model. They are based on OpenAI's GPT models. As we aim to stay as practical as possible within the scope of this thesis, the focus is not on model diversity but rather on the integration into companies. Therefore, as part of the qualitative investigation, it will later become apparent that these are the common models used in practice, and thus, the focus lies on the above mentioned solutions.

Models on the upper half of the timeline are open-sourced, while the ones below are closed-source models, additionally, dark blue rectangles stand for 'instruction-tuned' models, and light blue rectangles for 'pre-trained' models (Naveed et al., 2023, p. 2).

2.4. Fields of GenAI

Following the previously provided overview of the functionality and underlying principles of GenAI and its various providers and models, the next step involves categorizing it. GenAI encompasses all scenarios in which an AI generates something 'new'; this can take on various entities. Subsequently, GenAI will be categorized based on these output entities. Given the absence of a uniformly established definition of GenAI and its categorization, an appropriate approach is to observe its scientific context. A literature review conducted by García-Peñalvo and Vázquez-Ingelmo in 2023 illustrates how the topic of GenAI and its entities is reflected in scientific publications. One of their studies displays the publications of papers from 2020 to May 2023 on GenAI categorized by the output generated (García-Peñalvo & Vázquez-Ingelmo, 2023, p. 13).

As Figure 5 demonstrates, the thematic scope of GenAI publications includes generated content in the forms of Images, Data, Text, Video, Videogame assets, Code, 3D, and Audio (García-Peñalvo & Vázquez-Ingelmo, 2023, p. 13). For further consolidation, considering the context of this work focusing on introducing GenAI and its use cases into businesses, some of these fields can be amalgamated. With a focus on practical applications, three overarching categories emerge: Media (Video, Images, Audio), Text, and Code (Code, 3D, and Videogame Assets). To clarify the category "Code", besides secondary aspects such as Videogame Assets and 3D, it includes producing numerical algorithmic code across various programming languages, code debugging, addressing missing segments in numerical code, and translating existing code into different programming languages (Kashefi & Mukerji, 2023, p. 1). Moreover, GenAI models can be utilized to directly convert human input text into code, a process known as text-to-code (Gozalo-Brizuela & Garrido-Merchan, 2023, p. 19).

Ultimately, the categorization is a matter of interpretation, but in this context, such segmentation into Text, Media, and Code, is advantageous for clarity and overview. As will be evident later, these categories are good distinguishers for different applications and business use cases, with text-based solutions being the main one. As this research paper focuses on LLMs specifically and consequently on all text-based solutions, the categories Media and Code will only be addressed secondarily. Additionally, as mentioned earlier, the research results from Figure 5 include only data until May of 2023. Certainly, there have been shifts in interest and, consequently, in the distribution and number of publications since then, especially due to the increase in accessibility and utilization of GenAI and its expanding range of applications. However, these changes have no impact on the categorization.

2.5. Status quo of GenAI in companies
2.5.1. Overview of application areas and use cases

After outlining the fundamental functionalities of GenAI and its classification and categorization, this section briefly shows some potential applications of GenAI in corporate environments. The focus later lies on the actual factors affecting the implementation rather than primarily on the use cases. Nevertheless, the following provides a couple of examples of different application areas in order to establish a comprehensive overview of the application possibilities for the subsequent discussion.

GenAI can be deployed in various types of applications across different industries, for example, customer support,
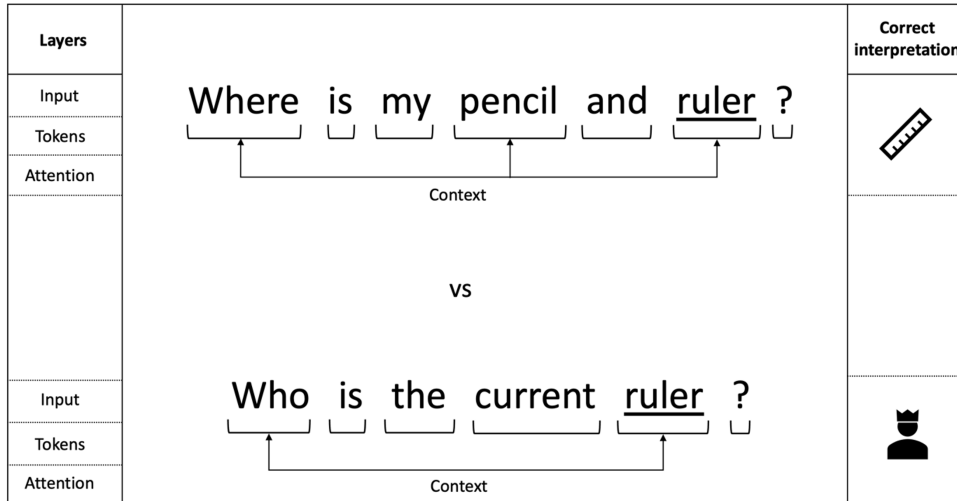
Figure 3: Example of contextual differences in meaning
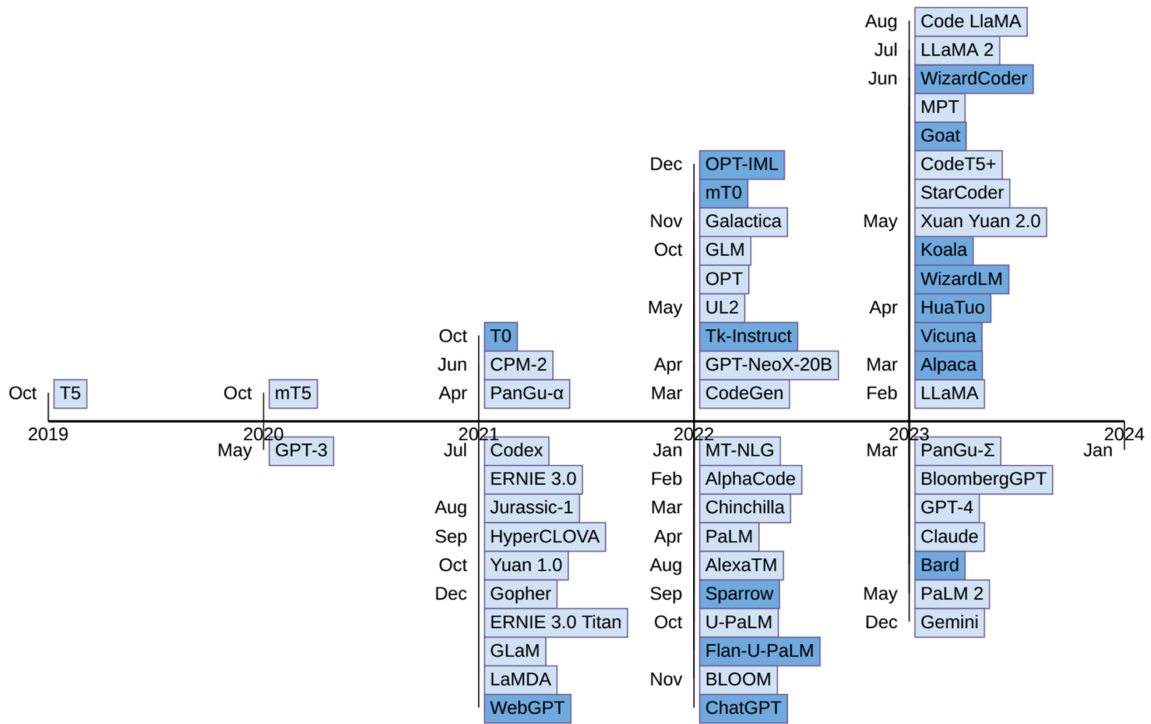
Figure 4: Chronological display of LLM releases [...] (Naveed et al., 2023, p. 2)

knowledge management, marketing and sales, education, health, recruitment, social media, and translation to name a few.

In customer support scenarios, GenAI can be used in the form of chatbots to provide users with tailored responses, thereby enhancing customer interactions across diverse sectors such as customer service, marketing, and e-commerce. The technology's versatility allows for customization to meet specific business needs, and therefore potentially contributing to improved user satisfaction. GenAI's proficiency extends to machine translation applications, where its neural network architecture is used to train on large multilingual text datasets. This enables GenAI to comprehend linguistic structures and semantic relationships, as described in chapter 2.2 by NLU and attention distribution, across different languages, resulting in translations of great accuracy and naturalness compared to traditional rule-based systems. The possibility to fine-tune a model further allows the adaptation to specific translation tasks for specific business settings, such as medicine or engineering. Here it can be used to translate technical terminologies into every-day language. For content writing, GenAI seems to be very valuable for generating high-
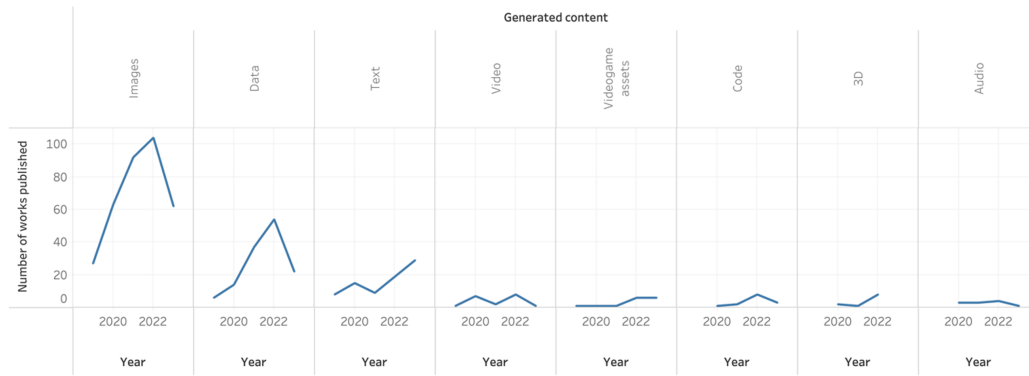
Figure 5: Number of works published over the years grouped by generated content type (García-Peñalvo & Vázquez-Ingelmo, 2023, p. 13)

quality NL text. Its ability to learn from vast datasets distinguishes it from rule- or template-based methods, making it particularly interesting for businesses requiring scalable content production, such as product descriptions, blog posts, reports, and text summaries. Another example for fine-tuning is that a journalist can efficiently generate article ideas or catchy headlines by providing a brief topic description and streamlining the content creation process. GenAI can also be used for information retrieval through its capability to answer diverse queries posed in NL. Users can obtain accurate and detailed responses by utilizing a chatbot interface with a pre-trained model. These models can also be trained and limited to specific datasets to control what data your answers will be relying on. Adjusting parameters like sampling temperature and noise level allows users to control the creativity of responses, ensuring flexibility in tailoring outputs to meet specific needs. The chapter demonstrates GenAI's transformative impact on NLU and NLP, presenting opportunities for improved efficiency and user experiences across different industry application areas. (Sarrion, 2023, pp. 32-43)

To gain insights into the most relevant advantages of GenAI applications in the corporate context, a study by Raj et al. from 2023 is referenced. Utilizing the Preference Selection Index and Complex Proportional Assessment approaches, the potential benefits of ChatGPT were weighted and prioritized in a tabular format based on their actual utility in businesses. (Raj et al., 2023, p. 1)

Table 1 shows the various advantages that can arise from the implementation of ChatGPT in the corporate context. The main categories are Cost Saving (CS) factors for businesses, Enhanced Customer Engagement (ECE) aspects, and advantages by Generating High-Quality Content (GHC) (Raj et al., 2023, p. 3). These are further detailed into their respective sub-categories. Additionally, this also provides a first useful overview of which potential advantages generally exist. The results for the overarching categories CS, ECE, and GHC are as follows: Generating High-Quality Content is by far the most valuable advantage, followed by Enhanced Customer Engagement and Cost Savings ranking third (Raj et al., 2023, pp. 5-6). It is noteworthy that CS and ECE are relatively close together in the evaluation.

Furthermore, the following results in Figure 6 offer an initial indication of which sub-fields are most relevant for the subsequent discussion. This is crucial as we aim to stay as practical as possible in the research for this work, focusing on the introduction of GenAI use cases in companies. Accordingly, the most relevant fields that offer the most benefits in the corporate setting are the most interesting for implementation.

Besides the results of the overarching categories, the evaluation of the top five specific sub-benefits is more intriguing for this research. The complete results can be seen in Figure 6. "Providing quick, informative, and more natural responses" (ECE1) under the category of "Enhanced Customer Experience" (ECE) is the most advantageous application of ChatGPT for business operations, according to the study. "Personalize customer interactions and tailor responses based on the customer's preferences" (GHC3) and the "Ability to generate human-like text" (GHC2) from the category "Generate High Quality Content" are very closely ranked, securing the second and third positions, respectively. "Automate repetitive tasks such as answering frequently asked questions" (CS3) and "Leads to a more positive experience for the customer" (ECE2) constitute the last two of the top five use cases from this analysis. Thus, these top five use cases, along with the remaining ones from Figure 6, provide a solid foundation and overview of the applications that will be further discussed in the context of the successful integration of GenAI into businesses. (Raj et al., 2023, p. 8)

2.5.2. Impact of GenAI use in corporate context

The actual effectiveness of GenAI in its variety of entities in its deployment in the corporate context was demonstrated by a very recent field experiment conducted by Dell'Acqua et al. at Harvard Business School of Technology & Operations in September of 2023. They investigated the impact of GenAI using GPT-4 on performance on realistic, complex, and knowledge-intensive tasks in collaboration with the Boston Consulting Group, a global management consulting firm.

The field experiment involved 758 consultants, with an initial establishment of a performance baseline on similar typical tasks. Benchmarking the initial situation is crucial for

Table 1: Explanation of different aspects of benefits and their sub-benefits [Adapted by author from Raj et al. (2023, p. 3)]

Benefits	CS	Cost Savings	ECE	Enhanced Customer Engagement	GHC	Generate High Quality Content
Sub-Benefits	CS1	Increased efficiency within a business	ECE1	Providing quick, informative, and more natural responses	GHC1	Save businesses time and resources for content creation
	CS2	Improved accuracy within a business	ECE2	Leads to a more positive experience for the customer	GHC2	Ability to generate human-like text
	CS3	Automate repetitive tasks such as answering frequently asked questions	ECE3	Increased customer satisfaction and loyalty	GHC3	Personalize customer interactions and tailor responses based on the customer's preferences
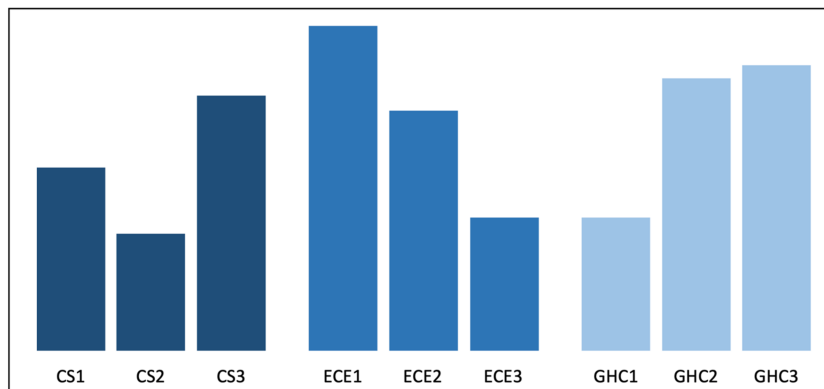
Figure 6: Illustration of sub-benefits parameters scores [Adapted by author from Raj et al. (2023, p. 7)]

conducting a meaningful comparative analysis later on. The consultants were allocated to three groups. The first group had no AI access, the second group had GPT-4 AI access, and finally, the third group had GPT-4 AI access along with an additional prompt engineering overview. For certain of the 18 realistic consulting tasks that were investigated, the results showed that consultants who used AI to handle these were overall significantly more productive. They processed the tasks 25.1% faster. Additionally, they were able to complete an average of 12.2% more tasks and demonstrated 40% higher quality results compared to the control group. However, these figures are based on a specific subset of the 18 tasks. According to the Harvard Business School study, these tasks are referred to as "inside the jagged technological frontier," meaning they have proven to be suitable tasks for the application of GenAI. For the remaining tasks outside this technological frontier, there was a 19 percentage points less likely outcome to produce correct solutions by the consultants compared to those without AI. (Dell'Acqua et al., 2023, pp. 1-19)

To conclude on the relevancy of this field experiment for this research paper, a particularly relevant insight gained from it is that there are tasks and use cases where the introduction of GenAI technology proves extremely advantageous, while in some cases, tasks might be better solved by a human alone. These cases, termed "inside the jagged tech-

nological frontier" of GenAI, need to be differentiated from tasks "outside the jagged technological frontier" of GenAI. Only through this differentiation can a successful, sustainable, and particularly rewarding implementation of GenAI in companies be ensured. The identification of these use cases thus emerges as one of the cornerstones and prerequisites for the introduction of GenAI. The empirical part of the study, in the form of expert interviews, aims to elaborate on how this identification can be achieved in practice and emphasizes its importance.

2.6. Critical success factors for the integration of GenAI

Many companies aspire to leverage the aforementioned potential benefits by integrating GenAI into their business processes, such as chatbots, advanced translations, and knowledge management support, among others. Realizing that there are many as yet unexplored difficulties along the way of implementing GenAI models into their company and establishing best practices, the topic of how to successfully adopt GenAI is becoming more apparent. Given the short time span from the public release of ChatGPT in November of 2022 (Gordijn & Have, 2023, p. 1) to the beginning of 2024, there have been only a few to no publications addressing this exact topic. The following is intended to highlight the current research findings regarding the successful implementation of GenAI in companies.

2.6.1. Influencing factors toward adoption

A study conducted by Prasad Agrawal in 2023 yielded some interesting results regarding the influencing factors for the adoption of GenAI in organizations. The study followed a framework that considered three overarching categories of influencing factors: Technology, Organization, and Environment. These unfolded into several subcategories, as shown in Figure 7. Results indicated that compatibility, competition intensity, organizational size, and environmental uncertainty were positively associated with the likelihood of corporate adoption of GenAI technology. On the contrary, complexity and regulatory support had a negative association with the likelihood of the adoption of GenAI technologies in companies. Absorptive capacity, relative advantage, and technological resource proficiency showed no statistically significant relationship to distinguish between adoption or no adaptation. This provides a good initial impression of which factors may have an impact. (Prasad Agrawal, 2023, pp. 1-11)

The key findings of this analysis are described below. As mentioned, absorptive capacity, relative advantage, and technological resource proficiency showed no clear indication and will not be further interpreted in this step. The negative association of complexity acts as a barrier to GenAI adoption due to the technology's immaturity, the absence of widely accepted standards, and the complexities involved in trying to adopt this new technology. There was no clear interpretation of the negative influence of regulatory support. However, it was noted that a certain environment with the right supportive regulations and policies must be created by policymakers to support GenAI adoption for companies. In this field, there may be changes soon with the enforcement of the EU AI Act (Schuett, 2023, pp. 1-4). Compatibility has a positive impact. For example, if companies have previous experiences aligning information systems with GenAI applications, and these turn out to be compatible with their existing information infrastructure, it indicates that future GenAI adoptions are more likely to succeed. Competition intensity, as a driving force in the business environment, was found to positively impact firms by encouraging receptiveness to GenAI technologies. The adoption of GenAI becomes more pronounced when competitors use it strategically, leading to increased concerns about competitive differentiation among adopters, surpassing those of non-adopters. Environmental uncertainty plays a crucial role in promoting the adoption of GenAI. Companies operating in environments marked by higher levels of uncertainty in their relationships with trading partners are more inclined to perceive opportunities, possibly contributing to the adoption of GenAI. The size of organizations plays a significant role in the adoption of GenAI, with larger firms being more likely to embrace this technology. Companies that have initiated the use of GenAI show fewer concerns about expenses related to acquisition, replacement, and ongoing costs compared to organizations that have not adopted the technology. The obstacles to GenAI adoption include software and hardware costs, consultancy support costs, as well as challenges related to installation and integration. Larger organizations with greater resources are positively influenced towards adopting GenAI. (Prasad Agrawal, 2023, pp. 11-14)

2.6.2. Adopting GenAI in organizational settings

Another perspective on possible adaptation paths is provided by the Harvard Business Review in Technology and Analytics by Davenport and Alavi from 2023. The article titled "How to Train Generative AI Using Your Company's Data" offers an interesting initial insight into how GenAI can be integrated into companies by training a GenAI model with their own corporate data. Particularly interesting for companies is the potential leverage of GenAI capabilities in the field of knowledge management to express complex topics in articulate language (Davenport & Alavi, 2023, p. 2).

Davenport and Alavi explain, that in the pursuit of customizing LLMs for specific domains, three main approaches can be employed. Firstly, training a domain-specific LLM from scratch is a rare, cost and resource-intensive method, as it demands vast amounts of high-quality data, which most companies don't have, considerable computing power, and expert data science talent. Bloomberg's creation of BloombergGPT for finance exemplifies this approach, utilizing over 40 years of financial data. BloombergGPT is an LLM the size of 50 billion parameters designed to achieve best-in-class results specific to financial benchmarks (Wu et al., 2023, p. 4). Secondly, the fine-tuning approach involves modifying an existing LLM and adding domain-specific content to a pre-trained model. Google's Med-PaLM2, tailored for medical knowledge, achieved notable success, answering 85% of U.S. medical licensing exam questions (Singhal et al., 2023, pp. 1-2). Despite its advantages in requiring less data and computing time, fine-tuning can be expensive and demands data science expertise. Thirdly, prompt-tuning, a common method for non-cloud vendor companies, involves freezing the original model and then modifying an LLM through prompts containing domain-specific knowledge. Morgan Stanley, for instance, utilized prompt tuning to train OpenAI's GPT-4 for financial advising (Ayoub et al., 2023, p. 7; Morgan Stanley, 2023). This approach is computationally efficient and doesn't require extensive training data. However, it presents challenges in handling large and unstructured text data, often necessitating the use of vector embeddings (Li et al., 2023, p. 1350). These are three popular approaches to incorporate proprietary data into GenAI models. (Davenport & Alavi, 2023, pp. 3-6)

To draw a first conclusion from these various approaches available for companies, developing an own LLM is often financially unrealistic for most organizations due to the high cost involved. While this might be a viable option for the largest enterprises and governments, it still demands a substantial time commitment. If the decision is made not to pursue in-house development, organizations can choose more cost-effective approaches. These approaches enable the adaptation and integration of an off-the-shelf model or LLM service using proprietary enterprise data. Several techniques can be employed to link data to an LLM, including few-shot
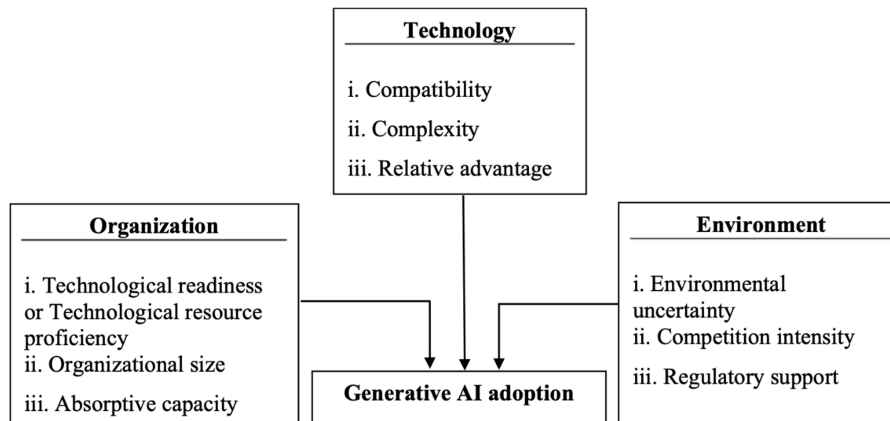
Figure 7: Proposed research model (Prasad Agrawal, 2023, p. 4)

prompting, the previously mentioned prompt-tuning and fine-tuning, and the Retrieval Augmented Generation (RAG) method. (Sweenor & Ramanathan, 2023, pp. 3-31)

The literature presented so far provides an initial theoretical insight into how companies can leverage, utilize, and partially integrate GenAI. However, there is a gap in comprehensive publications specifically addressing the success factors in the integration of GenAI into businesses. The current research in the field of AI, GenAI, and LLMs primarily focuses on functionality and, to some extent, on application possibilities but lacks describing detailed strategies on how companies can effectively integrate them into their business processes.

3. Methodology

3.1. Introduction

GenAI technologies only had their big breakthrough very recently, such as ChatGPT's public release in November 2022 (Gordijn & Have, 2023, p. 1), and since then a wave of research has been triggered. There have been many publications in the past on AI in general (Maslej et al., 2023, p. 24), but since the release of ChatGPT, the number of papers specific to GenAI has been increasing rapidly (Liu et al., 2023, p. 2). While conducting this research, it quickly became apparent that there are predominantly publications on the functioning of LLMs and general concerns of GenAI and, to some extent, application areas of GenAI. However, there are only very few publications that address the critical factors for a successful adaptation of these technologies for businesses, as described previously. In order to approach this meagerly researched topic, the following qualitative research approach is particularly suitable for detaching oneself from existing theories, misconceptions, and assumptions and inductively developing new theories (Schwaiger & Meyer, 2009, p. 413). For this reason, expert interviews were conducted in addition to the literature review to gain real-world insights from business perspectives. These are intended to identify additional important factors that the respective interviewee has experienced in their corporate environment, factors that have ei-

ther hindered or supported the integration of GenAI models inside companies. As a result, the following section of this paper introduces the methodology and qualitative approach for this empirical research.

3.2. Data collection and methodology

Due to the limited literature on the introduction of GenAI into companies and the subsequent conduction of expert interviews, an inductive research approach is being pursued (Eisenhardt, 1989, pp. 532, 537; Gioia et al., 2013, pp. 17, 21). The goal is to create a new theory and framework based on these new insights, which companies can use as a guide for the successful implementation of GenAI models in their own businesses. The data source for the qualitative analysis consists of four semi-structured, in-depth expert interviews and the resulting transcriptions. The data analysis was conducted using the Gioia method on three levels (Gioia et al., 2013, p. 21).

3.2.1. Semi-structured interviews

Semi-structured interviews offer the advantage of providing the interviewee the necessary freedom in conversation, responses, and individual verbal expressions while still ensuring a guide during the interview that both the interviewer and interviewee can follow. Additionally, the interviewer has the flexibility to ask follow-up questions and delve deeper in case of any uncertainties. This ensures the necessary flexibility during the interviews. (Adams, 2015, pp. 493-494)

This is especially important in this case, as the research question being investigated is a very new and untouched area, making guidance during the interview essential. For this reason, the semi-structured interviews are closer to conventional structured interviews. Pre-formulated questions were prepared to obtain the most detailed answers, given the novelty of the topic of GenAI integration and the lack of established common practices in companies. Consequently, terms and phrases that would typically be known for describing observations within the company in this context are generally less prevalent, requiring more precise support in the questions and more guidance.

3.2.2. Expert interviews

The individuals interviewed in these conversations are experts in the sense described by Gläser and Laudel in 2010: An expert, in this context, refers to the specific role of the interviewee as a source of specialized knowledge about the social phenomena under investigation. Expert interviews serve as a method to tap into this knowledge (Gläser & Laudel, 2010, p. 12). In the context of this research, experts refer to individuals who have direct experience with the integration or hindrance of GenAI models in companies. This particularly involves individuals in managerial and implementation roles related to internal IT processes or those who may already oversee GenAI applications within the company. The 'insider' knowledge gained from these experts, derived from real-world scenarios, is of extremely high significance to gain additional insights beyond the literature review. For this reason, identifying a smaller, more selectively chosen group of experts was of higher significance rather than settling for potentially more but semi-experts who might not contribute relevant and valuable new insights to this very recent GenAI integration topic during the interviews.

3.2.3. Interview guide

In the methodology section of this study, there are recurrent references to an 'Interview Guide' (Appendix C). However, it is important to note that there were two different 'versions' of the Interview Guide: the initial version sent to potential interview candidates and the second version. These two versions were used interchangeably, which makes a precise differentiation in wording secondary in this context. The first version, titled 'Information & Interview Guidelines', included a cover letter, an explanation of the research background, an overview of the essential interview process details, the consent form, and a summary of the thematic questions. The second version, employed during the interviews, differed only in including fully formulated questions. These questions are additionally provided in Appendix D. They were designed to be used in a dynamic style, allowing for spontaneous adjustments and weighting of questions during the interview. The questions were structured into an introduction section, the main questions comprising three parts, and the outroduction part. The questionnaire is extensive, with questions precisely formulated and categorized into three main themes: 'Strategic', 'Organizational', and 'Technical' factors influencing the integration of GenAI in companies. With 37 questions, which would exceed an appropriate length of an expert interview, the Interview Guide is designed to enable both prior and live dynamic adjustments of order and weighting of questions during the interview, based on the interviewee's personal expertise in these three areas. This information was partially ascertained during the preliminary acquaintance phase or revealed during the interview itself. In other words, if the interviewee's expertise focuses on technical factors, the questioning was weighted towards that aspect, allowing the interview partner to provide as detailed knowledge as possible. The remaining questions related to other aspects are then addressed secondarily. This approach aims to achieve the highest resolution and relevance in the shared knowledge and responses.

3.2.4. Sampling method and target population

After extensive preparation and the completion of the detailed Interview Guide, as described in the previous chapter, several potential interview candidates were identified. The interviews were offered to be conducted in English and alternatively in German to reduce potential language barriers that might discourage candidates from participating. The researcher's personal professional network, a leading IT consulting firm, was used as the starting point for case selection. Additional industries from which the interviewees were drawn include software and the insurance sector. As a result of brief preliminary discussions about the interview questions and personal experience in the relevant field, the selection was narrowed down. Following the iterative approach of conducting interviews, as described later, four interview partners resulted. With their specific expertise and personal experiences from their work environment on the subject of GenAI, including its use cases and introduction into companies along with the associated challenges, they were excellently suited as interview candidates. They held positions in their respective companies that involved significant knowledge and responsibility, as seen in Table 2. Among them was a manager from one of the three leading global business consulting firms, bringing experiences from client projects where GenAI use cases were identified and implemented, as well as insights from internal applications within the company. Additionally, there were two individuals from a major software provider. One is serving as the Head of Brand Creative and Communication with experience in GenAI marketing applications, and another follow-up interview with the company's Chief Technology Officer, who oversees the entire technology aspects of the company. The last interviewed person is from a large insurance company, which, in contrast to the other companies, does not yet have a fully integrated GenAI solution internally but is currently in the process of implementing one. Therefore, contributing valuable experiences concerning difficulties during GenAI integration efforts.

Comprising this knowledge and individual background, these individuals served as appropriate experts, as mentioned in chapter 3.2.2 according to Gläser and Laudel (2010), to support answering the central research question.

3.2.5. Data collection and approach

The interviews were conducted over a period of three weeks. The average interview length was 43 minutes with a range of 37 to 56 minutes, to ensure comparability and a similar level of granularity in the interviews. Theoretical saturation (Glaser & Strauss, 1967) was reached after the fourth interview. All expert interviews were conducted in remote online meetings, recorded via Zoom, and transcribed with the "f4x Audiotranskription" software to prevent context and information loss (Gläser & Laudel, 2010, pp. 152-158). A declaration of consent for data recording and processing was obtained through a consent form, which is the last section

Table 2: Overview of the interviewed experts

Industry	Description	Title	Status of GenAI Use in Company	Impact
Business consulting	Digital & data transformation	Manager	Several working company solutions and client implementation projects	High
Software development	CPM platform for finance	Chief Technology Officer	Working company solutions	High
Software development	CPM platform for finance	Head of Brand Creative and Communication	Working company solutions	Medium
Insurance	Diverse insurance products	Manager Information Security	Solution currently in development	Medium

of the Interview Guide. The transcripts were then manually reviewed, cross-checked with the recordings, and carefully corrected in the sense of falsely transcribed text by the software and other minor errors. Two interviews were held in German. To uphold traceability as well as originality, the original transcripts are in Appendix B. For the analysis part of this research, the translations were done as precisely and contextually correct as possible. To prevent information loss or data distortion caused by the translation, the translated transcripts, as well as the original transcripts, were sent to the interviewees for review and approval after completion and prior analysis.

Regarding the inclusion and exclusion criteria of the collected data, none of the interviews yielded unusable or irrelevant information. No technical disruptions occurred, and there were no data losses during the conduct or transcription processes. Due to the deliberate pre-selection of interview candidates, none of them subsequently proved to be unsuitable. Consequently, all conducted interviews could be included, and there was no need for exclusions.

3.3. Methods of analysis

Details regarding the approach to the qualitative data collection process and analysis have already been discussed. Following, a brief theoretical background will follow, describing the chosen method of analysis by Gioia et al. 2013, before moving on to the description of the coding and synthesis of the collected data.

Gioia's method for analyzing qualitative interview results consists of five stages in which the interview data is coded along a certain analysis structure. In the first step, named 1st-order analysis, a large number of terms and phrases are directly gathered from the interview transcripts, often resulting in many categories and expressions in the code. In the second step, similarities and differences among the numerous categories are to be identified. This is referred to as the 2nd-order analysis. The goal is to reduce the number of 1st-order concepts to a more manageable number, somewhere typically around 25 or 30. During this phase, it is possible that the researcher identifies new connections in the data, resulting in possibly reiterating the questionnaire and adjusting it for further interviews. In the third step, the theoretical realm is

reached. Here, the researcher aims to describe the observed phenomena with the identified themes and concepts. Special attention is given to concepts that are not well presented in the current literature. The theoretical saturation (Glaser & Strauss, 1967) is reached when the 1st-order and 2nd-order concepts and themes are sufficient for a comprehensive analysis and no further decisive new findings emerge. These are then further abstracted to the so-called aggregated dimensions. The fourth step involves building a static data structure that shows how the 1st and 2nd-order concepts and themes result in the main aggregate dimensions. This data structure is a key component for the theory that is to be developed. The final step in Gioia's approach consists of connecting all the above-mentioned concepts and data to derive a holistic theory from it. To support this, the data and its interconnections are to be visualized in a dynamic visualization. (Gioia et al., 2013, pp. 20-23)

3.4. Scientific quality criteria

The scientific quality criteria of transparency, scope, and intersubjectivity that apply to qualitative research were maintained in the context of this work. The description and disclosure of the procedure within this methodology chapter transparently and comprehensibly revealed how the data collection and analysis took place. By formulating and posing open-ended questions for discussion, maintaining intersubjectivity was ensured. A consistent set of questions and the Interview Guide were used, contributing to the reproducibility of results and, therefore, ensuring a sufficient scope. By elucidating the appropriateness of the chosen research approach and disclosing the empirical work and the developed theory, a sufficient level of comprehensibility is ensured (Schwaiger & Meyer, 2009, p. 408).

3.5. Data synthesis and coding

As previously described, the interview data were processed and coded using the Gioia method. From the transcripts in Appendix B, a total of 187 1st-order concepts were identified. In contrast to the classical formation of 1st-order concepts, according to Gioia, particular attention was paid here to incorporate statements very close to the original of the interviewees into the 1st-order concepts. This adjustment

was made due to the novelty of the topic and the lack of comprehensive abstraction capabilities of interconnecting categories at the time of the interview analysis. Therefore, the approach was slightly modified in the first step to minimize data loss through early abstraction endeavors. These 1st-order concepts resulted in 23 2nd-order themes. Six overarching aggregate dimensions could be derived from those 2nd-order themes: Strategic Grounds, Awareness and Central Enablement, Feasible Framework and Tangible Use Cases, Technical Considerations, Risk Identification and Management, and Regulatory Measures. A static data structure of the 1st-order concepts, 2nd-order themes, and the six overarching aggregate dimensions is provided in Appendix A. These form the basis for the theory that is to be developed. The following will elaborate on these dimensions based on their respective coding structure and 2nd-order themes. (Gioia et al., 2013, pp. 19-21)

Strategic Grounds

Strategic Grounds define the necessary prerequisites for the strategic alignment of GenAI with the respective company that intends to incorporate GenAI models into its structures and business model. Additionally, competitive advantages are crucial in this context; they need to be identified to establish the feasibility of implementing GenAI. Adaptability to tech describes the capability and readiness of the respective company to adopt, based on its structure and employees.

Awareness and Central Enablement

Awareness and Central Enablement address the resistance and acceptance stance by employees towards the GenAI models within the company. It primarily revolves around forming a comprehensive understanding of the company's workforce to achieve a high adoption rate for the introduced GenAI models. This is driven by GenAI awareness within the company. GenAI-specific in-house expertise and awareness need to be nurtured through specialized trainings. The right executive support and leadership are crucial to ensuring a successful implementation. Detailed collaboration and communication within the organization are necessary, for example, to exchange success stories related to GenAI use cases.

Feasible Framework and Tangible Use Cases

A Feasible Framework and Tangible Use Cases are crucial to achieving a sustainable and for the employee's comprehensible introduction of GenAI technologies. Possible pre-identification of clear use case definitions can help recognize the potential value gained and find the right approach. Through tangible use cases and best practices, it is also possible to create a very conceivable and practical image for the employees, who are ultimately the end-users, of how they can use the introduced technology in their day-to-day business. Additionally, various rollout approaches are available, which must be carefully chosen depending on the use cases and company specifics to ensure a proper and successful implementation.

Technical Considerations

There are various Technical Considerations that arise when planning to introduce GenAI in any form into a company. Different GenAI solution types and technical challenges must be taken into account. A thoughtful and considered decision must be made, considering various model selection criteria. Model explainability and interpretability are of essential importance in this regard to ensure a certain level of comprehensibility in its usage.

Risk Identification and Management

Risk Identification and Management initially involves the identification of typical risks and mitigation measures. A comprehensive risk assessment must be conducted to establish the foundations for effective risk management later. To successfully address the perceived risks, various concrete actions against data risks need to be undertaken.

Regulatory Measures

A multitude of new Regulatory Measures must be introduced. Initial regulatory guidelines need to be redefined or expanded to incorporate GenAI-specific requirements. If no specific governance of users is in place, at the minimum, thought must be given to potential use restrictions. Furthermore, continuous monitoring and optimization of the introduced GenAI model must be ensured, and ongoing monitoring and evaluations need to be conducted to respond adequately to emerging successes and issues.

The dynamic relationship and interplay of the 2nd-order themes and the six aggregate dimensions are depicted in the Figure 8. At the center is "Awareness and Central Enablement", ensuring the facilitation of the surrounding implementation efforts. The core messages of the interviewees' statements are illustrated around this center. Serving as the foundation and prerequisite are the "Strategic Grounds" around the model, addressing crucial preceding points.

Subsequently, a comprehensive theory will be derived from this coding evaluation. This dynamic model serves as the foundation, which will be modified and adapted after the subsequent final analysis.

4. Results and Discussion

4.1. Interview results and analysis

The following will present and evaluate the interview results along the six overarching aggregated dimensions.

4.1.1. Strategic Grounds

Respective companies need to clearly understand why they want to incorporate a specific GenAI model into their business processes. In principle, identifying business cases and determining business value is crucial, asking, for example, what competitive advantage they can gain. Productivity gains are the most typical benefits that come to mind, additionally, one can leverage the current market momentum, position themselves as pioneers in the field, and potentially even market the gained expertise.
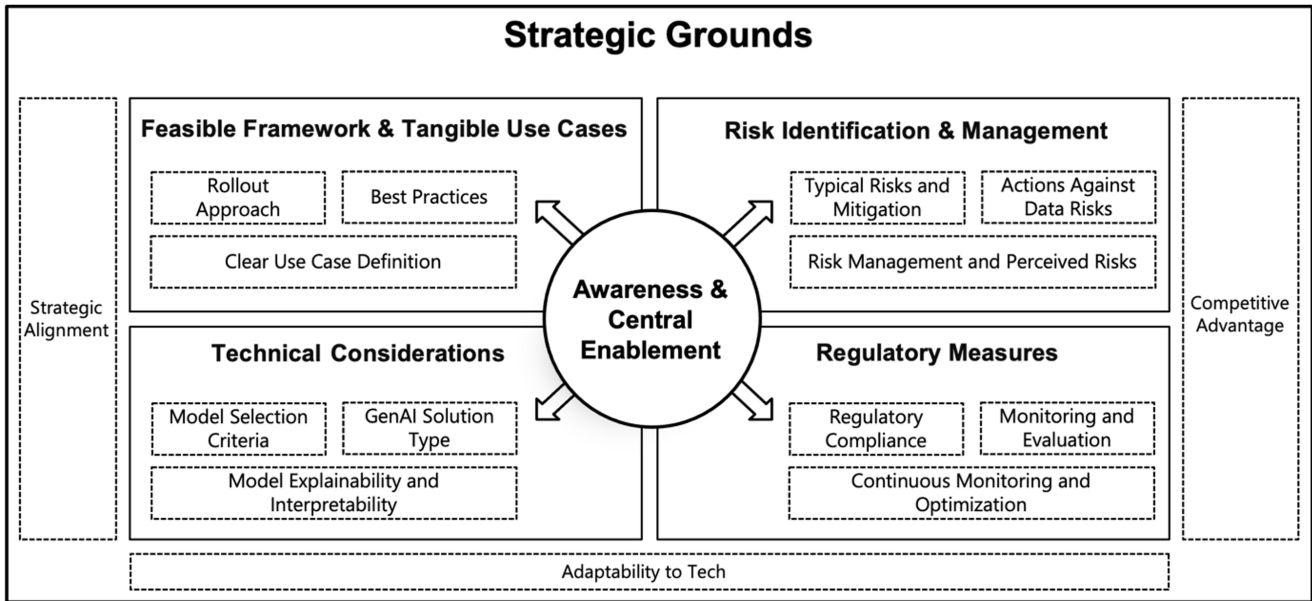
Figure 8: Developed dynamic model of the structural relationships

"You can currently take advantage of a very good momentum because there's a lot happening in the market."

"[We] leverage generative AI to really give us productivity gains [. . .]"

"So for the GitHub copilot [. . .] allegedly [it] gives a productivity boost to developers of 30 to 40%. Given its cost, which is like $20 per user per month. If that's true, then it's a no brainer from a commercial point of view, right."

"[. . .] We will likely reach a point where we all use it relatively similarly. So, it's not an endless competitive advantage. But where it currently benefits us a lot is in offering consulting services related to GenAI because it not only affects us but also our customers. And if we are pioneers in that regard, it gives us a competitive advantage to offer consulting services."

"I would say if you snooze, you lose, right? [. . .] People hesitate to move with technology. [. . .] So the early adopters will have the edge, but they have also the challenges because they have to do all the learning curve. [. . .] But if you don't do it, you're definitely going to fall behind because the speed with AI is incredible, right? [. . .]"

Furthermore, it is essential to ensure a strong strategic fit between GenAI and the company's strategy and culture. This is what is referred to as Strategic Alignment in this context. This significantly enhances the likelihood of successful adoption. However, an imperfect fit should by no means be considered as an exclusion criterion. A clear advantage here is the immense boost in growth.

"[. . .] We are a company that's growing 50% a year and [GenAI] is helping us do it even faster. You have to know that we're also a private equity invested company with the intention to exit. So we're on this fast value creation program to improve the value of the company. So AI plays a key role there."

"[. . .] It fits like a glove because our goal is, of course, growth. And as a consulting company, we are also a people business, and scaling essentially only happens through people. We could hire a lot more people, but that also comes with risks. And generative AI makes individual employees even more productive."

In addition to the strategic fit, adaptability to technology is also a crucial consideration. Different companies have diverse backgrounds within the workforce, such as generational-related factors and varying technical expertise. These need to be considered during the implementation process to achieve the highest possible adoption rate of the introduced GenAI tools. The type, size, and structure of the company also play a role in this context.

"If you think about who our employees are, 50 plus or even older. They can use Google, but getting correct answers from ChatGPT is something else."

"Are they ordinary clerks who have only been on the phone their whole lives and maybe occasionally use Google privately? Or are they people our age who have grown up with these issues, for whom using AI is natural?"

"[. . .] Being that we are small or mid sized company, we are very agile and very quick. So we have

quick, very quick, very flat hierarchy, very quick decision making processes."

"[. . .] As a consulting company, we are much more adaptable, and we will use such technology much more strongly and quickly. [. . .] [We] are used to constant changes in conditions, dealing with new customers, and new employees coming in."

Thus, Strategic Grounds emerge as one of the most crucial foundation elements and prerequisites in the consideration and implementation of GenAI integration initiatives.

4.1.2. Awareness and Central Enablement

To advance the topic of GenAI within the company, a certain foundation must be established. Employees need to be introduced to the topic of GenAI, considering various levels of knowledge and backgrounds. Option rooms and use cases for incorporating GenAI into existing processes must be explored and illustrated, and touchpoints need to be created, especially with employees who may not be tech-savvy. Questions such as "What can we do with this new tool?" or "Why do we need it?" and "How can I effectively use this in my day-to-day activities?" must be addressed. This is crucial to ensure that a later-introduced tool achieves a high adoption rate and does not go unnoticed. All these aspects fall under the theme of "Awareness and Central Enablement." For this, it is important to have dedicated GenAI teams. An illustrative example from the interviews that demonstrates how this can be transferred into practice is the introduction of so-called "GenAI Blackbelts," who act as GenAI experts in the company. They serve as points of contact and GenAI ambassadors.

> *"[. . .] I am also a so-called GenAI Blackbelt. This is our internal multiplier concept. We have set up a GenAI Lab centrally, which has set itself the mission of introducing GenAI in the Germany, Austria, Switzerland, or Central Europe region."*
>
> *"Internally, the Blackbelt program is now being rolled out, where, as a Blackbelt, I am required to drive and promote the topic in my office. I will also receive material to set up learning sessions [. . .]"*
>
> *"And you have the designated AI teams."*

Next, one must proactively address the topic of resistance and acceptance by employees. A certain proportion of employees may not immediately resonate with the tool. They might not immediately recognize its benefits and may not know how to integrate it into their day-to-day tasks. Or, they may simply not invest the time for it. A certain 'activation energy' is required to overcome this initial hurdle, which, as later described, can be facilitated through practical explanations, tangible use cases, and trainings, enabling them to become familiar with the tool and build up a certain level of excitement. This proactive approach serves as a preventive measure against potential rejections towards the GenAI tool.

> *"But there's also another angle which is around adoption, because if you just give it to people, probably 30% will really use it and really get into it, but 60% or whatever, 70% will probably not even bother to use it. And so, you want to get the engagement up, you want to get people using it, build a certain level of excitement and get that adoption up so you really get the value from it."*
>
> *"So it's just some people are too busy with their day to day to give it a shot."*
>
> *"I couldn't prompt properly, or I didn't know how specific I could be. The results were somewhat mediocre, and I thought, well, in that time, I could have just done it quickly myself instead."*
>
> *"I think it's more a little bit of fear and a little bit of "well I don't know how to start. I don't know how to do this.""*

To address the lack of in-house expertise and awareness, various methods and communication channels can be employed. Dedicated Microsoft Teams or Slack channels and internal newsletters can be utilized to raise awareness and 'promote' the topic internally. This is where simple and easily understandable use cases should be demonstrated to engage people and spark interest. Specific training sessions and company-wide meetings can complement this, with a focus on comprehensibility and applicability. Moreover, there should be an in-depth exploration of prompt engineering in these sessions. Only through this approach can a highly effective environment be created, enabling users to derive significant value from the introduced GenAI tool. At the same time, attention should also be given to the described risks, such as distortions, hallucinations, biases, and how to handle them. More details on this will be elaborated later in the context of regulatory compliance.

> *"We have a few Slack channels, and they sort of formed by themself, and there are some GenAI distribution lists that someone set up, where a lot of knowledge is shared. Sometimes very specific things, sometimes very basic things."*
>
> *"[. . .] Subscribe to certain newsletter distribution lists, and always screen what comes out of there."*
>
> *"[. . .] [We had] company wide meetings where our CTO introduced it, showed how to use it, showed some of the benefits."*
>
> *"[. . .] [We had] trainings in the company where people have been educated showing how it works and also on prompt engineering [. . .]"*
>
> *"Especially with a strong focus on prompt engineering [. . .]"*
>
> *"Be aware that the data, the responses, may not always be correct, that it may be simply made up."*

Further examples of the necessary clear communication and enablement to ensure GenAI awareness throughout the company include the following:

> "*Enablement is crucial. Clearly communicate to employees what they can do with it, what they can do well with it, and what they should avoid.*"

> "*[. . .] Showing people scenarios like that really helps because it just kind of fires up their imagination [. . .]*"

> "*[. . .] There's an element of showing people [what's possible]. And then encouraging them to use it as well.*"

> "*Creating awareness and also showing examples, such as in one training where the random invention of information is shown.*"

> "*[. . .] Enablement is crucial and to clearly tell the employees what the risks are and how they need to deal with them.*"

Furthermore, it has proven to be highly beneficial to share success stories related to introduced GenAI tools between business units and working groups within a company. This is precisely where individuals with a more conservative attitude towards the topic can observe and identify with it, making it more conceivable for them.

> "*It's definitely really, really crucial because if one department [. . .] has success, then they need to share it with the other departments, right.*"

Lastly, to effectively ensure central enablement, strong executive support and leadership are essential. They need to commit to the GenAI topic, not only ensuring the necessary resources for the actual model itself but also for training, dedicated teams, and all supporting functions mentioned. This is crucial to achieve a sustainable introduction and the highest possible adoption rate.

> "*I mean, the executive leadership our C-level is definitely the driving force of AI.*"

> "*[. . .] Number one, leadership commitment. Clearly, someone from the top must drive this initiative. This person also needs to believe that it has an impact and should provide the necessary resources to drive it within the company.*"

> "*[. . .] It is crucial that you have a leader and also a sufficiently high-ranking leader who drives it. In our case, even towards a global initiative, a lot was driven from Germany. So, our ***** Central Europe CEO personally took on the topic and founded the GenAI LAB, and he drove it through his peers and network [. . .]. [Our Managing Director and Senior Partner] specifically ensured that consultants were staffed on this internal topic to make it correspondingly large. So, super important.*"

4.1.3. Feasible Framework and Tangible Use Cases

A feasible framework for the introduction and implementation of GenAI in a company is crucial for achieving effective and smooth integration of the technology. A central component of this framework is the rollout of the model. There are various rollout approaches that can be considered, and some companies may already have experience with the rollout of other introduced tools. Depending on the specific technology, company structure and size, and employee competence and expertise, the chosen rollout approach should be adjusted.

A notable example from the interviews was the observation of one interviewee who implemented a GenAI tool for a client. The client, an automotive company, exhibited significant differences in competence, receptiveness, and speed to adaption between technology-savvy departments and other 'normal' departments. The approach was quickly adapted to ensure earlier access to the introduced GenAI tools for these departments. This difference in technology affinity between departments can be leveraged. Due to their unique expertise, these departments can identify useful use cases more quickly and experience possible problem areas early on, and these can then be disseminated later through the chosen rollout approach and communication channels throughout the company.

> "*[. . .] [Regarding] decentralized implementation, we actually observed this at the automotive manufacturer. Technology-savvy departments tend to take matters into their own hands; they don't wait for IT to come around and say, "Look, we've developed something for you, and you can use it now." Therefore, from an IT perspective, it's crucial to provide tools quickly, such as a sandbox, so that data analysts, who are already abundant in vehicle development, logistics, and sales, can experiment and implement their own use cases.*"

However, it is crucial to note that there is not one universally correct rollout approach. As described, it needs to be adaptively fitted to the situation. An example of this is provided by the following two statements, both from the same person and referring to two different tools that were rolled out within the same company.

> "*Specifically, with ChatGPT, we conducted a pilot over the past year and evaluated its success. The decision was made to roll it out, and it's happening in what I would call a rapid Big Bang, over a very short period. I believe it was rolled out within two to three weeks.*"

> "*In other examples, if I take the Deckster tool, [. . .] it also went through a pilot, and we have dedicated Slack channels for each pilot with product owners. So, we do have iterative development as well.*"

The first tool, ChatGPT Enterprise, was rolled out in a few weeks in a type of Big Bang, all at once. This allowed every-

one across the company to access it directly and simultaneously. In contrast, the Deckster tool, which is a PowerPoint integration involving slide creation and providing content from knowledge management in the company style without the need for manual searching, was developed and rolled out in an iterative style involving various product owners.

One of the interviewees, the CTO of a software company, chose a very scientific approach regarding the rollout of the GitHub Copilot. Divided into two groups, comparable to a typical 'control group' and an 'experimental group', he could clearly benchmark the performance gained through the introduced GenAI tool using various metrics.

> *"So for the GitHub Copilot rollout, [. . .] what I didn't want to do was just: "Hear you go, developers take it, run with it, see if you like it". I wanted to take a more scientific approach. And so, what we've done is we've done effectively A / B testing, whereby we rolled it out to a group of engineers and we have engineering metrics, tooling that allows us to understand, the current performance of those engineers. So, we benchmark that performance, benchmark that against other teams. We've rolled it out and now we've been monitoring it for the last four months just to see the impact of that tool."*

In addition to the quantitative measures described, he also incorporated a complementary qualitative approach by conducting surveys.

> *"And then we also take a qualitative approach too, we survey them about every six weeks or so just to kind of ask questions along the lines of the impact of that tool, so on and so forth. So that's generally the approach and that's been really successful."*

That was an example of a rather scientific approach and a very detailed procedure, but it does not necessarily have to unfold exactly like that. In principle, the various rollout approaches, however, share some commonalities, which can be summarized as follows:

> *"Do a hackathon. Do a prototype. Figure out what is possible. Start to narrow down some of the scenarios where we think we can get impact and add value for the products. Then take those prototypes to the next level and then roll them out."*

The importance of use cases should be indisputable by now. Centrally providing tangible use cases is crucial to comprehensibly demonstrate to employees how and for what purposes they can use the introduced GenAI tool. A clear framework and guidelines must be provided to create a productive environment for the use of GenAI.

> *"[. . .] There are very clearly defined frameworks in which generative AI is incredibly helpful."*

> *"[. . .] The big impetus for generative AI was use case identification [. . .]."*

The approach to successfully identify these use cases can vary. A best practice from an interviewee's experience shows that gradually accumulating and filtering use cases proved to be sensible in order to ultimately identify the crucial so-called 'High Value Top Use Cases'.

> *"[. . .] We built a large use case funnel, basically built an idea list and then gradually filtered it to get to the so-called "High Value Top Use Cases.""*

4.1.4. Technical Considerations

Among the technical considerations, one of the most crucial decisions that needs to be made before the rollout is apparent is: 'Which model, in what form, from which provider do I choose to incorporate in my company?' For this, comprehensive knowledge about the corresponding model selection criteria is needed. An interviewee from a company highly advanced in the GenAI field, referring to their company as "the largest OpenAI customer there is", described the process of selecting the right approach as follows: "It's like navigating a multi-level decision tree, I would say." She divided the process into an initial make-or-buy decision under certain criteria, with various consequences, such as the potential training of LLMs or the use of pre-trained models and fine-tuning.

> *"Yes, I think at the core, the first decision you have to make is a make-or-buy decision. That essentially depends on whether there is an existing solution in the market that adequately covers your use case. It could be a ChatGPT Enterprise license if you have many small use cases where you just want a helper alongside. If such a solution doesn't exist, or if commercial off-the-shelf solutions don't meet these requirements, or if you have very specific data security requirements, then building one yourself may make sense. Then you move to the next level, where you also ask yourself: Do I train my own model, or do I use a pretrained model? And if pre-trained, do I want to fine-tune it, or do I use the pre-trained model as is and incorporate my proprietary data, for example, through a Retrieval Augmented Generation (RAG) approach?*

Especially the last point mentioned here, RAG, represents a very practical solution for companies, giving GenAI models the ability to access external data, particularly in complex and knowledge-intensive tasks. This way, effects like hallucination can be significantly reduced, leading to more factual consistency and reliability in the responses (Gao et al., 2023, pp. 1, 17).

To be as close to current practice and application reality as possible, practical and realistic methods for the introduction of GenAI in companies are to be developed. Therefore, the following observation from the same person mentioned previously, who has conducted various GenAI implementation projects in her company as part of client services, provides a good overview of the current common and functional practices.

"For most use cases I've seen in companies, they actually rely on a pre-trained large language model. Not even on some small open-source models, but most of them use either the GPT APIs from OpenAI through a ChatGPT Enterprise account or the Azure Open AI Service. But ultimately, it's the same GPT model behind it."

If a company has very specific requirements and decides to develop its own solution, it is extremely important to develop a well-thought-out architecture, adjust 'freedom' parameters, try different 'temperature' settings as well as to test different token length sizes. Additionally, they have to carefully consider whether a very demanding and resource-intensive fine-tuning process should be rolled out or if the in comparison, less complex and proven RAG approach is sufficient (Gao et al., 2023, p. 17).

"For building your own solution, a well-thought-out architecture is essential, defining how much freedom you want to give to a large language model in your solution. That's the consideration. If the model is supposed to do something company-specific, do you really want to fine-tune it, or do you use the mentioned RAG approach."

The next aspect that needs to be considered is model explainability and interpretability. It primarily revolves around the user's expectation of transparency when using GenAI models. An exemplary experience from the interviewed consulting firm illustrates this:

*"I recently used ChatGPT to brainstorm GenAI use cases for a company [...] The first thing ChatGPT did was go to the [competitor's] website, from another consulting firm. I even provided in the prompt: "I am a ***** consultant." So, that shows that there is no logical reasoning behind it. They are very opportunistic, whatever they find quickly that might fit will be used."*

To meet these requirements of model explainability and interpretability measures such as providing sources by the model, as done in the 4.0 version of GPT, need to be taken. Moreover, users save time when they can extract useful information from the response without having to search for the source.

"[...] Providing sources is [...] an important point. ChatGPT does that quite well through the 4.0 version and the browser integration."

"[...] Explainability is super important for us when we use output or information on customer projects."

"I think it's super important because if an employee is unsure, they can look it up directly instead of searching for hours."

The specific solution types that the companies of the interviewed individuals have in their practice include the previously mentioned ChatGPT Enterprise offering as well as the so-called OpenAI Playground. The crucial point with these solutions is that the input into the models is not used for further training of the models by the providers. This allows for the use of company-sensitive data for prompts and incorporation into the model.

"[...] OpenAI Playground, basically your data isn't used to train the model. It's just in your own domain."

If you want to be on the safe side, there is the option of using a pre-trained model and feeding in your specific ground data to generate responses based on this limited dataset. Another client example illustrates this for a company in the legal context:

"If you take a pre-trained LLM or a regular LLM service and you input the relevant legal foundations, [...] [for example] a German Civil Code, into a vector database, basically embedding it as knowledge, and then you let the model work only with this provided knowledge and get the corresponding text passages. That works really well and is, I would say, always the safest solution when you have a manageable knowledge base that is relevant to you."

In terms of technical challenges, no major issues were experienced. The challenges experienced were more towards prompt engineering, which has already been addressed in the prompt training and GenAI awareness section.

"[...] It's actually pretty simple to integrate and use these models via API."

"The challenges are typically more on things like prompt engineering, data engineering, making sure your data is in the right format, it's clean, so on and so forth."

A certain flexibility in setup and cost can be ensured through special Platform as a Service (PaaS) offerings. In this approach, resources such as computing power, storage, and network costs, are outsourced and made available on-demand. This consumption-based model allows for a concise cost overview in one single fee and a simplified setup of the GenAI model.

"'Platform as a Service', which basically means you [...] pay for what you use. So, all of that, that power usage, the storage, the network costs, that's all rolled up into a single fee that you pay based on the amount that you use the service. So that's how we will leverage it in a production environment. And that's actually how we're currently leveraging it even with Playground as well. It's a consumption model."

4.1.5. Risk Identification and Management

As part of Risk Identification and Management, the perceived risks of the company, mainly concerning data leakage, are addressed. Possible other risks are very company-specific, depending on the type, structure, and IT landscape of the organization. Data leakage risks can occur, especially if adequate measures are not taken, such as not using a model that does not share the data with the GenAI model provider. Furthermore, there is the risk that users may use responses from GenAI models directly without verifying them, and in the worst case, unfiltered responses may be sent to customers, for example.

> *"Another risk, of course, is that employees simply adopt the answers one-to-one."*

Important for the GenAI introduction is directly communicating and confronting the employees with this topic. One initial way to manage these risks without directly resorting to regulatory measures is to be proactive. Employees must be made aware during internal training and workshops to treat certain data or tools with special care, aiming to prevent potential risks from arising in the first place. Following the principle:

> *"So, prevention is the best course of action [. . .]"*

It is important to clearly communicate to users, possibly based on use cases, how to categorize and handle different scenarios. An example of a concrete implementation in the form of a three-color stage traffic light system that could be later transferred into regulatory measures is:

> *"[The] AI policy [. . .] has basically green, amber and red use cases for how you can use generative AI. And basically those use cases [that are okay] to pass to Gen AI [green] and the types of data that you need explicit approval for, which is amber, and then the types of data that you explicitly cannot pass to any GenAI. Those are the red use cases."*

4.1.6. Regulatory Measures

As a central component of Regulatory Measures, the emerging regulatory compliance issues around the GenAI topic must be considered. The current most important aspect is the EU AI Act, which companies must adapt to accordingly. Use cases are classified into different risk classes; therefore, companies need to adjust their internal guidelines to comply with the new EU AI Act regulations. A practical example demonstrates how this can be implemented by adding another dimension to already existing risk processes:

> *"Foremost is the EU AI Act for all applications to be deployed in Europe. It regulates certain things but still allows enough room for companies to work. Ultimately, use cases are divided into risk classes, which is not much different from what companies*

> *already do with their applications in risk management. You're just adding another dimension. How is it solved? For the customer company, they have mainly considered additional risks posed by GenAI. These could be things like hallucinations or the fact that certain things in a model cannot be traced, as most models are built, yet the benefit outweighs the risks. In such cases, different control mechanisms are needed, and these criteria, risks, and corresponding mitigation measures are embedded in the existing risk process. No additional GenAI risk process is established."*

To further this, various usage restrictions can be implemented. Texts generated by the AI, for example, are marked as such and accompanied by a disclaimer. Apart from visibly marking the GenAI text, there can also be covert marking by employing the watermarking method, where algorithmically detectable statistical markers in the form of a short span of tokens are embedded into the text that are invisible to humans (Kirchenbauer et al., 2023, p. 1). This can be helpful if one wants to trace back GenAI content. Furthermore, the use of the introduced GenAI tools can be restricted until the respective employee has completed specific mandatory trainings and workshops. In addition, they must also agree to the newly established guidelines that describe issues such as factual incorrectness, hallucinations, distortions, and other biases. An example from one of the interview companies illustrates this through the establishment of so-called 'Responsible AI Guidelines':

> *"[. . .] To activate this license, must read our Responsible AI Guidelines."*

> *"[. . .] First unlock all the AI systems as soon as employees have completed mandatory training."*

> *"[. . .] We always clearly mark what is generated and what has been created by humans. This is to ensure clarity and includes providing a disclaimer."*

> *"[. . .] There are potential distortions, hallucinations, biases, every employee is called upon to check the output of the models and not to use it just like that."*

It is important to note that this proactive approach is much more sensible, as employees can resort to alternatives in the case of a potential complete ban. If websites like ChatGPT are blocked company-wide, employees could turn to so-called 'mirror sites' that replicate the content and functions of the original site. This could lead to even more dangerous data leaks. An interviewee working as an Information Security Manager described it as follows:

> *"[. . .] Then you could just have a mirror site that just mirrors ChatGPT and then it works anyway. Then it's not blocked. If employees want to use it, they can do it on their private computer in home office if necessary. There are always ways to bypass the issue."*

Another useful aspect regarding the governance of users is, for example, to gain insights by reading out the network logs of the respective website on how much a tool is being used. This allows measuring the adoption rate or getting a rough overview of how much and by whom it is used. Another aspect gained from that, as part of the initial consideration of introducing a GenAI tool, is that this could also be used to get an idea of the level of interest in GenAI. This helps to better assess how much ChatGPT, for example, is already covertly used before a rollout and whether an introduction is worthwhile.

> *"[. . .] Read the network logs and see how many calls, for example, ChatGPT has made. That was already a good indication for the automotive manufacturer that the technology is being utilized, even if they don't offer their own application."*

Lastly, to ensure continuous monitoring and optimization of the GenAI models and processes, incorporating feedback mechanisms is necessary. Besides already mentioned surveys, possibly setting up monitoring dashboards or simple things like evaluating thumbs up or down, or even the copy button as part of the chatbots, can provide valuable information to further track and develop the tool.

> *"With ChatGPT, for example, you can give a thumbs up or thumbs down, and they actually measure when you press the copy button too."*

> *"This may involve implementing a monitoring dashboard or some monitoring interface where a GenAI application owner can randomly check responses."*

This monitoring can be used to evaluate system-related KPIs (Key-Performance-Indicators) that concern topics such as latency or outages. Additionally, measuring gained benefits and converting these to classical KPIs should be considered to be able to track these for management.

The constant involvement of a human checking over the model output in the so-called 'human in the loop' process is important, especially in sensitive cases, to always ensure a high-quality standard.

> *"The point of "human in the loop" is definitely crucial, especially for critical use cases or cases where it's essential for the output quality to be high and for nothing untoward to happen."*

However, in the long-term, to achieve a significantly high level of scalability, one must gradually move away from this temporary solution of the 'human in the loop.' This is well described by an interviewee in the concluding quote:

> *"You start with a human in the loop as a gatekeeper and eventually reach a point where you trust the solution enough to only perform random checks.*

> *At some point, you could even use your GenAI models for verification. Haha, the AI checks the AI. But it actually works quite well. We need to evolve in that direction, in my opinion."*

4.2. Discussion

Subsequently, following this detailed analysis of the interview results, all insights are to be summarized and evaluated in conjunction with those from the literature research. These results are intended to be developed and synthesized within a framework that can be used by companies and other interested parties. Derived from the dynamic representation in Figure 8 from the interview results, the obtained results suggest the following proposal for a six-step step framework (Figure 9) that can be structured as follows:

At first, the Strategic Grounds (1) lay the foundation for the successful introduction of GenAI in companies. Secondly, a detailed Risk Identification and Assessment (2) procedure follows. Thirdly, based on that, first concrete Regulatory Measures (3) must be implemented. Consequently, as the fourth step, adequate Technical Considerations (4) must be made. Simultaneously, during these steps, comprehensive GenAI Awareness and Central Enablement (5) must be ensured to drive this process continually. The sixth step involves securing a Feasible Framework and Tangible Use Cases (6) for the rollout process.

The Strategic Grounds represent prerequisites and external influencing factors. Awareness and Central Enablement act as a central foundation, continuously driving the process through necessary facilitation. It is important to note that this constitutes a cyclical process, meaning it does not end at the last step but rather begins anew, continually moving, for example, to identify newly emerging risks, mitigate them, and continually optimize the model. Furthermore, it does not present a rigid sequence of steps; these can be handled iteratively depending on various external factors.

In the following, the final identified key success factors and development potentials for companies to adopt GenAI into their businesses will be detailed and summarized.

Number 1: Strategic Grounds

As part of the Strategic Grounds, companies are encouraged to first address the question of why they want to incorporate a specific GenAI model. It is essential to initially identify business cases and determine business value, such as generating human-like text, providing quick, informative, and more natural responses, and personalizing customer interactions or other potential cost savings factors, as described in Table 1 and Figure 6. Other side effects can also arise, such as potentially increasing the company's overall value and even marketing (commercializing) the gained expertise. A factor from the literature review that should be incorporated here is the observation regarding the competition intensity. This can act as a driving force in the business environment, increasing the receptiveness of these companies to adopt GenAI due to competitive pressure. Companies
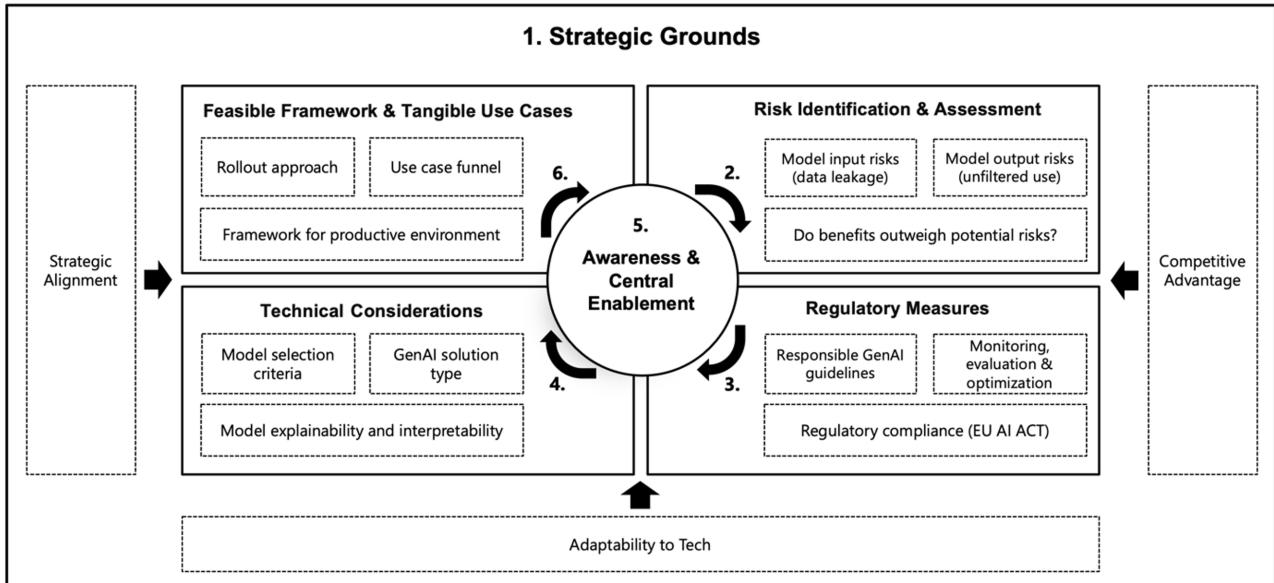
Figure 9: Proposed GenAI implementation framework for companies

in this situation should, therefore, consider GenAI integration more intensively (Prasad Agrawal, 2023, pp. 11-14). Leveraging the current market momentum is an option that should not be overlooked, positioning themselves as pioneers in the field of AI. It's important to consider that there is no endless competitive advantage in incorporating GenAI since competitors will follow; therefore, being on the forefront and having the edge as early adopters will be crucial. Furthermore, the strategic fit of the company's business model and principles to the GenAI technology must be considered, and adaptability to technology should be taken into account. The inclusion of diverse backgrounds within the workforce plays an important role, varying from company to company, in order to achieve the highest possible adoption rate later on.

Number 2: Risk Identification and Assessment

Extremely important is the identification of company-specific risks, primarily those related to data leakage. Mishandling or underestimating the importance of data security measures is one of the most significant risk factors. These risks, along with others, such as the one-to-one adaptation of GenAI output by users and its unfiltered reuse and distribution, must be identified beforehand. A comprehensive risk assessment must then be conducted to subsequently evaluate whether the benefits outweigh the perceived risks. Afterward, proactive measures, as explained in later steps through training and awareness, should be considered early on to ensure that these identified risks do not arise in the first place. In this case, prevention is always the best course of action.

Number 3: Regulatory Measures

Fundamentally, correct, and effective regulatory measures are decisive. This includes considering newly emerging

regulatory compliance issues around the GenAI topic, with a central focus being on the EU AI Act. Companies need to adjust their internal guidelines. It is not necessarily required to establish an entirely new GenAI risk process; rather, an additional dimension must be added. GenAI-specific effects, such as hallucinations or partial untraceability, need to be integrated into this dimension, and cases must be classified into different risk classes. Implementing various usage restrictions, for example, through the introduction of 'Responsible AI Guidelines,' is crucial. For instance, the categorization of use cases could be realized through a color-coded 'traffic light' system. Red indicating explicitly prohibited use cases, yellow for approval-dependent cases, and green for free-to-go use cases. Furthermore, in some cases, GenAI-generated text should be marked as such and accompanied by a disclaimer. Employees should only gain access after successfully completing specific mandatory training and workshops, which explain effects like factual incorrectness, hallucinations, distortions, and other biases. It's worth noting that in the case of the prohibition of GenAI websites, employees could easily bypass restrictions by using so-called 'mirror sites'. Therefore, clear and proactive communication and implementation prove more sensible than a prohibition policy or gray zone strategy. Additionally, limited governance of users can be advantageous. Reading out the network logs of GenAI site calls can enable measuring the adoption rate or determining to what extent the introduction of GenAI is worthwhile by assessing how much it was covertly used beforehand. Additionally, a comprehensive 'Continuous Monitoring and Optimization' system should be established. Incorporating feedback mechanisms through surveys and measuring actions such as thumbs up and down, as well as the copy button, is important and should be captured through a monitoring dashboard. This allows for the measurement of system-related KPIs, such as latency or outages,

and classical productivity KPIs for management. In the long term, to achieve a significantly high level of scalability, one must gradually move away from this temporary solution of the 'human in the loop' and consider methods such as "AI checking the AI."

Number 4: Technical Considerations

The first technical consideration is the correct model selection. Navigating a multi-level decision tree, the initial make-or-buy decision must be made depending on whether an off-the-shelf solution is sufficient or not. Observations from qualitative research have shown that for most companies, the GPT APIs from OpenAI through a ChatGPT Enterprise account or the Azure Open AI Service are satisfactory. This aligns with the approaches discussed in the literature section described by Davenport and Alavi in 2023, who particularly emphasize that self-developing company own GenAI models and fine-tuning is associated with significantly high costs. However, if companies have very specific requirements, potential training of their own LLMs or the use of pre-trained models and fine-tuning can be considered. Besides the input data, different parameters such as 'freedom', 'temperature', and token length size can then be fundamentally changed but require a well-thought-out architecture. These are associated with considerably more resource effort; however, methods like the RAG approach, which reduces hallucinations and increases factual consistency and reliability, can simplify this, especially for knowledge-intensive tasks. In contrast to the observation made in the literature (Chapter 2.6.1) that the complexity of the models and their associated immaturity is an obstacle, no significant problems were identified in the interviews. On the contrary, the wide range of offers and easy integration through the APIs make it 'relatively' easy. Next, attention must also be given to the model's explainability and interpretability. Providing sources, for example, through the 4.0 version of GPT, can contribute to creating transparency for the end user. Additionally, this saves time since they can trace back information from the response without having to search for the source. In the end, regardless of the chosen GenAI solution type, it is crucial that the input into the models is not used for further training of the public models; otherwise, data security is jeopardized. Alternatively, or additionally, one can use an 'offline' pre-trained model to which specific ground data has been fed in advance to generate responses based on this limited dataset. A particularly attractive consumption-based model for businesses is the PaaS, where computing power, storage, and network costs, are outsourced and made available on-demand. It provides a concise cost overview in one single fee and a simplified setup.

Number 5: Awareness and Central Enablement

The GenAI Awareness and Central Enablement shall act as a central driving force, consistently advancing the GenAI topic within the company and thus fueling this implementation process from the inside. Initially, attention must be paid to the different levels of knowledge backgrounds. Particu-larly, questions like 'how and for what purpose can I incorporate GenAI in my day-to-day activities' must be encountered through tangible use cases. By introducing dedicated GenAI teams and representatives, sufficient touchpoints must be created, continuously ensuring awareness of GenAI, to later achieve a high adoption rate. These internal GenAI ambassadors act as a multiplier concept, promoting the topic through, for example, learning sessions and driving it into the individual offices. A proactive approach considering potential resistance to adoption by employees must be taken. Some may not immediately resonate with the tool, and some may simply not take the necessary time during their workday to give it a shot. Building up a certain level of excitement, for example, by showcasing the capabilities through demos, can act as a catalyst to help overcome the initial 'activation energy' needed. To counteract the lack of in-house expertise, various countermeasures must be implemented. Through diverse communication channels and internal newsletters, the topic can be further promoted, drawing attention to specific training sessions and company-wide meetings that primarily focus on the comprehensibility and applicability of demonstrations and learnings. An in-depth exploration of 'Prompt Engineering', explaining effects such as distortions, hallucinations, and biases, and addressing potential ethical concerns arising should be a central part of this. Sharing GenAI success stories across business units and working groups can be highly advantageous, especially to reach and engage individuals with a rather reserved or conservative attitude towards GenAI. Strong executive support and leadership towards the introduction are the decisive factors to ensure, through this central enablement, that not only the necessary resources for the actual model itself are sufficient but also for the training and dedicated teams. Practice shows that if not enough employees are staffed on this topic, not much will come of it.

Number 6: Feasible Framework and Tangible Use Cases

As part of the Feasible Framework and Tangible Use Cases, the first step is selecting the appropriate rollout approach, which is based on various factors such as the chosen solution, company structure and size, and the employees' competencies and expertise. Possibly even a mixture of a rollout in waves and phases, pilot projects, iterative development, step-by-step, and big bang should be considered. The difference in technology affinity between departments does not necessarily have to comprise a disadvantage; it can be leveraged during the rollout approach to identify useful use cases more quickly and experience possible problem areas early on, for example, by favoring these tech-savvy departments and including them in pilot projects. A more effort-intensive but insightful approach is the scientific one, which splits into a 'Control Group' and an 'Experimental Group,' where GenAI users are benchmarked against conventional users. This allows for capturing detailed metrics. The clear definition of use cases is crucial. These must be vividly and comprehensibly communicated to the employees. A clear framework and guidelines must be provided to create

a productive environment. Accumulating and filtering use cases along a use case funnel is essential to identify the 'High Value Top Use Cases.' These must be collected and made available for everyone to access.

5. Conclusion

In summary, it can be said that based on the insights gained from the interviews and their insights into companies with GenAI, a clear conclusion can be drawn. Companies that see an opportunity based on the proposed framework to integrate GenAI into their business processes should take this seriously. Not just take it seriously but also act on it as quickly as possible. Time is of the essence here. Being at the forefront, being a GenAI pioneer in a specific business field, will prove to be very advantageous not only in the long term but especially in the short term. In contrast to most investments companies make, which are usually planned on a mid- to long-term perspective (Zellweger, 2007, pp. 1-2), GenAI integration represents a contrary strategy. It can be rolled out relatively quickly through the correct rollout strategy outlined in the proposed framework and has the potential to disburse its benefits sooner.

The central research question and objective were to identify the success factors and development areas for companies for the integration of GenAI technologies. The end result is summarized in the developed framework. Based on the developed GenAI implementation framework, companies considering or already implementing GenAI can use it as guidance. It aims to be a practical and hands-on guide derived from real-world company insights, providing assistance and guidance on various success factors while pointing out risks and important considerations. In conclusion, considering the identified benefits throughout this thesis as well as the generally perceived risks by society, the following can be said:

GenAI will not necessarily replace people and their jobs in the short term, but individuals and companies leveraging GenAI will soon replace and surpass those who refuse.

5.1. Limitations

While conducting this qualitative work, there were several limitations. Firstly, it should be mentioned that there is not yet a comprehensive or substantially meaningful amount of research papers in this field, especially regarding the influencing factors of GenAI integration for companies. Therefore, the otherwise extensive and solid foundation of literature is not fully present in this case.

Furthermore, the qualitative analysis, conduct, and evaluation of the interviews are always subject to a certain degree of subjectivity. On the one hand, caused by the chosen sampling method, which included the selection of experts in the personnel network of the researcher, on the other hand, is limited due to the novelty of the topic, as only a small percentage of companies actually have valuable experiences in the GenAI integration process. Additionally, expert interviews and the resulting statements are naturally subject to

an inherently subjective and personal influence and opinion of the interviewees. It is also worth noting that generalizing results from a small case study to a larger population is often challenging.

Various data losses and distortions due to conducting interviews online via Zoom cannot be completely ruled out. The best efforts were made to minimize this, as interviews were recorded, transcribed, partially translated, corrected, prepared, and subsequently rechecked and consulted with the interviewees.

Therefore, the proposed framework should be viewed only as a guide and reference for companies and interested parties, not as a comprehensive solution. Ultimately, it is up to companies to determine how they implement GenAI into their business processes. Indeed, at this earlier stage, forming a universally valid assessment or judgment about the plausibility and value contribution of the developed theory is problematic and would border on a philosophical discussion (Schwaiger & Meyer, 2009, p. 408). Instead, it is intended to encourage further research, as described below.

5.2. Further research opportunities

Moreover, the presented results are intended to encourage additional researchers to complement them through further investigations. By encompassing a broader range of perspectives, approaches, types of companies and industries, and various GenAI solutions, this model can be further developed. This ongoing refinement will enable a continuous elaboration of the developed theory over time to ensure a development towards a more robust theory. The following interesting observation encountered during the development of this thesis should encourage reflection and provide a possible impulse for further research.

As with any newly introduced technology, GenAI brings not only the mentioned benefits and risks but also disadvantages. One particularly interesting aspect should be briefly mentioned here. Companies introducing GenAI technologies might be exposed to certain side effects. The use of, for example, ChatGPT by employees could lead to a reduction in the diversity of ideas among the results produced with GenAI. Initially, one might expect that the use of ChatGPT would exclusively improve the diversity of results, given its extensive knowledge base. However, the study discussed in the literature review section from Harvard Business School by Dell'Acqua et al. from 2023 revealed a tendency toward a decrease in the variation of results compared to the control group that had not used ChatGPT. Consequently, companies could be exposed to this side effect and might expect, in some cases, less conceptual variation in the production of GenAI-supported results. (Dell'Acqua et al., 2023, pp. 53-54)

However, this phenomenon is not yet fully explored, as the production of results heavily depends on how and in what context GenAI is used. Additionally, the quality of the results is not taken into account here. For instance, while the semantic similarity of results may increase overall, the relevancy and quality of the results may differ compared to non-GenAI

results. Overall, this point is intended to stimulate consideration and reflection and does not represent a fully substantiated statement. (Dell'Acqua et al., 2023, pp. 53-54)

References

Adams, W. C. (2015). Conducting semi-structured interviews. In *Handbook of Practical Program Evaluation*.

Ayoub, T. Y., Amami, A., & Hachaïchi, Y. (2023). Expectations of AI Economic Impact & Giant AI Experiments: Case of ChatGPT 3.5.

Brown, P. F., Della Pietra, V. J., Desouza, P. V., Lai, J. C., & Mercer, R. L. (1992). Class-based n-gram models of natural language. *Computational linguistics*, *18*(4), 467–480.

Chang, Y., Wang, X., Wang, J., Wu, Y., Zhu, K., Chen, H., Yang, L., Yi, X., Wang, C., & Wang, Y. (2023). A survey on evaluation of large language models.

Chui, M., Hazan, E., Roberts, R., Singla, A., Smaje, K., Sukharevsky, A., Yee, L., & Zemmel, R. (2023). The economic potential of generative AI.

Davenport, T., & Alavi, M. (2023). How to Train Generative AI Using Your Company's Data.

Dell'Acqua, F., McFowland, E., Mollick, E. R., Lifshitz-Assaf, H., Kellogg, K., Rajendran, S., Krayer, L., Candelon, F., & Lakhani, K. R. (2023). Navigating the Jagged Technological Frontier: Field Experimental Evidence of the Effects of AI on Knowledge Worker Productivity and Quality [Working paper: 24-013]. *Harvard Business School Technology & Operations*.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, *14*(4), 532–550.

Gao, Y., Xiong, Y., Gao, X., Jia, K., Pan, J., Bi, Y., Dai, Y., Sun, J., & Wang, H. (2023). Retrieval-augmented generation for large language models: A survey.

García-Peñalvo, F., & Vázquez-Ingelmo, A. (2023). What do we mean by GenAI? A systematic mapping of the evolution, trends, and techniques involved in Generative AI. *International Journal of Interactive Multimedia and Artificial Intelligence*, *8*(4).

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology.

Glaser, B., & Strauss, A. (1967). *Discovery of Grounded Theory: Strategies for Qualitative Research*.

Gläser, J., & Laudel, G. (2010). *Experteninterviews und qualitative Inhaltsanalyse* (Vol. 4). Springer-Verlag.

Gordijn, B., & Have, H. t. (2023). ChatGPT: evolution or revolution. *Medicine, Health Care and Philosophy*, *26*(1), 1–2.

Gozalo-Brizuela, R., & Garrido-Merchan, E. C. (2023). ChatGPT is not all you need. A State of the Art Review of large Generative AI models.

Hanna, R. (2023). How and Why ChatGPT Failed The Turing Test.

Kashefi, A., & Mukerji, T. (2023). ChatGPT for programming numerical methods. *Journal of Machine Learning for Modeling and Computing*, *4*(2).

Kirchenbauer, J., Geiping, J., Wen, Y., Katz, J., Miers, I., & Goldstein, T. (2023). A watermark for large language models.

Li, L., Zhang, Y., & Chen, L. (2023). Prompt distillation for efficient LLM-based recommendation. *Proceedings of the 32nd ACM International Conference on Information and Knowledge Management*.

Liu, Y., Han, T., Ma, S., Zhang, J., Yang, Y., Tian, J., He, H., Li, A., He, M., & Liu, Z. (2023). Summary of ChatGPT-related research and perspective towards the future of large language models. *Meta-Radiology*.

Maslej, N., Fattorini, L., Brynjolfsson, E., Etchemendy, J., Ligett, K., Lyons, T., Manyika, J., Ngo, H., Niebles, J. C., Parli, V., Shoham, Y., Wald, W., R., Clark, J., & Perrault, R. (2023). The AI Index 2023 Annual Report.

Morgan Stanley. (2023). Morgan Stanley Wealth Management Announces Key Milestone in Innovation Journey with OpenAI.

Naveed, H., Khan, A. U., & Qiu, S. (2023). A Comprehensive Overview of Large Language Models.

Ozdemir, S. (2024). *Quick Start Guide to Large Language Models*. Addison-Wesley.

Prasad Agrawal, K. (2023). Towards Adoption of Generative AI in Organizational Settings. *Journal of Computer Information Systems*, 1–16.

Raj, R., Singh, A., Kumar, V., & Verma, P. (2023). Analyzing the potential benefits and use cases of ChatGPT as a tool for improving the efficiency and effectiveness of business operations. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, *3*(3).

Sarrion, E. (2023). *Exploring the power of ChatGPT*. Apress.

Schuett, J. (2023). Risk Management in the Artificial Intelligence Act. *European Journal of Risk Regulation*, 1–19.

Schwaiger, M., & Meyer, A. (2009). *Theorien und Methoden der Betriebswirtschaft: Handbuch für Wissenschaftler und Studierende*. Vahlen.

Singhal, K., Tu, T., Gottweis, J., Sayres, R., Wulczyn, E., Hou, L., Clark, K., Pfohl, S., Cole-Lewis, H., & Neal, D. (2023). Towards expert-level medical question answering with large language models.

Sweenor, D., & Ramanathan, K. (2023). *The CIO's Guide to Adopting Generative AI: Five Keys to Success*. TinyTechMedia LLC.

Turing, A. M. (1950). I.—Computing Machinery and Intelligence. *Mind*, *59*(236), 433–460.

Wu, S., Irsoy, O., Lu, S., Dabravolski, V., Dredze, M., Gehrmann, S., Kambadur, P., Rosenberg, D., & Mann, G. (2023). BloombergGPT: A large language model for finance.

Zellweger, T. (2007). Time horizon, costs of equity capital, and generic investment strategies of firms. *Family Business Review*, *20*(1), 1–15.

Diversity Within Top Management Teams: The Effects of Diversity Within Boards Towards Managerial Attention on Digital Transformation

Vincent Alberth-Jan Cremer

University of Groningen

Abstract

Digital transformation (DT) is crucial for firms to stay competitive, yet few fully embrace it. DT goes beyond moving from analogue to digital; it necessitates a complete restructuring of business models, including customer experiences and internal structures. Leadership significantly impacts strategic decision-making, as Hambrick (2007) notes. A board's diversity and composition affect a firm's decisions. Diversity in TMT can enhance innovation and creativity or increase friction and conflicts. While much research exists on these topics, examining managerial focus on DT and TMT diversity using Harrison and Klein's (2007) framework is new. As DT becomes more important, firms must understand TMT diversity's role. I argue that top management's demographic characteristics are positively influenced by diverse education, tenure, and network, with a negative moderating effect of age and gender heterogeneity. This study found that in cumulative DT efforts, there are effects between age and tenure, and gender and network. Age separation decreases tenure's positive effect, and gender separation diminishes the positive effect of diverse networks, suggesting inconsistencies with Hambrick's (2007) theory.

Keywords: Blue's Index; digital transformation; diversity; top management teams; Upper Echelon Theory

1. Introduction

Digital Transformation is redefining the world, affecting individuals, firms and society as a whole (Pasamar et al., 2019; Rachinger et al., 2019). Digital Transformation, or DT, impacts all business sides, from business model innovation to consumer experience and their expectations (Verhoef et al., 2021). The intensifying competitive environments in which firms find themselves, combined with rising expectations of consumers and improving digital technologies, external factors are influencing firms on their road towards digital transformation (Verhoef et al., 2021). The combination of the arrival of Industry 4.0 and the high failure rate of successfully integrating digital transformation resulted in scholars

and practitioners asking which components would increase this success rate. Suggesting that digital transformation is the core focus for firms in this era (Hanelt et al., 2020).

As firms are facing the effects of these changing environments, they need to adjust their way of doing business. Hambrick (1984) stated that a Top Management Team (TMT) shapes a firm's strategic choices. TMT's decisions to initiate change within a firm result from their reaction to their internal and external environment, including both opportunities and constraints. The Upper Echelon Theory (UET) by Hambrick (1984) posits that the characteristics of Top Management Team members influence the firms' strategies. For example, the individual characteristics of board members can combine diverse backgrounds, knowledge or experiences which enables the team to address a challenge from a variety of perspectives, which enriches the quality of the proposed solution (Knight et al., 1999). Scholars widely use this theory for researching firm performance and TMT compositions. UET suggests that, depending on the composition of the TMT, it can result in varying interpretations of these opportuni-

ties and constraints. Diversity in demographic characteristics of individual Top Management Team members shapes these interpretations and, consequently, the decisions they make (Hambrick, 1984). Due to the vast variety of metrics which can be used to measure diversity within a team, the outcomes of the prior literature are dual and complex in nature, depending on the used metrics and characteristics researched.

Verhoef et al. (2021) summarized digital transformation to have three phases: digitization (encoding analogue information so that computers can process this information), digitalization (a process used to alter the existing value chain of firms) and digital transformation (firm-wide changes resulting in new business models). Intensifying in between incremental and radical change, and different essentials for every individual stage (Hanelt et al., 2020). One understanding between these phases is that it demands creativity to stimulate firm innovation (Cox & Blake, 1991). These endeavours demand firms to use a multitude of perspectives to find the best qualitative solution for a problem. These perspectives derive from an individual, who tend to flourish in diverse groups (Verhoef et al., 2021).

Harrison and Klein (2007) pose that while diversity in teams has been researched prior, the measures used in these studies are sometimes mixed, leading to incomparable outcomes of studies. Every measure of diversity has, due to it's dual nature pros and cons, so understanding the different kinds is important for firms in order to act accordingly. Variety, separation and disparity are methods proposed to solve this by excluding mixing up the metrics. Separation refers to the differences in opinions or stances among group members, measuring this knowledge on a singular continuous characteristic. Variety is about the different types of knowledge or skills each member brings based on their unique experiences and expertise, enhancing each other in the decision-making process. Disparity denotes the differences in e.g., status among members, like income or hierarchical position variations. Together, these concepts help to understand the multi-faceted nature of diversity in social groups or organizations (Harrison & Klein, 2007). Diversity has a complicated dual nature, depending on the measure and interpretation it could suggest potential different outcomes. Hence for this study, variety (tenure, educational background and network size) is used, as well as separation (age and gender) in order to measure managerial attention to digital transformation.

As digital transformation becomes more critical for firms to stay competitive in the dynamic environment and the respective importance of TMTs during strategic change, this study focuses on diversity within Top Management Teams and their managerial attention towards Digital Transformation (Verhoef et al., 2021). Digital transformation has an effect on all types of firms, improving internal processes, focussing on efficiency, sustainability and effectivity (Hanelt et al., 2020). While there is vast research on TMT composition and Digital Transformation, literature which combines these two distinct topics is relatively scarce. The research question for this study is: *How does diversity in Top Management Teams, including educational backgrounds, tenure and network*

ties, affect a firm's commitment towards adopting digital transformation? Additionally, how do age and gender differences influence the connection between a board member's background and the success of their change efforts towards Digital Transformation?

This paper aims to fill the gap and answer these questions by combining Digital Transformation literature with the Upper Echelons Theory. Resulting in an improved understanding of managerial actions and their effects on digital transformation. In addition, the dual nature of diversity research linked with firm innovation and digital transformation leaves the academic community with questions. The findings are constructed around TMT diversity and how this diversity results in strategic decision-making towards digital transformation. For this study, a theoretical model was created to test the diversity within top management teams, specifically educational background, tenure, and network ties. In addition, how do age and gender affect these characteristics concerning managerial attention to DT?

A panel dataset (2005 to 2022) was used with a cross-industry sample of 3,000 of the largest U.S. firms (based on the Russell 3000) to test these aims. Managerial attention towards DT is measured using a CATA scan, counting keywords in 10-K filings of firms per year for every stage of DT. Diversity of TMT is measured using variety (for education, tenure and network) and separation (for age and gender) and this data is retrieved from BoardEx.

Whereas the Top Management Team (TMT) role has been mainly researched via the Upper Echelon Theory, only a few studies look into the growing world of Digital Transformation. In addition, using Harrison and Klein's (2007) suggestion on distinguishing between the various forms of diversity. Answering the call of Verhoef and Bijmolt (2019) for a study focussing on board composition as an influence towards managerial attention on digital transformation. Complemented with Nielsen's (2010) call, this study focuses on the UET in combination with the differences in diversity as presented by Harrison and Klein (2007). Hence, this research will contribute to understanding the individual characteristics, according to Figure 1, and interrelated dynamics and diversity towards the success rate of Digital Transformation within a firm.

2. Theoretical Background & Hypotheses

2.1. Digital Transformation

Digital Transformation is not 'just' an IT initiative anymore but a prerequisite to remaining relevant and competitive in this digitalizing society (Verhoef et al., 2021). Verhoef and Bijmolt (2019, p. 1) defines digital transformation as: "A firm employs digital technologies to develop a new business model that helps to create and appropriate more value for the firm". This definition indicates the complexity of Digital Transformation, splitting it two ways. It (A) redefines the boundaries of firms, stimulating firms to find 'new' ways of doing business, reaching and engaging with customers, as

well as (re)structuring internal processes (Furr et al., 2012). Combined with (B) Balancing 'old' and 'new' practices, innovation is paired with digital transformation, while 'traditional' operations are still relevant (Furr et al., 2012). Although a split exists between traditional or 'pre-digital' firms and born-digital firms, digital transformation catalyses both, encouraging them to re-evaluate and overhaul their business models (Chanias et al., 2019).

The split between pre-digital and born-digital firms originates partly through the chronicles of time. Whereas most practitioners are acquainted with IT-enabled innovation, Digital Transformation-enabled innovation is relatively new (Appio et al., 2021; Matarazzo et al., 2021). Considering that this split derived from the effects of 'Industry 4.0'. Industry 4.0 is a (fundamental) shift in manufacturing and production, characterized by the integration of digital technologies, automation, IoT (Internet of Things), and data analytics to create more intelligent and more efficient industrial processes (Savage, 2022). Whereas IT focuses on existing value propositions, DT focuses on (re)defining value propositions (Ferrigno et al., 2023). In addition, the drivers and scope of the processes deviate. IT-enabled innovation focuses on exploitative innovation and improving internal processes and is frequently initiated top-down (Vial, 2019). In contrast, DT responds to external drivers, including technological advancements, in the developing competitive landscape, and consumers' changing demands and behavior (Verhoef et al., 2021). However, both processes are focused on achieving technology-driven change (Besson & Rowe, 2012) and performance improvement (Hanelt et al., 2020). While there is a vast amount of research on IT-enabled innovation, DT differs as they are vastly different, which this study aims to complement to.

According to Verhoef et al. (2021), digital transformation consists of three distinct stages that seamlessly transition into one another, transitioning from IT-enabled innovation towards completed digital transformation: digitization, digitalization and digital transformation. Digitization, the first phase of digital transformation, involves firms converting analogue information into a digital format. It focuses on technical conversion and does not change the value creation process of a firm (Hess et al., 2020; Verhoef et al., 2021). Digitization refers to using digitalized data to improve firm processes or enhance customer experiences with a focus on efficiency. Digital Transformation is the current final state; it refers to a change with a holistic nature that has an influence on the entirety of the organization. It alters the firm's mindset towards innovation-focused processes, referring to culminating new business models (Downes & Nunes, 2016; Matt et al., 2015; Verhoef et al., 2021). While digitization and digitalization typify incremental change, digital transformation is considered radical (Verhoef et al., 2021). Each phase embodies a deeper integration of technology in core business processes and strategy (Verhoef et al., 2021). Demanding firms to collaborate in adapting to change to achieve success reflects a mutual exchange and highlights the importance of fostering ambidexterity within an organization (McAfee & Brynjolfsson, 2017; Rogers, 2016; Venkatraman, 2017). The cumulative efforts of digital transformation, as researched per this study are of interest as they visualize the journey and potential changes that firms need to undergo in their board compositions.

This ambidextrous firm combines the prerequisite of explorative and exploitative innovation to successfully reach Digital Transformation in all its complexity (Henfridsson & Bygstad, 2013). Where exploitation indicates the effective use of current resources, exploration symbolizes the search for new resources (Henfridsson & Bygstad, 2013). Generally, these two strategies do not pair well, and firms tend to separate the two practices within a firm while coordinating them from the executive level (Henfridsson & Bygstad, 2013). Dynamic capabilities enable a firm to fully utilize both procedures (Rindova & Kotha, 2001). Matarazzo et al. (2021) state that dynamic capabilities are the most critical assets of a firm, defining dynamic capabilities as: "higher-level competences that determine the firm's ability to integrate, build and reconfigure internal and external resources/competences to address, and possibly shape, rapidly changing business environments" (Teece, 2012, p. 1395). Dynamic capabilities are different from 'normal' capabilities as they enable a firm to perform essential tasks reconfiguration and are much more difficult to replicate than standard capabilities (Teece, 2012). It relies on a firm's culture, structure and people, and its role is to produce new 'ordinary' capabilities as the environment of a firm changes (Teece, 2007, 2012). Innovation is a combination of two elements: (a) generating new ideas and (b) introducing them as a change (O'Reilly et al., 1989).

Leadership is an essential component of dynamic capabilities. Leaders define the firm's strategic direction, allocate resources, and shape the organizational culture needed to adapt and innovate (Teece, 2012). As DT reshaped the role of IT from supportive to redefining business models, the role of management changed along (Haffke et al., 2016; Lin et al., 2016). Effective leadership is vital for an organization to develop and leverage dynamic capabilities successfully (Matarazzo et al., 2021). He suggested that in order to successfully develop dynamic capabilities, leadership needs to focus on 4 elements: (a) Sensing - Identifying or developing new digital trends, (b) Learning – adapting current capabilities with new knowledge, (c) Integrating - Integrating new knowledge within the firm and (d) Coordinating or asset 'orchestration'. Whereas every firm has its approach to handling these four elements, these clusters state how firms 'create their own capabilities' and make these a result of a sum of the firm's leadership (Fernandez-Vidal et al., 2022; Matarazzo et al., 2021). The demanding role of TMTs in a digital age can be summarized as setting a formal context for DT, leading change while understanding digitalization (Wrede et al., 2020). As TMT members' characteristics influence dynamic capabilities, this study continues to explore the effects of characteristics on developing and maintaining dynamic capabilities.

2.2. Top Management Teams

In 1984, Hambrick and Mason wrote an article that would tremendously affect business scholars. They argue that managers' demographic characteristics shape their values and perceptions. These characteristics, in turn, influence their decisions, affecting the actions executed within an organization (Hambrick et al., 1996). This research suggested that executive management defines their tendencies in strategic decision-making as a combination of their functional characteristics and backgrounds (Carpenter, 2002; Hambrick et al., 1996). When examining the variety within teams, two leading theories are often cited: the information/decision-making viewpoint and the faultline concept, as explored in the work of researchers such as (Lau & Murnighan, 1998; Veltrop et al., 2015; Williams & O'Reilly, 1998). From the angle of the information/decision-making viewpoint, particularly in terms of diversity among board members, it is posited that the heterogeneous nature of a team significantly enhances its ability to make decisions. The Upper Echelon Theory by Hambrick et al. (1996) emphasizes the efforts of an entire team and not an individual CEO, enabling the entire team as strategists and enabling them as they are indicated to be specialized in the maintenance of an operation (Finkelstein & Hambrick, 1996). Contrasting prior research, they considered boards the most influential actors as their decisions impact strategy setting most (Finkelstein & Hambrick, 1996).

These individual characteristics, which ultimately shape a firm's strategic direction, tend to cluster. Whereas homogeneous teams tend to have the same characteristics, leading to similar decisions, they have fewer internal conflicts (Hambrick et al., 1996), faster decision-making processes, and their potential for streamlined decision-making and unified vision stimulate firm performance (Hambrick et al., 1996). Heterogeneous teams tend to have a variety of experiences and perspectives combined within their team. Cox and Blake (1991) argue that combining these characteristics results in innovative thinking and creative problem-solving. This diversity in board composition enables them to detect opportunities from these distinct perspectives, as they have varying knowledge and backgrounds. Outweighing the adverse effects of internal conflicts (Hambrick et al., 1996; Ones et al., 1994). Diversity is essentially a 'double-edged sword' (Hambrick et al., 1996) as diversity has both positive (Kilduff et al., 2000), not significant (e.g. Bunderson and Sutcliffe (2002)) and negative outcomes within academic literature (Timmerman, 2000). Diverse TMTs are believed to enhance innovation and creativity within a firm by creating greater variance and decision-making alternatives (Knight et al., 1999). While their decision-making process might be slower, they are more likely to find solutions for changing environments which are not copied from competitors, ensuring longer lasting competitive advantage (Knight et al., 1999). However, due to these greater variances in the background of the board members, the TMT needs to devote more attention to communicating properly and assimilating information asymmetry as much as possible. People work best if they share similar experiences as well as equivalent beliefs and attitudes (Lawrence, 1997).

In contrast, due to humans tending to stick with their 'own kind', group cohesion within the board decreases, impacting the trust within a TMT (Knight et al., 1999). Finally, the varied backgrounds in a diverse team tend to surface conflicts more readily than in homogeneous teams, where members share similar characteristics and experiences. This commonality in homogeneous groups often streamlines their decision-making process, leading to a higher likelihood of board member agreement (Knight et al., 1999). These board compositions affect a firm's strategic direction, enabling it to focus on innovation (Simons et al., 1999). Looking at these initial differences with regard to diversity in team composition displays the dual and complex nature of diversity research. Due to the different interpretations of diversity research, outcomes can vary per study, which calls for a unified method of interpretating diversity (Harrison & Klein, 2007).

2.3. Diversity within Top Management Teams

Harrison & Klein claimed in 2007 that there is no 'general all applicable diversity measure' and that diversity can be looked at in three ways. They stated that diversity is not a measure of a complete unit on an array of aspects or that diversity belongs to one person in a group. Diversity describes the variation of discrepancies among the members of a unit concerning one standard attribute X, such as tenure, education, gender or pay (Harrison & Klein, 2007). Concluding that diversity is (a) dedicated towards a group and (b) focusing on one specific attribute at a time. Much of the literature regarding diversity surrounds demographic variables and characteristics (Harrison & Klein, 2007), e.g., gender (O'Reilly et al., 1989), tenure (Hambrick et al., 1996) or educational background (Ones et al., 1994).

The different types that they presented were *separation, variety or dispersion.* Separation is classified as a "composition of differences in position towards one another; it is derived from several theories (e.g., attraction-selection-attrition or theory of similarity attraction). The latter can be linked to the quote of Lawrence (1997) above. Variety is a combination of differences derived from information processing, which can be linked to bounded rationality (Harrison & Klein, 2007). Lastly, disparity is a "composition of (vertical) differences in the proportion of socially valued assets, e.g. inequality", which is considered distributive by Harrison and Klein (2007).

On the one hand, one can strive for minimal diversity, e.g. when all members within a team occupy a similar position (separation), belong to the same category (variety) or are on the same level of hierarchy (disparity). Maximized diversity, however, is when members of a team are equally dispersed in terms of, e.g., opinion (separation), are from unique categories (variety) or are different in ranking (e.g. top management team member versus a trainee). (Harrison & Klein, 2007). Separation, as explained by Harrison and Klein (2007), states that reduced separation increases internal integration and trust (Locke & Horowitz, 1990). Resulting in comfortable surroundings with like-minded, agreeable

individuals (Harrison & Klein, 2007). However, increased separation (lower similarity) would lead to increased creativity and innovation but with the risk of splitting the group into opposing sub-teams. Variety, according to Harrison and Klein (2007), can result in a "sociocognitive horsepower' (Carpenter, 2002). The members involved have different backgrounds, leading to a creative, solution-oriented team, as everyone has a unique perception of the world. In contrast, it could result in information asymmetry, as the suggestion is there that everyone has the same background and information, failing to discuss information with the entire team (Harrison & Klein, 2007). Disparity, as explained by Harrison and Klein (2007), is a battle between one team member holding the majority of the power within a team (e.g. a CEO in its TMT), resulting in decreased performance as a result of decreased trust or increased deviance within a team (Harrison & Klein, 2007). These contradictions visualize the dual and complex nature of diversity research.

Meanwhile, research into TMTs and their diversity has used numerous personal characteristics (Jackson et al., 2003). This research focuses on the demographic characteristics of TMTs, looking at the variety in educational background, tenure (Hambrick et al., 1996), and network (Matarazzo et al., 2021). And the moderating effects of age- and gender separation towards managerial attention (Konrad & Gutek, 1987). These components create a well-balanced overview of diversity within Top Management teams and are explained in detail in the following sections.

2.3.1. Educational Background

Education has been positively linked with cognitive orientation and knowledge base (Herrmann & Datta, 2005). Diverse TMTs about educational background are expected to contribute to dealing with uncertainty, a necessity to thrive in an innovative and uncertain environment (Bredthauer et al., 2020; Erhardt et al., 2003). Therefore, these board members have a wide range of skills, perspectives, and domains available during the decision-making process (Wiersema & Bantel, 1993). Different educational backgrounds contribute to a richer board with creativity, a critical attribute for innovative strategies focusing on digital transformation. As these different backgrounds enable individuals to see challenges from different perspectives, enhancing the quality of the solution found. In contrast, a TMT with highly educated directors might face homogeneity within its board. Homogeneous teams tend to have similar demographics. Whereas having higher diversity is linked with higher turnover (Simons et al., 1999). In addition, communication problems increase, e.g., reaching a consensus, negatively impacting firm innovation (Carter & Lorsch, 2004). This type of heterogeneity is a source of conflict (Simons et al., 1999). Concluding that while heterogenous teams might face difficulties in time-constrained situations, their solutions tend to create longer lasting competitive advantages (Teece, 2012).

Hypothesis 1: *There is a positive relationship between the diversity in educational backgrounds of board members and the level of attention towards digital transformation in a firm.*

2.3.2. Tenure

Organizational tenure is the duration of an individual's presence within a firm. Within research, it is considered a sum of relevant knowledge regarding the organization and the function that an individual can find itself in (Gilson et al., 2013). Wiersema & Bantel's study (1993) found that diversity in terms of age, educational backgrounds and tenure influence a firm's attitude towards change. Where age and educational background diversity tend to embrace change, longer tenure suggested an increased resistance towards change. In addition, similar people may find interacting easier, as it provides them with positive reinforcement of their attitudes and beliefs (Tanikawa & Jung, 2016). This contrasts with dissimilarity, in which they consider cooperating a punishment, leading to decreased communication (Williams & O'Reilly, 1998).

Prior research states that older managers are less likely to strategic change performance in comparison to younger managers (Bredthauer et al., 2020). Bantel and Jackson (1989) state that risk-aversion is something that typifies older executives. Bantel and Wiersema (1993) suggest that due to the stage of their career, taking risks might become a career hazard, negatively influencing the financial security needed during their retirement. In contrast to younger managers, according to Bredthauer et al. (2020) who are appealed to strategic changes and are partaking in risk-taking endeavours. Combining these dual perspectives on career creates a positive balance towards firm innovation, using the best of both worlds. Within tenure, heterogeneity refers to a higher likelihood of embracing change as different lengths of experience offer diverse insights (Wiersema & Bantel, 1993).

Hypothesis 2: *There is a positive relationship between board members' diversity in tenure (length of service) and the level of attention towards digital transformation in a firm.*

2.3.3. Network Size

The underlying argument for the complexity of operations is that due to the high information-processing demands of a TMT, diversity works towards relational capital or an extensive network (Matarazzo et al., 2021). To cope with the high complexity of organizations, a broad knowledge base within the team and efficient team processes are necessary (Dezsö & Ross, 2012). The number of network ties available to a TMT increases the cognitive repertoire of board members (Harrison & Klein, 2007). As the size of a network indicates corroborating with a multitude of individuals (Matarazzo et al., 2021). In addition, widespread network ties have been shown to stimulate organization-wide innovation as a value-creation mechanism (Ridwansyah et al., 2023). Having wide networks allows a TMT to spread information, process the

information on the horizontal and vertical levels, and eventually stimulate innovation, positively impacting transformational processes such as DT (Clark et al., 2003).

> **Hypothesis 3:** *There is a positive relationship between the diversity in the network sizes of board members and the level of attention towards digital transformation in a firm.*

2.3.4. Age Separation

In an evolving business environment marked by an ageing workforce and a nationwide shortage of skilled junior employees, the qualifications of a firm's workforce are a crucial factor when facing the commitment towards digital transformation (Kunze et al., 2010). The average age of TMTs is considered to be the antecedent of a firm its' performances as it represents a cumulation of knowledge and experience (Bantel & Jackson, 1989; Hambrick & Mason, 1984). Age separation within an organization can present challenges, as suggested by the Faultline Theory, which states that generational differences might create divisions affecting this commitment.

The Faultline theory as proposed by Lau and Murnighan (1998) explores the concept of fault lines in teams. Fault lines, explained as hypothetical dividing lines based on the alignment of multiple demographic variables within a group. The strength of these lines depends on the degree of alignment and influences the group dynamics, including communication, formation of subgroups and potential conflicts. Integrating the dual nature of age diversity and the benefits of having both perspectives in a team as explained in section 2.3.1. Hence, it is hypothesized that age diversity moderates the relationship between educational background, tenure network size and commitment to DT by introducing potential fault lines that may weaken attention and adaptability among directors of different ages (Bredthauer et al., 2020).

> **Hypothesis 4a**: *Diversity in age moderates the relationship between educational background and attention toward digital transformation in a firm, resulting in a decreased effect.*
>
> **Hypothesis 4b**: *Age moderates the relationship between tenure and attention toward digital transformation in a firm, resulting in a decreased effect.*
>
> **Hypothesis 4c**: *Age moderates the relationship between the Network Size of the different individuals in a board and the attention toward digital transformation in a firm, resulting in a decreased effect.*

2.3.5. Gender Separation

Due to the changing workforce, the relative growth of the number of women (and other minority groups) relative to the number of males in the workforce has been high. Political and societal changes encourage females to participate in the labour market. For example, Denmark forced its firms to install a female -quota (Wolbrecht & Campbell, 2007). In addition, customers are more likely to buy from a firm if the employees of that firm are people they can identify themselves with (Wolbrecht & Campbell, 2007). It would only make sense that the higher levels of management would change along, portraying an example towards the rest of the firm (Rampling, 2012).

However, equal gender diversity in top management teams has not yet been reached. The research found that including females in a TMT has two major strengths: participative decision-making styles and increased sensitivity, positively impacting firm performance and innovation (Rao & Tilt, 2015). In addition, when reaching the threshold of 25% women in a TMT, Abtahi et al. (2023) stated that this increased corporate risk-taking, enhancing innovation. Contrastingly, gender diversity might lead to increased conflict, negatively impacting innovation (O'Reilly). As a result of the dual nature of diversity, situating gender diversity against educational background, tenure and network size is hypothesized to have a moderating negative effect on innovation. Regarding gender diversity,

> **Hypothesis 5a**: *Gender will moderate the relationship between educational background and attention toward digital transformation in a firm resulting in a decreased effect.*
>
> **Hypothesis 5b**: *Gender will moderate the relationship between tenure and attention toward digital transformation in a firm, resulting in a decreased effect.*
>
> **Hypothesis 5c**: *Gender will moderate the relationship between the Network Sizes of the different individuals on a board and the attention toward digital transformation in a firm, resulting in a decreased effect.*

In Figure 1, the conceptual model provides an overview of the abovementioned hypotheses.

3. Methods

The following sections explain this study to examine how top management team diversity influences managers' attention towards digital transformation. First, the empirical setting is discussed and aligned with the hypotheses. Second, to ensure validity, the data sample must provide variance among all observations and include all relevant data needed to test the hypotheses. Third, valid measures need to be developed along with the correlating factors of attention. Last, the method needs to include count-distributions focused on within-firm diversity, and an analytical method is described.

3.1. Empirical setting

This research's empirical setting is a dataset comprising data from the 3,000 largest US-listed firms over 18 years (2005 – 2022) and contains all major U.S. industries. The
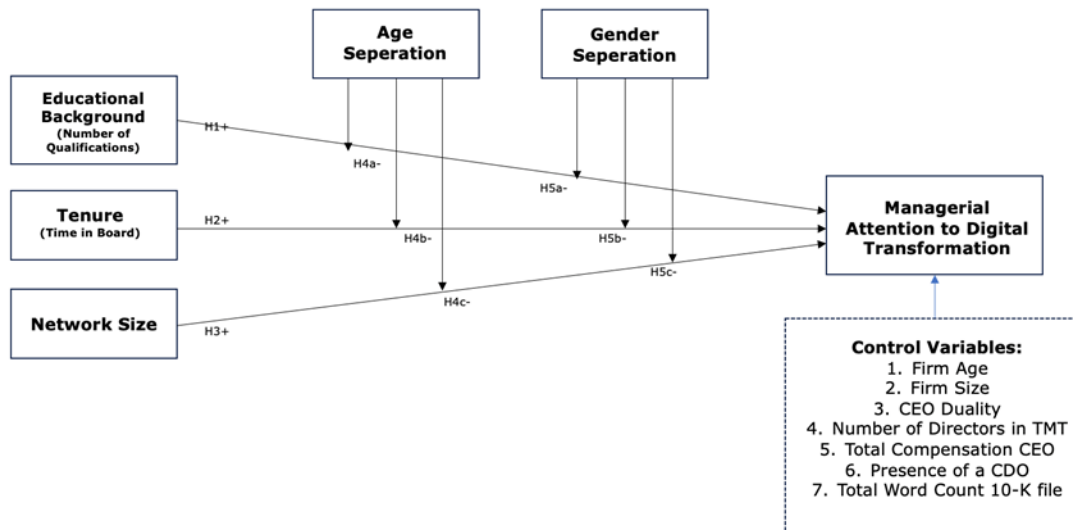
Figure 1: Conceptual Model

fact that the data is cross-industry has several advantages for this study. Verhoef et al. (2021) stated that digital transformation is not solely present in technology industries; rather, it directly affects a wide range of industries and has different maturity levels within each industry. As per these differences, the managerial attention towards digital transformation differs (Chanias et al., 2019). Including these different industries enhances the reliability of the research, as the different maturity levels per sector balance each other out. The research was initiated as a derivative of a custom-made and supervised dataset by Dr. Marvin Hanisch. The data quality within this dataset is relatively high as it has been custom-made for this line of research. Due to the nature of these firms being publicly listed, most information has been available via 10-K filings and/or annual reports.

3.2. Data Collection and Sample

This study enlarged an already existing panel dataset of the Russell 3000 Index. Several students, including myself, have been working on collecting additional data (2019 – 2022), checking inconsistencies in prior firm data (2017 – 2019), and ensuring completeness of the available documents (e.g., 10-K filings). The dataset provides information from 2005-2022 and includes information on the sector, financial data, shares and stock prices, CEO and CDO information, salary, and digital transformation forms. The data is retrieved from Dr. Marvin Hanisch and consists of public sources, such as annual reports, 10-K filings, letters to shareholders, LinkedIn, About Us pages, Salary.com, and Yahoo Finance. The 10-K file, annual report, letter to shareholders and About Us pages have been converted to (flat) text documents, which helped extract information about managerial attention towards digital transformation. The data may be subject to revisions and may contain errors.

In addition to this collected dataset, Dr. Marvin Hanisch and his students developed the method for the dependent variable (managerial attention). He and his students developed a Computer-Aided Text Analysis (CATA) scan, which analyzed the keywords used in 10-K filings that could be linked to the different stages of digital transformation. This Computer-Aided scan improves the quality of the study, as using CATA for such a study prevents human errors due to fatigue (Short et al., 2018). The list used in this research has not been altered, as this is not considered the focus of this study. A small sample of the words used can be found in Appendix 1.

This research investigates the diversity within top management teams, which was not present in this prior mentioned dataset. Hence, working together with Kirsten Huetink, an additional dataset was created complementing this existing dataset to function as dependent- and moderating variables. The TMT composition data has been retrieved from WRDS, Wharton Research Data Services, and specifically from BoardEx – North America. Two types of data sources have been used from there. Firstly, the Organizational Summary is used to check for the composition of the Top Management Teams and retrieve director IDs corresponding to individual executives, followed by looking up these IDs in the BoardEx – Individual Profile Detail database. These lists have been merged and cleaned prior to analysis.

3.3. Measures

This section gives an overview of the different variables and their measurements used for the hypothesis testing. The independent variable originates from the CATA scan, the dependent and moderating variables originate from WRDS, and the control variables are from the original dataset. Table 2 visualizes all variables used in this study.

3.3.1. Dependent variable.

Managerial attention to digital transformation is measured using CATA on the 10-K filings and relates to the cogni-

tive estimate of paying attention to forms of either digitization, digitalization or digital transformation (Verhoef et al., 2021). This method is derived from prior work linked to the work of Dr. Marvin Hanisch, and the list is created and supervised by him, with no alteration to the keywordlist. The method is a way to quantitatively analyze the different phases of digitalization over a large number of firms/years. It analyses the attention towards DT by counting keywords in 10K filings. The number of keywords counted in the 10K filings indicates the managerial attention towards digital transformation, e.g., a higher number of counted keywords indicated a relatively higher amount of managerial attention.

3.3.2. Independent variable.

Diversity in top management teams is measured using Blue's Index and Separation (Harrison & Klein, 2007). This method consists of five metrics: three are used as independent variables, and two are used as moderating variables. All independent and moderating variables are imported from BoardEx (as outlined in section 3.3). For the independent variables, educational background, tenure, and network size, this study uses Blue's Index. The majority of the diversity research uses *variety* in the field of Upper Echelons (Pasamar et al., 2019).

Blue's Index (BI) is measured by using the number of qualifications each individual TMT member has. This dataset consists of degrees received as Bachelor's, Master's, PhD, MBA, License and Others. After collecting this information, individual dummy variables have been created to categorize this into six categories (0 to 5). Categories are derived from Wiersema and Bantel (1993). Table 1 presents an overview of the categories for the independent variable made.

After ordering this per firm/year, the study uses the proportions of the different categories concerning the total number of qualifications achieved by the sum of board members. These outcomes were squared to calculate the variance, after which this score was summed. This sum was deducted with 1 to retrieve the Blue's Index for Education Level. Afterwards, all dummies were deleted, and only the Blue's Index Score per firm/year was kept and used for calculation.

$$Blau's\ Index = 1 - \Sigma_k\ p_k^2$$

Blue's Index - Tenure is measured using an approach similar to this independent variable. The different categories for time on board are also displayed in Table 1. These categories are based on the time an executive spend within a board and is based on (Wiersema & Bantel, 1993).

Lastly, Blue's Index for Network has been calculated similarly to the previous one. The categories used for this Index are also displayed in Table 1. The used categories are based on the research of Matarazzo et al. (2021).

3.3.3. Moderating variables.

Moderating variables are measured using separation (Harrison & Klein, 2007). Separation is calculated as a Standard Deviation of the included data.

$$Standard\ Deviation = Seperation = \sqrt{\frac{(S_i - S)^2}{n}}$$

Age is calculated first by creating count dummy variables for all the Board Members. After this, a count was done of the total board members per year/firm. Followed by a total sum of the different TMT member's ages (year/firm) was calculated. A mean (year/firm) was derived from that. The different ages of board members were deducted from the mean, squared, and summed to a total. This sum is divided by the total amount of members on each TMT, which is once again squared to derive the standard deviation. All in-between steps were dropped, but the separation age variables (year/firm) were kept as a moderating variable.

$$Separation_{Age} = \sqrt{\frac{\sum_{i=1}^{38}(mean\ age - age_i)^2}{Total\ Age\ dummies}}$$

As gender is considered binary (by the dataset from BoardEx), firstly, (count), dummy variables were produced to derive the total number of board members in a team. Then, dummies were used to derive a total number of men and a total number of women on each team. The amount of male and female board directors was summed, and the proportions of the two genders were calculated (gender/total). Lastly, the proportion of male board members times 1 – the proportion of male board members combined was divided by the total number of board members; this was then squared to derive the standard deviation (or separation as stated by Harrison and Klein (2007)).

$$Separation_{Gender} =$$
$$\sqrt{\frac{\sum_{i=1}^{38}(Proportion_{males} - proportion_{male_i})^2}{Total\ Director\ Gender}}$$

3.3.4. Control variables.

As prior research states (Verhoef et al., 2021), and assuming that TMT Diversity does not solely determine managerial attention to digital transformation, several control variables are included in this study.

Firm size can impact the likelihood of engaging in innovative activities Wiersema and Bantel (1993). Large firms may have vast resources that can contribute to innovation (O'Reilly et al., 1989). This control variable is calculated by using the number of employees of a firm for any given year.

Firm age. This control variable is calculated by deducting the focal year – the foundation year. As younger firms tend to have a higher likelihood of being a 'born-digital' firm, whereas older firms might have more cumulative resources (Appio et al., 2021).

Total Amount of Board Members: A TMT can consist of as many people as between 1 and 38; the number of board

Table 1: Overview categories used for independent variables

Level of Education	Number of Qualifications	Level of Tenure	Time in Board	Level of Network	Network size
Category 0	0 number of Qualifications				
Category 1	1 number of Qualifications	Category 1	0 – 2.4 years	Category 1	0 – 250 contacts
Category 2	2 number of Qualifications	Category 2	2.5 - 5.4 years	Category 2	251 – 550 contacts
Category 3	3 number of Qualifications	Category 3	5.5 – 9.4 years	Category 3	551 – 950 contacts
Category 4	4 number of Qualifications	Category 4	9.5 – 15 years	Category 4	951- 1500 contacts
Category 5	≥5 number of Qualifications	Category 5	>15.1 years	Category 5	>1501 contacts

members has been taken into account. This has been calculated by creating a (count) dummy variable and is calculated per firm/year. *As smaller teams may have less trouble communicating all information, a larger team is known for greater variety.* This variable is calculated by counting the different inputs firm/year (Chiang & Lin, 2011; Horwitz & Horwitz, 2007).

CEO compensation as CEO compensation may result in increased discreteness of a CEO (Adams & Ferreira, 2008). It has been calculated as total compensation = salary + stocks + other.

CEO Duality, as DT is a holistic process (Chiang & Lin, 2011), and therefore solely linked to the CEO in terms of functional focus, the duality of a CEO as chairman of a board is taken into account. In addition, this chairman, having complete control, reduces conflict, leading to a higher firm performance (Chiang & Lin, 2011). It functions as a dummy variable derived from the original dataset.

CDO presence is the presence of a Chief Digitalisation Officer in a TMT. The role of the CDO is holistically focussing digital innovation within the firm, making this function fundamentally different as this board member could focus on holistic elements compared to functional board members (Fernandez-Vidal et al., 2022; Fitzgerald et al., 2014; Grossman & Eckel, 2012; Singh & Hess, 2020). This study is considers it a dummy variable as a CDO is expected to act as a digital evangelist (Fernandez-Vidal et al., 2022).

The total number of words in the 10-K file as the dependent variable is derived from the 10-K filings, stating that the number of keywords is the level of managerial attention. This control variable is there to account for differences between the number of words used in the 10-K filings, per year/firm.

3.4. Analytical Method

To test the hypotheses, Stata17.0 was used. The dataset contains observations for the years 2005-2022, and panel analysis was used. As the dependent variable, managerial attention towards digital transformation is a continuous variable. A frequency distribution of the dependent variable, as displayed in Appendix 2, is used to check the model for skewness to decide on one of these tests. Looking at Figure 3, the frequency distribution is highly right-skewed, concluding that an OLS model is unsuitable. And as the values are count variables and only contain non-negative values, the best test would be either a Poisson or negative binomial regression (Gardner, 1995). In addition, the variance in the model exceeds the mean value (See appendix 2), leading to the assumption of an over-dispersion within the model, concluding that a Poisson model is not suited either (Hausman & Taylor, 1981).

To test the robustness of the study, a VIF test was used to test for multicollinearity (See Appendix 2). These results where below the rules of thumb threshold of 4 for VIF (O'Brien, 2007), suggesting the lack of presence for multicollinearity in variables within the analysis. This lack of multicollinearity makes this a suitable study for the negative binomial regression model. As this research focuses on diversity within boards, a fixed effect is proposed. The Hausman test was used within Stata to validate this decision (Hausman & Taylor, 1981). After testing both effects, the test indicated that using a fixed effects model for this study is relevant. These fixed effects help us focus on diversity while controlling for potential endogeneity and unobserved heterogeneity across firms.

In total, 44 models are created, consisting of the sum of the processes of the DT *main model* and the different stages *of DT, as seen in the Extensive model* (see table 5). The remaining models are linked with the interaction effects in order to test for the interaction effects, they have been calculated per phase and per interaction variable, after which these outcomes have been combined and inserted in their respective models, as displayed in table 4 and 5.

Table 2: Overview Measures

Variable Type	Variable Name	Measure
Dependent Variable	Managerial attention to Digital Transformation	Total (sum) keyword counts for clusters (D1) digitization, (D2) digitalization, and (D3) digital transformation, as well as a sum of efforts (Appendix A)
Independent Variables	Educational Background	Blau's Index for Number of Qualifications
	Tenure - Time in Board	Blau's Index for time on the board
	Network size	Blau's Index for Network Size
Moderating Variables	Separation - Age	Separation (SD) of Age within a Board
	Separation - Gender	Separation (SD) of Gender within a Board
Control Variables	Age of the Firm	Age of the firm (year - foundation year)
	Size of the Firm	Number of Employees
	CEO Duality	Is the CEO of the Board also chairman - Dummy Variable
	CEO Board member Total Compensation	Total Compensation of the TMT (Base Salary, Stocks + other)
	Presence of CDO	Dummy variable for the presence of a CDO within a Board
	Total Count of Words	Total count of words within 10-k filings
Fixed effects	Year	Controlled for fixed effects

4. Results

In this section, the results following the statistical tests are displayed. Firstly, an overview of the general statistics and the correlations are provided. Secondly, the outcomes of the negative binomial regressions for the different hypotheses are displayed.

4.1. Descriptive Statistics and Correlations

Table 3 gives a summary of the descriptive statistics and the correlation between the different variables used in the model. In total, 18,791 observations contain values for all variables. The average firm age is 55,98 years, and it has approximately 2.609.000 employees. The boards have approximately 9,75 directors. CEOs are more likely to also be chairman of the board (average 1,56); the board is likely to have no CDO (average <0,5).

When looking at the diversity within the board, the Blue Index on the educational background, tenure, and network size are relatively left-skewed (mean = 0,62, mean = 0,60, and mean = 0,55). This indicates that on average, TMTs tend to be more varied. Whereas separation – gender is right-skewed (0,10), indicating that boards tend to consist of more people of the same gender as indicated by less separation.

This table 3 presents the total number of keywords per stage of DT/year. Digitization has been detected on average 43.05 times, digitalization 24.13 times, and digital transformation 2.29 times firm/year. These stages have a cumulative mean of 69.47 keywords per 10-k file.

As expected, there are significant correlations between the dependent variable and the three separate stages, with digitization (r =0.50), digitalization (r = 0.29), and Digital Transformation (r = 0,93). Moreover, Blue's Index Scores for the Number of Qualifications correlate with the dependent

variable (r = 0-0,03, r= - 0,01 (not significant), r= 0,05, and r= 0.03). Interestingly, it does not correlate significantly with all phases, assuming that the number of qualifications might be less impactful for the individual stages but essential for the overall cumulative efforts toward DT. In addition, Blue's Index score for Time on Board (r = -0,06, r=-0,05 r=-0,05 and r = 0,07) all significantly correlate respectively with the three stages and SUM of digitalization, suggesting that on the one side, longer tenure might lead to more comprehension of DT, but as it negatively correlates with the other dependent variables, might lead to increased resistance to change. Lastly, Blau's Index for the Network size (r = -0.21, r =-0.18, r=-0.11 and r=0.23) are all correlated towards the dependent variables, indicating that network size might hinder the individual stages of DT but has a positive impact on the cumulative efforts towards DT.

The independent Blau's Index (BI) variables are correlating with the dependent variables. Firstly, BI tenure with BI educational background (r = 0.08), indicating a weak positive effect of a diverse tenure on the educational background on managerial attention. Secondly, BI network size with BI education (r = 0.04) and BI tenure (r = 0.05), suggesting that network sizes positively influences educational background and tenure. Next, the moderating variables correlate significantly with the dependent variable, albeit weakly. In addition, age separation correlates positively with BI Education (r = 0,03) and BI tenure (r = 0.10) but negatively with network size (r = -0.28). Gender separation positively correlates with BI education (r = 0.04) and BI tenure (r = 0.08) but not with BI network size.

Lastly, the control variables correlate significantly with the dependent and independent variables, but since these correlation coefficients are relatively small, no issues regard-

ing multicollinearity are expected. Several interesting elements were analyzed in the control variables. Firm age negatively correlates with all different stages of DT (r=-0.18, r=-0.13, r=-0.09, r=-0.18), suggesting that older firms may reach lower levels of DT. Firm age positively correlates with the independent- and moderating variables, indicating that older firms may have more diverse boards. The size of a firm has a slight positive correlation with the dependent variables (r = 0.01, r=0.08, r=0.03, r=0.04) but negatively correlates with BI network size (r =-0.28), suggesting that larger companies have (relatively) smaller networks in comparison to their size. CEO duality negatively correlates with the dependent variables, indicating that firms where the CEO also serves as a chairman are less likely to participate in DT-related efforts. The number of Directors has weak but mixed significant correlation outcomes (r = -0.06, r=0.03, r=-0.01, r=-0.03) towards the dependent variables, which could be explained as a greater number of directors, negatively impact managerial attention (excluding digitalization). The correlation of the number of directors towards the BI education (r = 0.14), BI tenure (r= 0.29) and the Separation variables (Age – r = 0.33 & gender r = 0.29) is relatively strong for this model, suggesting that a greater number of directors enhances the possibility of diversity within teams. CEO compensation correlations with the variables are generally weak, suggesting no relation between the stages of DT and compensation. The presence of a CDO correlates positively with the later stages of DT (excluding digitization) (Digitalization r = 0.06, DT r=0.02, SUM r=0.03). The total amount of words in a 10-K file positively correlates with all dependent variables (r= 0.07, r=0.11, r=0.09, r=0.1), concluding that more comprehensive 10-K filings seem more involved with DT. Which could be due to the information density of the reports, addressing topics in more detail.

4.2. Regression Results and Hypothesis Testing

Table 4 presents the Negative Binomial Regression results to test the hypotheses in section 2. The total amount of models used to compile this table is 44. In this section, the main model, which includes a sum of the three phases of digitization, will be examined using a fixed-effects method, the number of observations, and the number of firms that decline per stage. Table 5 provides an overview of the three different stages of digitization and their respective outcomes. The natures of the three different stages differ. However, this study aims to look at the firms in their totality with regard to DT, hence, this section will discuss the outcomes based on the proposed hypothesis. As stated in the literature section, and uses the primary model analysis, complemented with the extended regression model, as this has an overview of the individual stages.

The number of observations for this model is 18,791. In the lower sections of the table, there are independent fit models- using the Akaike & Bayesian information criterion (AIC, BIC), as well as the log-likelihood. Although the BIC indicator is above the threshold ($\Delta i > 10$), the AIC and the log-likelihood estimators (from now on LL) decrease from

model 4.1 (AIC = 197,199; LL =-98,591) to model 4.4 (AIC = 193,758; LL -96,860), indicating that there is minimal loss of information and a model which improves from basics towards a complete model (Burnham & Anderson, 2004). This trend has been seen for all the different individual stages of D; digitization 1.1 (AIC = 178,567; LL = -89,274) to 1.4 (AIC = 174,872; LL = -87,417), digitalization 2.1 to 2.4 (AIC = 157,112; LL = -78,548) to 2.4 (AIC = 154,597; LL = -77,280), and digital transformation 3.1 (AIC = 56,368; LL =-28,176) to 3.4 (AIC = 54,731; LL = 27,342). These results suggest that every final model of the different stages is most adequate.

The regression has been split into the three Digital Transformation stages and a cumulative model. In this section, the model numbers correspond with the model of the different stages 1.1 to 1.4 is linked with digitization, model 2.1 to 2.4 with digitalization, and 3.1 to 3.4 with Digital Transformation as stated in Table 5. As displayed in Table 4, the main model contains models 4.1 to 4.4. This section first discusses the individual stages of DT, followed by an interpretation of the SUM DT efforts.

Hypothesis 1: *A positive relationship exists between diversity in the number of educational qualifications and the level of attention towards DT in a firm.* Contrary to this hypothesis, the regression results across models 1.1 to 2.4 are non-significant coefficients. However, for the Digital Transformation stage, an increase in diversity in the number of qualifications is associated with a decrease in attention towards managerial attention. There is a non-significant effect for the sum of DT efforts, concluding that the hypothesis cannot be supported.

Hypothesis 2: *There is a positive relationship between board members' diversity in tenure (length of service) and the level of attention towards digital transformation in a firm.* H2 predicts a positive relationship. However, since the first two phases of DT do not have significant results, DT has a negative significant correlation (model 3.3 b =-0.2183, p<0.01). For the SUM of DT efforts, the outcome in model 4.2 (b = -0.02; not significant) and 4.3 (b = - 0.0598; p < 0.1) is negative and significant, indicating a negative relationship between the level of managerial attention, further disproving Hypothesis 2.

Hypothesis 3: *There is a positive relationship between the diversity in the network sizes of board members and the level of attention towards digital transformation in a firm.* H3 predicts a positive relation, but the different models consistently show a strong negative relationship. The most substantial negative significant effect is seen during Digital Transformation in model 3.1 (b = -0.3283; p<0.01). For the sum of DT efforts, models 4.2 to 4.4 have strong negative relationships between the SUM and BI Network size, all significant at the 0.001 level (-0,17, -0,16, -0,16). These results are contradictory to H3, which predicted a positive relationship.

Hypothesis 4a*: Diversity in age moderates the relationship between the number of Qualifications and the attention toward digital transformation in a firm, resulting in a negative moderating effect.* The interaction is not significant in the dig-

Table 3: Descriptive statistics

	Mean	S.D.	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Dependent Variables																				
(1) Digitization	43.05	70.78	0	990	1															
(2) Digitalisation	24.13	39.52	0	660	0.50***	1														
(3) Digital Transformation	2.29	10.48	0	404	0.29***	0.32***	1													
(4) Cumulative SUM DT	69.47	100.83	0	1482	0.93***	0.77***	0.44***	1												
Independent Variables																				
(5) BI - Educational Background	0.62	0.12	0	0.83	-0.03***	-0.01	-0.05***	0.3***	1											
(6) BI - Tenure	0.61	0.19	0	0.80	-0.06***	-0.05***	-0.05***	0.07***	0.08***	1					P					
(7) BI - Network Size	0.55	0.20	0	0.80	-0.21***	-0.18***	-0.11***	0.23***	0.04***	0.05***	1									
Moderating Variables																				
(8) Age Separation	1.82	1.65	0.00	20.51	0.04***	0.05***	0.03***	0.05***	0.03***	0.10***	-0.28***	1								
(9) Gender Separation	0.10	0.06	0.00	0.35	0.06***	0.07***	0.04***	0.08***	0.00	0.19***	-0.16***	0.09***	1							
Control Variables																				
(10) Age of the Firm	55.98	44.30	0	239	-0.18***	-0.13***	-0.09***	-0.18***	0.06***	0.24***	-0.10***	0.11***	0.14***	1						
(11) Size of the Company (in 1,000,000)	26.09	90.08	0	2925	0.01	0.08***	0.03***	0.04***	0.03***	0.09***	-0.28***	0.16***	0.1***	0.07***	1					
(12) Dummy - CEO duality	1.56	0.5	1	2	-0.10***	-0.05***	-0.03***	-0.1***	-0.01	0.06***	-0.07***	0.06***	0.00	0.1***	0.01	1				
(13) Number of Directors on a Board	9.75	2.48	1	33	-0.06***	0.03***	-0.01	-0.03***	0.14***	0.29***	-0.2***	0.33***	0.19***	0.32***	0.2***	0.03***	1			
(14) Total Compensation CEO	53.41	4127.04	0	563802.28	0.00	0.02***	0.00	0.01	0.00	0.00	-0.01	0.00	0.01	-0.01	0.01	0.01	0.01	1		
(15) Dummy - Presence CDO	0.02	0.13	0	1	0.01	0.06***	0.02***	0.03***	0.00	0.03***	-0.01***	0.04***	0.06***	0.06***	0.05***	-0.03***	0.08***	0.00	1	
(16) Total Amount of Words in 10-K (in 1,000)	61.03	31.61	1.5	1150.25	0.07***	0.11***	0.09***	0.1***	0.00	-0.03***	-0.11***	0.07***	0.09***	0.02***	0.00	0.00	0.19***	0.01	0.08	1

Note: N=18,791, significance level at ***p<.01, **p<.05, *p<.10.

itization phase but is negatively significant in the Digitization phase (Model 2.3; b =-0.10131; p < 0.05), indicating that the predicted moderating effect is present in this phase of DT. For the SUM of DT efforts, there is no significant interaction in model 4.3 (b = -0.003; p > 0.05). From these results, we can conclude that there is support for the individual phase *digitization* but not for the SUM of DT efforts.

Hypothesis 4b: *Age moderates the relationship between the time on a board and the attention toward digital transformation in a firm, resulting in a negative moderating effect.* H4B predicts a negative relation, and the interaction terms are significant across all phases of DT. Most vital in the digitization model 1.3 (b = -0.1273; p<0.001), but also present digitalization (b = -0.0999; p <0.05) and most robust in Digital Transformation (b=-0.1534; p <0.01). DT efforts, the interaction effort is positive and significant in model 4.3 (b = 0.0187; p < 0.01), contrasting the predicted negative moderating effect. Hypothesis 4C is therefore not supported.

Hypothesis 4c: *Age moderates the relationship between the network size of the different individuals in a board and the attention toward digital transformation in a firm, resulting in a negative moderating effect.* H4C predicts a negative relation, but there are positive significant outcomes in digitization and digital transformation (b = 0.249; p<0.001 and b =0.0186; p<0.1). For the SUM of For the SUM of DT efforts, the interaction term is negative and significant (b = -0.1185; p< 0.01), indicating that age indeed negatively moderates the relationship between time on board and attention towards cumulative Digital Transformation efforts. This supports Hypothesis 4B.

Hypothesis 5a: *Gender moderates the relationship between the number of Qualifications and the attention toward digital transformation in a firm, resulting in a negative moderating effect.* H5A predicts a negative relation, and the interaction terms are negative across all DT stages. The only significant negative interaction term is in model 3.4 (b = -0.0375; p<0.1). For the SUM of DT efforts, model 4.4 is negative and significant (b = -0,012; p <0.1), concluding that hypothesis 5A is supported for the cumulative efforts towards DT, and that a larger separation in gender within a board decreases the impact of the positive effect of diversity in educational background.

Hypothesis 5b: *Gender moderates the relationship between the time on a board and the attention toward digital transformation in a firm, resulting in a negative moderating effect.* H5B predicts a negative relation, and the significant outcomes relevant to this hypothesis are in model 1.4 (b = 0.0795; p< 0.05) and 2.4 (b = 0.1819, p < 0.01), indicating a negative significant relationship for the stages digitization and digitalization. For the SUM of DT efforts, there is no significant interaction effect in model 4.4. This is supported for the individual stages (digitization and digitalization), but the hypothesis (5B) is not supported.

Hypothesis 5c: *Gender moderates the relationship between the Network Sizes of the different individuals on a board and the attention toward digital transformation in a firm, resulting in a negative moderating effect.* H5c predicts a neg-

ative relation, and the interaction terms are negative and significant across all individual stages of DT (b = -0.0318; p <0.01, b = -0.0380; p < 0.01 and b = -0.0359; p <0.1). For the SUM of DT efforts, model 4.4 states that the interaction effect is negative and significant (b = 0.0358; p < 0.01), supporting hypothesis 5C. Concluding that a larger separation in gender, decreases the impact of the diversity in network size with respect to managerial attention.

An interpretation of the control variables leads to the following observations. The age of the firm is negatively associated with the four distinct models (1.1 to 4.4); the strongest effects are observed in the digital transformation stage (model 3.4 b = -0.2448; p <0.001). The size of a firm is positively associated with attention across all individual stages; the level of significance varies between strongest in the digital transformation phase (b = 0.063; p <0.01) and weakest in the SUM model (model 4.1 b = 0.0177; p < 0.001). CEO duality is negatively associated with all four models of DT, suggesting that firms where the CEO is also chair, might be less attentive to DT efforts (model 4.1; b = -0.1403; p <0.001). The number of directors in a TMT has mixed effects across the DT stages. However, model 4.4 is negative and significant (b = - 0.029; p < 0.001), indicating that a larger board size might be associated with a decreased focus on DT efforts.

The compensation of the CEO has a weak positive effect on digitalization (model 2.1 b = 0.007; p <0.05) but not on other stages. A CDO is positively associated with all models and is most vital in the Digital Transformation stage (model 3.1; b = 0.8227; p <0.001). The word count in a 10-K file shows a consistent positive relationship with attention to DT efforts across all individual stages of DT (b = 0.7; p < 0.001 in model 4.4).

To interpret the marginal effects, 6 estimated marginal effect plots with 95% Confidence Intervals (Cis; shaded areas) are visualized in Figure 2. These 6 plots are relevant to the main model, the remaining 18 models (linked to the individual stages) can be found in Appendix 3. The plots visualize the two moderating variables (separation) interacting with the independent variables (Blau's Index). These marginal effect plots have three systemic percentiles visualized: 5th percentile, 50th percentile (median), and 95th percentile (Mize, 2019). These systemic percentiles correspond with colors presented in the figure; red lines visualize low levels of separation, green lines average levels, and blue lines have high levels of separation. Highly overlapping Cis indicate no moderating effect, whereas non-overlapping areas indicate a significant difference. As visualized in Figure 2, there are several outcomes which have non-overlapping moderating effects. Including gender and tenure; gender and network size; gender and educational background as well as age and network size (when low). This indicates that the moderation effect of the stated interactions have a significant effect on the independent variables, intensifying when separation increases.

To conclude, the Blau Index score indicates that this board characteristics, network size, consistently negatively

Table 4: Main Model – Negative Binomial Regression

Dependent Variable	Model 4.1	Model 4.2	Model 4.3	Model 4.4
	Total Sum Keywords Digital Transformation Stages			
Independent Variables				
BI - Educational Background		0.00	-0.00	-0.0009
		(0.01)	(0.01)	(0.0060)
BI - Tenure		-0.01	-0.02*	-0.0598
		(0.01)	(0.01)	(0.0335)
BI - Network Size		-0.17***	-0.16***	-0.1640***
		(0.01)	(0.01)	(0.0064)
Moderating Variables				
Age Separation			0.00	0.0670**
			(0.00)	(0.0249)
Gender Separation			1.22***	0.0495**
			(0.10)	(0.0185)
Interaction Variables				
Interaction effect - Qualifications x Age				-0.0030
				(0.0059)
Interaction effect - Time on Board x Age				-0.1185***
				(0.0356)
Interaction effect - Network Size x Age				0.0187***
				(0.0044)
Interaction effect - Qualifications x Gender				-0.0117*
				(0.0059)
Interaction effect - Time on Board x Gender				0.0486
				(0.0295)
Interaction effect - Network Size x Gender				-0.0358***
				(0.0066)
Control Variables				
Age of the Firm	-0.11***	-0.12***	-0.12***	-0.1248***
	(0.01)	(0.01)	(0.01)	(0.0066)
Size of the Company	0.04***	0.02***	0.02***	0.0177***
	(0.00)	(0.00)	(0.00)	(0.0045)
Dummy - CEO Duality	-0.11***	-0.14***	-0.14***	-0.1403***
	(0.01)	(0.01)	(0.01)	(0.0121)
Number of Directors on a Board	0.01	-0.01*	-0.03***	-0.0289***
	(0.01)	(0.01)	(0.01)	(0.0071)
Total Compensation CEO	0.01	0.01	0.01	0.0052
	(0.01)	(0.01)	(0.01)	(0.0038)
Dummy - Presence CDO	0.17***	0.09*	0.09*	0.0760
	(0.05)	(0.05)	(0.04)	(0.0449)
Total Amount of Words in 10-K	0.08***	0.07***	0.07***	0.0700***
	(0.00)	(0.00)	(0.00)	(0.0040)
Observations	19,036	19,034	18,791	18,791
AIC	197199	196446	193806	193758
BIC	197261	196533	193809	193907
Log-likelihood	-98591	-98212	-96890	-96860

Standard errors in parentheses, significance levels at *** p<0.001, ** p<0.01, * p<0.05 I N = 18,791

impact transformation efforts. This suggests that having a more extensive network may not benefit DT efforts. The moderating variables play a significant role, indicating that demographic diversity within a board can influence how the board impacts DT. The different interaction terms suggest a complex dynamic with varying outcomes. This leaves us to assume that while the board composition can significantly impact the DT efforts, other factors such as the control variables (e.g., firm age, size, leadership structure, and CDO presence and thoroughness of corporate reporting) are also critical.

5. Discussion

5.1. Theoretical Contributions and Implications

This research investigated the role of Top Management Team compositions and their respective levels of diversity (variety and separation) in combination with managerial attention on digital transformation efforts. The aim of this was to understand *when* and *why* managerial attention shifts during the cumulative process of digital transformation. In order to increase understanding of the individual stages, these have been added to this study as well. As addressed in the introduction, the current gap in literature presents opportunities for combining UET with DT, in addition, this study succeeded in advancing literature with regards to distinguishing the effects of the different kinds of diversity, as well as their effects on optimal board composition per phase.

First, intending to advance the Upper Echelon Theory as a framework to look at TMT's, with digital transformation, several inconsistencies have been found when comparing the empirical findings to current the literature. The independent variables, diversity in education, tenure, and network size, do not directly influence managerial attention toward digital transformation. This opposes Hambrick et al. (1996). For diversity in the number of qualifications, the cumulative effects are non-significant, opposing Bredthauer et al. (2020), Erhardt et al. (2003), and Wiersema and Bantel (1993). However, it negatively contributes to the individual stage of digital transformation, which might be due to the holistic and drastic nature of digital transformation (Verhoef et al., 2021). In addition, diversity in tenure negatively correlates with the individual stage of digital transformation, opposing Hambrick et al. (1996), stating that it would positively contribute towards innovation. Due to being a relatively new phenomenon and heterogeneous firms being slower but qualitatively better in their strategic changes, it might be that these phases still need to happen, which would explain the current empirical outcomes (Gilson et al., 2013; Wiersema & Bantel, 1993). Diversity in network size, as proposed by Ridwansyah et al. (2023), does not positively influence attention to digital transformation. This study's empirical outcomes suggest that diversity tends to negatively impact managerial attention during every stage, which might be explained by overstimulation of information, linking the empirical findings to the bounded rationality theory (Clark et al., 2003).

Second, this study further explored the moderating effects of age and gender separation on the demographic diversity. This study hypothesized that the separation would negatively moderate digital transformation while age separation only negatively moderates the digitalization stage in the empirical findings. This might be explained by Rogers' innovation diffusion theory (Oliveira & Martins, 2011), as explained by to digitalization as a threshold (Wonglimpiyarat & Yuberk, 2005). As found in the empirical evidence, age separation negatively moderates tenure, enhancing research on this topic (Bredthauer et al., 2020). In conclusion, age separation about diversity in network size, as found in the study, positively moderates the attention to DT, contradicting the hypothesis suggested in this study (Matarazzo et al., 2020). This could be explained by the decreased need for an extensive network because a diverse team can represent and connect with different elements of the firm (Bantel & Jackson, 1989).

Third, gender separation influencing the diversity in educational has been correctly hypothesized, confirming O'Reilly et al. (1989) research. While gender separation has a negatively moderating impact on diversity in tenure concerning the initial stages of digital transformation (digitization and digital transformation), this study has found no support for the individual stage of digital transformation and the cumulative efforts of DT. The reason for this may relate to the increased conflict of age separation within TMTs (O'Reilly et al., 1989), increasing the time to understand one another, which delayed the current evidence for these later phases of DT (Rao & Tilt, 2015). Gender separation in relation to network sizes is correctly hypothesized, as this has a negative moderating effect on managerial attention to DT. The individual stages, as well as the cumulative efforts, are negative, which could be explained by the decrease for a variety in the number of contacts due to the increased initial diversity within a board (Rao & Tilt, 2015).

5.2. Managerial implications

This study concludes with insights for practitioners. As digital transformation efforts become a necessity of continuous innovation for firms, managers and shareholders might consider re-evaluating the board composition for the different stages of digital transformation and adjust their hiring efforts accordingly. While this research aimed to look at cumulative efforts towards Digital Transformation, several compositions have been found essential for the individual stages, these are described in Table 6. Insights that are applicable across the DT journey consist of the interaction between age and tenure , gender and network, indicating that low age separation in a TMT with longer tenure decreases the amount of managerial attention to DT, and low gender separation and larger networks also decrease the amount of managerial attention to DT. TMTs might use the insights of the different stages in combination with self-reflection of their current stage to focus on their following strategic goals and analyse competitors to explore future strategic goals.

Table 5: Extensive Regression Model

Dependent Variable	Model 1.1	Model 1.2 Keywords digitization	Model 1.3	Model 1.4	Model 2.1	Model 2.2 Keywords Digitalisation	Model 2.3	Model 2.4	Model 3.1	Model 3.2 Keywords Digital Transformation	Model 3.3	Model 3.4
Independent												
BI - Education		-0.0006 (0.0063)	-0.0036 (0.0063)	-0.0047 (0.0063)		0.0092 (0.0062)	0.0063 (0.0062)	0.0060 (0.0062)		-0.0248* (0.0124)	-0.0287* (0.0125)	-0.0267* (0.0126)
BI - Tenure		0.0047 (0.0073)	-0.0076 (0.0073)	-0.0302 (0.0355)		-0.0127 (0.0071)	-0.0155* (0.0072)	-0.0549 (0.0356)		-0.0430** (0.0136)	-0.0507*** (0.0138)	-0.2183** (0.0671)
BI - Network		-0.1825*** (0.0063)	-0.1730*** (0.0065)	-0.1742*** (0.0067)		-0.1406*** (0.0063)	-0.1389*** (0.0065)	-0.1353*** (0.0068)		-0.3283*** (0.0112)	-0.3170*** (0.0117)	-0.3162*** (0.0123)
Moderating Variables												
Age Separation			0.0062 (0.0039)	0.0626* (0.0266)			0.0002 (0.0040)	0.0618* (0.0266)			0.0019 (0.0075)	0.0847 (0.0511)
Gender Separation			1.7642*** (0.1035)	0.1077*** (0.0199)			0.6845*** (0.1036)	-0.0039 (0.0194)			1.7571*** (0.2045)	-0.0103 (0.0368)
Interaction Variables												
Qualifications × Age				-0.0019 (0.0062)				-0.0131* (0.0064)				0.0045 (0.0119)
Tenure × Age				-0.1273*** (0.0379)				-0.0999** (0.0382)				-0.1534* (0.0737)
Network Size × Age				0.0249*** (0.0046)				0.0084 (0.0047)				0.0186* (0.0084)
Education x Gender				-0.0100 (0.0063)				-0.0109 (0.0061)				-0.0375** (0.0123)
Tenure × Gender				0.0120 (0.0315)				0.0795* (0.0310)				0.1819** (0.0587)
Network Size × Gender				-0.0318*** (0.0068)				-0.0380*** (0.0073)				-0.0359** (0.0122)
Control Variables												
Age of the Firm	-0.0941*** (0.0069)	-0.1129*** (0.0069)	-0.1174*** (0.0069)	-0.1185*** (0.0069)	-0.0894 (0.0068)	-0.0999*** (0.0069)	-0.1009*** (0.0069)	-0.1009*** (0.0069)	-0.2238*** (0.0142)	-0.2406*** (0.0143)	-0.2433*** (0.0143)	-0.2448*** (0.0144)
Size of the Company	0.0371*** (0.0039)	0.0087 (0.0050)	0.0052 (0.0052)	0.0066 (0.0051)	0.0509*** (0.0035)	0.0319*** (0.0042)	0.0315*** (0.0042)	0.0310*** (0.0042)	0.0629*** (0.0062)	0.0184* (0.0085)	0.0171* (0.0087)	0.0162 (0.0088)
Dummy - CEO duality	-0.1203*** (0.0129)	-0.1473*** (0.0128)	-0.1560*** (0.0128)	-0.1524*** (0.0128)	-0.0697 (0.0127)	-0.0902*** (0.0126)	-0.0933*** (0.0127)	-0.0937*** (0.0127)	-0.0945*** (0.0250)	-0.1522*** (0.0250)	-0.1542*** (0.0253)	-0.1526*** (0.0253)
Total Directors	0.0085 (0.0068)	-0.0170* (0.0071)	-0.0349*** (0.0075)	-0.0350*** (0.0075)	0.0151* (0.0068)	-0.0028 (0.0071)	-0.0115 (0.0075)	-0.0118 (0.0075)	0.0444*** (0.0132)	0.0087 (0.0141)	-0.0043 (0.0149)	-0.0044 (0.0149)
Total Compensation CEO	0.0049 (0.0044)	0.0047 (0.0045)	0.0044 (0.0044)	0.0043 (0.0044)	0.0073* (0.0037)	0.0072* (0.0036)	0.0071* (0.0036)	0.0071* (0.0036)	-0.0053 (0.0136)	-0.0066 (0.0149)	-0.0069 (0.0148)	-0.0069 (0.0148)
Dummy - Presence CDO	0.1804*** (0.0486)	0.0887 (0.0474)	0.0863 (0.0468)	0.0708 (0.0469)	0.2015*** (0.0478)	0.1379** (0.0469)	0.1392** (0.0466)	0.1229** (0.0467)	0.8277*** (0.0696)	0.6446*** (0.0685)	0.6442*** (0.0684)	0.6304*** (0.0685)
Total words 10 K filing	0.0799*** (0.0039)	0.0705*** (0.0043)	0.0665*** (0.0045)	0.0678*** (0.0045)	0.0715*** (0.0038)	0.0654*** (0.0040)	0.0636*** (0.0041)	0.0644*** (0.0041)	0.0790*** (0.0059)	0.0776*** (0.0063)	0.0762*** (0.0065)	0.0765*** (0.0065)
Number of Observations	18,791	18,791	18,791	18,791	18,791	18,791	18,791	18,791	18,791	18,791	18,791	18,791
AIC	178567	177420	174916	174872	157112	156646	154632	154597	56368	55564	54745	54721
BIC	178646	177507	175018	175021	157175	156732	154734	154746	56431	55651	54847	54870
Log-likelihood	-89274	-88699	-87445	-87417	-78548	-78312	-77303	-77280	-28176	-27771	-27359	-27342

Standard errors in parentheses, significance levels at *** p<0.001, ** p<0.01, * p<0.05 II Year fixed effects: YES
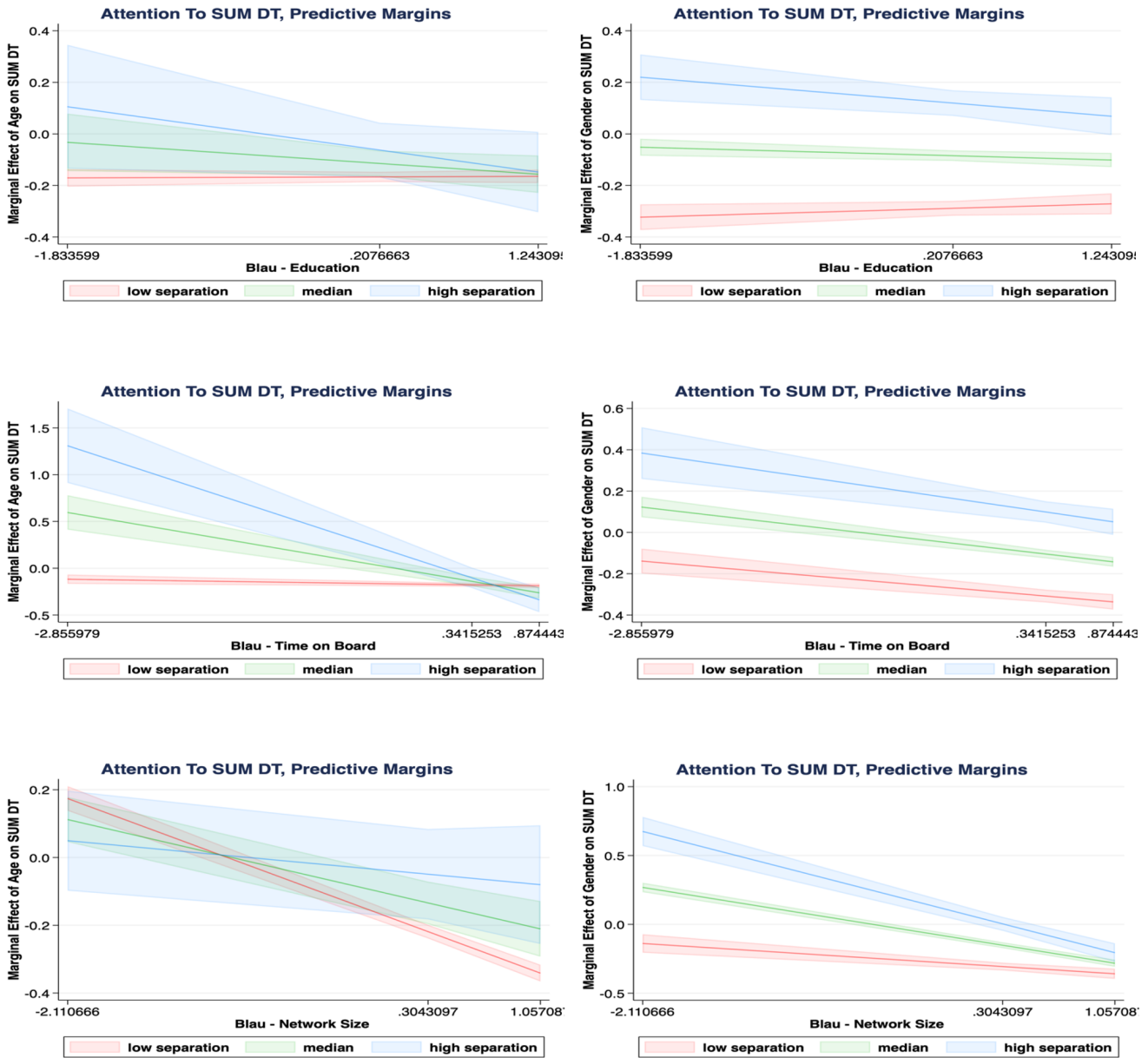
Figure 2: Predicted marginal effects

5.3. Limitations and future research

This study is subject to limitations due to time constraints or human errors but offers promising topics for future research. First, the study focuses on top-performing firms, as they are part of the Russell 3000, potentially leading to a selection bias. Considering this bias, the study's generalizability is limited to the largest firms in the United States. Second, due to the nature of the research, looking at the compositions of boards during the individual phases and the cumulative DT efforts. Third, while the data, supervised by Dr. Marvin Hanisch, is of high quality, the merge with the individual board member information decreased the number of total observations due to lacking information from both datasets. This in combination with manually calculating the Blau's Index scores and separation; while it has been done several

times and checked over and over, there might be data points that slipped through. Last, due to the nature of the negative binomial regression, it might have impacted the results of the outcomes.

Future research could be considered to uncover the complex dynamics of Top Management Team compositions. To understand the different board compositions and their effect on managerial attention and the sociological group dynamics that stimulate these mechanisms. For this research, a qualitative approach might be more appropriate. In addition to this, a generalized study, including a larger sample of firms, could be included, including small- and medium-sized firms as well as family-owned firms, to discover if the found effects would be similar in these types of firms.

Table 6: Managerial recommendations

Digitization	Low age separation combined with a similar educational background decreases the managerial attention toward digitization. Low age separation with larger network sizes increases this initial stage of DT. However, low gender separation with longer tenure decreases the managerial attention to digitization.
Digitalization	Low gender separation, in combination with longer tenure, decreases the amount of managerial attention toward Digitalisation.
Digital Transformation	A TMT with similar educational qualifications harms managerial attention to digital transformation. Similarly, low separation of gender and the number of qualifications obtained by a TMT hurts managerial attention. Lastly, low age separation, combined with an extensive network size, positively impacts managerial attention.
The sum of DT Efforts	Larger network sizes hurt managerial attention towards DT in general. In the overall DT efforts, low gender separation combined with a similar number of education qualifications has negatively impact managerial attention to cumulative DT efforts.

References

Abtahi, Z., Chkir, I., & Benkraiem, R. (2023). Board diversity and Corporate Innovation: New evidence from the Canadian context. *Finance Research Letters*, *55*, 103826. https://doi.org/10.1016/j.frl.2023.103826

Adams, R. B., & Ferreira, D. (2008). Women in the boardroom and their impact on governance and performance. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1107721

Appio, F. P., Frattini, F., Petruzzelli, A. M., & Neirotti, P. (2021). Digital Transformation and innovation management: A synthesis of existing research and an agenda for future studies. *Journal of Product Innovation Management*, *38*(1), 4–20. https://doi.org/10.1111/jpim.12562

Bantel, K. A., & Jackson, S. E. (1989). Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal*, *10*(S1), 107–124. https://doi.org/10.1002/smj.4250100709

Besson, P., & Rowe, F. (2012). Strategizing Information Systems-enabled organizational transformation: A transdisciplinary review and New Directions. *The Journal of Strategic Information Systems*, *21*(2), 103–124. https://doi.org/10.1016/j.jsis.2012.05.001

Bredthauer, J., Dolinsky, M., & Taylor, B. (2020). Top management teams and investment decisions: A study of executive experience and cultural diversity. *Corporate Ownership and Control*, *17*(4), 200–213. https://doi.org/10.22495/cocv17i4art16

Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *Academy of Management Journal*, *45*(5), 875–893. https://doi.org/10.5465/3069319

Burnham, K. P., & Anderson, D. R. (2004). Multimodel inference. *Sociological Methods & Research*, *33*(2), 261–304. https://doi.org/10.1177/0049124104268644

Carpenter, M. A. (2002). The implications of strategy and social context for the relationship between top management team heterogeneity and firm performance. *Strategic Management Journal*, *23*(3), 275–284. https://doi.org/10.1002/smj.226

Carter, C. B., & Lorsch, J. W. (2004). Back to the drawing board: Designing corporate boards for a complex world.

Chanias, S., Myers, M. D., & Hess, T. (2019). Digital transformation strategy making in pre-digital organizations: The case of a financial services provider. *The Journal of Strategic Information Systems*, *28*(1), 17–33. https://doi.org/10.1016/j.jsis.2018.11.003

Chiang, H. T., & Lin, M. C. (2011). Examining board composition and firm performance. *International Journal of Business and Finance Research*, *5*(3), 15–27.

Clark, K. D., Smith, K. G., & Oliver, C. (2003). Top management team social networks and organizational innovation: An information theory explanation of tmt value creation. *Administrative Science Quarterly*, *26*, 1–56.

Cox, T. H., & Blake, S. (1991). Managing cultural diversity: Implications for organizational competitiveness. *Academy of Management Perspectives*, *5*(3), 45–56. https://doi.org/10.5465/ame.1991.4274465

Dezsö, C. L., & Ross, D. G. (2012). Does female representation in top management improve firm performance? A panel data investigation. *Strategic Management Journal*, *33*(9), 1072–1089. https://doi.org/10.1002/smj.1955

Downes, L., & Nunes, P. (2016). Big Bang Disruption. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2709801

Erhardt, N. L., Werbel, J. D., & Shrader, C. B. (2003). Board of director diversity and firm Financial Performance. *Corporate Governance: An International Review*, *11*(2), 102–111. https://doi.org/10.1111/1467-8683.00011

Fernandez-Vidal, J., Perotti, F. A., Gonzalez, R., & Gasco, J. (2022). Managing digital transformation: The view from the top. *Journal of Business Research*, *152*, 29–41. https://doi.org/10.1016/j.jbusres.2022.07.020

Ferrigno, G., Del Sarto, N., Piccaluga, A., & Baroncelli, A. (2023). Industry 4.0 base technologies and business models: A Bibliometric analysis. *European Journal of Innovation Management*, *26*(7), 502–526. https://doi.org/10.1108/ejim-02-2023-0107

Finkelstein, S., & Hambrick, D. C. (1996). *Strategic leadership: Top executives and their effects on organizations*. West Publ. Co.

Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2014). Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, *55*(2), 1.

Furr, N. R., Cavarretta, F., & Garg, S. (2012). Who changes course? The role of domain knowledge and novel framing in making technology changes. *Strategic Entrepreneurship Journal*, *6*(3), 236–256. https://doi.org/10.1002/sej.1137

Gardner, H. (1995). "Multiple intelligences" as a catalyst. *The English Journal*, *84*(8), 16. https://doi.org/10.2307/821182

Gilson, L. L., Lim, H. S., Luciano, M. M., & Choi, J. N. (2013). Unpacking the cross-level effects of tenure diversity, explicit knowledge, and knowledge sharing on individual creativity. *Journal of Occupational and Organizational Psychology*, *86*(2), 203–222. https://doi.org/10.1111/joop.12011

Grossman, P., & Eckel, C. (2012). Giving versus taking: a "real donation" comparison of warm glow and cold prickle in a context-rich environment. *Monash University Department of Economics Working paper*, (20-12).

Haffke, I., Kalgovas, B. J., & Benlian, A. (2016). The role of the CIO and the CDO in an organization's digital transformation.

Hambrick, D. C. (2007). Upper Echelons Theory: An update. *Academy of Management Review*, *32*(2), 334–343. https://doi.org/10.5465/amr.2007.24345254

Hambrick, D. C., Cho, T. S., & Chen, M.-J. (1996). The influence of top management team heterogeneity on firms' competitive moves. *Administrative Science Quarterly*, *41*(4), 659. https://doi.org/10.2307/2393871

Hambrick, D. C. (1984). Taxonomic approaches to studying strategy: Some conceptual and methodological issues. *Journal of management*, *10*(1), 27–41.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of management review*, *9*(2), 193–206.

Hanelt, A., Firk, S., Hildebrandt, B., & Kolbe, L. M. (2020). Digital M&A, digital innovation, and firm performance: An empirical investigation. *European Journal of Information Systems*, *30*(1), 3–26. https://doi.org/10.1080/0960085x.2020.1747365

Harrison, D. A., & Klein, K. J. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, *32*(4), 1199–1228. https://doi.org/10.5465/amr.2007.26586096

Hausman, J. A., & Taylor, W. E. (1981). Panel data and unobservable individual effects. *Econometrica*, *49*(6), 1377. https://doi.org/10.2307/1911406

Henfridsson, O., & Bygstad, B. (2013). The generative mechanisms of digital infrastructure evolution. *MIS Quarterly*, *37*(3), 907–931. https://doi.org/10.25300/misq/2013/37.3.11

Herrmann, P., & Datta, D. K. (2005). Relationships between top management team characteristics and international diversification: An empirical investigation. *British Journal of Management*, *16*(1), 69–78. https://doi.org/10.1111/j.1467-8551.2005.00429.x

Hess, T., Matt, C., Benlian, A., & Wiesböck, F. (2020). Options for formulating a digital transformation strategy. In *Strategic Information Management* (pp. 151–173). Routledge. https://doi.org/10.4324/9780429286797-7

Horwitz, S. K., & Horwitz, I. B. (2007). The effects of team diversity on team outcomes: A meta-analytic review of team demography. *Journal of Management*, *33*(6), 987–1015. https://doi.org/10.1177/0149206307308587

Jackson, S. E., Joshi, A., & Erhardt, N. L. (2003). Recent research on team and organizational diversity: SWOT analysis and implications. *Journal of Management*, *29*(6), 801–830. https://doi.org/10.1016/s0149-2063_03_00080-1

Kilduff, M., Angelmar, R., & Mehra, A. (2000). Top management-team diversity and firm performance: Examining the role of cognitions. *Organization Science*, *11*(1), 21–34. https://doi.org/10.1287/orsc.11.1.21.12569

Knight, D., Pearce, C. L., Smith, K. G., Olian, J. D., Sims, H. P., Smith, K. A., & Flood, P. (1999). Top management team diversity, group process, and strategic consensus. *Strategic Management Journal*, *20*(5), 445–465. https://doi.org/10.1002/(sici)1097-0266(199905)20:5<445::aid-smj27>3.0.co;2-v

Konrad, A. M., & Gutek, B. A. (1987). Theory and research on group composition: Applications to the status of women and ethnic minorities. In *Interpersonal Processes* (pp. 85–121).

Kunze, F., Boehm, S. A., & Bruch, H. (2010). Age diversity, age discrimination climate and performance consequences—a cross-organizational study. *Journal of Organizational Behavior*, *32*(2), 264–290. https://doi.org/10.1002/job.698

Lau, D. C., & Murnighan, J. K. (1998). Demographic diversity and faultlines: The compositional dynamics of organizational groups. *Academy of management review*, *23*(2), 325–340.

Lawrence, B. S. (1997). Perspective—the black box of organizational demography. *Organization Science*, *8*(1), 1–22. https://doi.org/10.1287/orsc.8.1.1

Lin, H.-F., Su, J.-Q., & Higgins, A. (2016). How dynamic capabilities affect adoption of management innovations. *Journal of Business Research*, *69*(2), 862–876.

Locke, K. D., & Horowitz, L. M. (1990). Satisfaction in interpersonal interactions as a function of similarity in level of dysphoria. *Journal of Personality and Social Psychology*, *58*(5), 823–831. https://doi.org/10.1037//0022-3514.58.5.823

Matarazzo, M., Penco, L., Profumo, G., & Quaglia, R. (2021). Digital transformation and customer value creation in made in Italy SMEs:

A dynamic capabilities perspective. *Journal of Business Research*, *123*, 642–656. https://doi.org/10.1016/j.jbusres.2020.10.033

Matarazzo, M., Penco, L., & Profumo, G. (2020). How is digital transformation changing business models and internationalisation in Made in Italy SMEs? *Sinergie Italian Journal of Management*, *38*(3), 89–107.

Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, *57*(5), 339–343. https://doi.org/10.1007/s12599-015-0401-5

McAfee, A., & Brynjolfsson, E. (2017). *Machine, platform, crowd: Harnessing our digital future*. WW Norton & Company.

Mize, T. (2019). Best practices for estimating, interpreting, and presenting nonlinear interaction effects. *Sociological Science*, *6*, 81–117. https://doi.org/10.15195/v6.a4

Nielsen, S. (2010). Top management team diversity: A review of theories and methodologies. *International Journal of Management Reviews*, *12*(3), 301–316. https://doi.org/10.1111/j.1468-2370.2009.00263.x

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, *41*, 673–690.

Oliveira, T., & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *Electronic journal of information systems evaluation*, *14*(1), pp110–121.

Ones, D. S., Mount, M. K., Barrick, M. R., & Hunter, J. E. (1994). Personality and job performance: a critique of the Tett, Jackson, and Rothstein (1991) meta-analysis. *Personnel Psychology*, *47*(1), 147–156.

O'Reilly, C. A., Caldwell, D. F., & Barnett, W. P. (1989). Work group demography, social integration, and turnover. *Administrative Science Quarterly*, 21–37.

Pasamar, S., Diaz-Fernandez, M., & de La Rosa-Navarro, M. D. (2019). Human capital: the link between leadership and organizational learning. *European journal of management and business economics*, *28*(1), 25–51.

Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*, *30*(8), 1143–1160. https://doi.org/10.1108/jmtm-01-2018-0020

Rampling, P. N. (2012). Board influence on remuneration: A literature review. *Available at SSRN 2109213*.

Rao, K., & Tilt, C. (2015). Board composition and corporate social responsibility: The role of diversity, gender, strategy and decision making. *Journal of Business Ethics*, *138*(2), 327–347. https://doi.org/10.1007/s10551-015-2613-5

Ridwansyah, A., Lantu, D. C., & Anggoro, Y. (2023). Leadership dimensions and behaviors in business schools' forced digital transformation. *International Journal of Research in Business and Social Science (2147-4478)*, *12*(3), 159–170.

Rindova, V. P., & Kotha, S. (2001). Continuous "morphing": Competing through dynamic capabilities, form, and function. *Academy of Management Journal*, *44*(6), 1263–1280. https://doi.org/10.5465/3069400

Rogers, A. D. (2016). *Examining small business adoption of computerized accounting systems using the technology acceptance model*. Walden University.

Savage, G. (2022). *Breaking down the barriers to industry 4.0 in the North* (tech. rep.). https://ad-aspi.s3.ap-southeast-2.amazonaws.com/2022-08/SR188%20Breaking%20down%20the%20barriers_0.pdf

Short, J. C., McKenny, A. F., & Reid, S. W. (2018). More than words? Computer-aided text analysis in organizational behavior and psychology research. *Annual Review of Organizational Psychology and Organizational Behavior*, *5*(1), 415–435. https://doi.org/10.1146/annurev-orgpsych-032117-104622

Simons, T., Pelled, L. H., & Smith, K. A. (1999). Making use of difference: Diversity, debate, and decision comprehensiveness in top management teams. *Academy of Management Journal*, *42*(6), 662–673. https://doi.org/10.5465/256987

Singh, A., & Hess, T. (2020). How chief digital officers promote the digital transformation of their companies. In *Strategic Information Man-*

agement (pp. 202–220). https://doi.org/10.4324/97804292867
97-9

Tanikawa, T., & Jung, Y. (2016). Top management team (TMT) tenure diversity and firm performance. *International Journal of Organizational Analysis*, *24*(3), 454–470. https://doi.org/10.1108/ijoa-02-201
4-0739

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350. https://doi.org/10.1
002/smj.640

Teece, D. J. (2012). Dynamic capabilities: Routines versus entrepreneurial action. *Journal of Management Studies*, *49*(8), 1395–1401. https:
//doi.org/10.1111/j.1467-6486.2012.01080.x

Timmerman, T. A. (2000). Racial diversity, age diversity, interdependence, and team performance. *Small Group Research*, *31*(5), 592–606.
https://doi.org/10.1177/104649640003100505

Veltrop, D., Hermes, C., Postma, T., & de Haan, J. (2015). A tale of two factions: Why and when factional demographic faultlines hurt board performance. *Corporate Governance-An International Review*, *23*(2), 145–160.

Venkatraman, V. (2017). *The digital matrix: New rules for business transformation through technology*. LifeTree Media.

Verhoef, P. C., & Bijmolt, T. H. A. (2019). Marketing perspectives on digital business models: A framework and overview of the special issue. *International Journal of Research in Marketing*, *36*(3), 341–349.
https://doi.org/10.1016/j.ijresmar.2019.08.001

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, *122*, 889–901. https://doi.org/10.1016/j.jbusres.2019.0
9.022

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Wiersema, M. F., & Bantel, K. A. (1993). Top management team turnover as an adaptation mechanism: The role of the environment. *Strategic Management Journal*, *14*(7), 485–504. https://doi.org/10.1002
/smj.4250140702

Williams, K. Y., & O'Reilly, C. A. (1998). Demography and Diversity in Organizations: A Review of 40 Years of Research. *Research in organizational behavior*, *20*, 77–140.

Wolbrecht, C., & Campbell, D. E. (2007). Leading by example: Female members of parliament as political role models. *American Journal of Political Science*, *51*(4), 921–939. https://doi.org/10.1111/j.154
0-5907.2007.00289.x

Wonglimpiyarat, J., & Yuberk, N. (2005). In support of innovation management and Roger's innovation diffusion theory. *Government Information Quarterly*, *22*(3), 411–422. https://doi.org/10.1016/j.gi
q.2005.05.005

Wrede, M., Velamuri, V. K., & Dauth, T. (2020). Top managers in the digital age: Exploring the role and practices of top managers in firms' digital transformation. *Managerial and Decision Economics*, *41*(8), 1549–1567.

Junior Management Science

Good as Gold or Merely Glitter? Elite Board Members' Impact on Firm Performance

Veronika Timoschenko

Ludwig Maximilian University of Munich

Abstract

This thesis investigates the influence of elite supervisory board members on the performance of German firms. Following the transformation of the German business landscape post-reunification, elite board members, characterized by their exceptional social capital, continue to play a crucial role. Using resource dependence theory, the study explores the link between board members' social capital and firm performance. Leveraging a yearly ranking of the top 30 most powerful supervisory board members to identify elite members, this thesis analyses their influence on firm performance. Contrary to expectations, the results show a significant negative impact of elite board members on accounting-based performance and no significant effect on market-based performance. The expected stronger effect of having an elite board chair was not supported. These findings encourage a reevaluation of the assumed benefits of elite board membership, suggesting underlying complex dynamics. The thesis concludes with implications for corporate governance, limitations of the study, and directions for future research.

Keywords: corporate governance; elite board members; firm performance; social capital; supervisory board

1. Introduction

After the turn of the century, the German business landscape transformed drastically, responding to changing demands following the German reunification and global pressures of the internationalization of businesses (Ringe, 2015, pp. 493–494). Labeled "Germany Incorporated"[1], the previous system worked through thick entanglements of shareholdings between firms, ties between firms and politicians, and ties between supervisory board members in German firms. At the time, this system ensured a high performance

of the involved firms (Ahrens et al., 2013, p. 7; Bundeszentrale für politische Bildung, 2016). Similar to international equivalents ("Japan Incorporated" or "Austria Incorporated"), business practices changed after the turn of the century evidenced by German banks divesting into national firms and alteration of law and governance structures (Ahrens et al., 2013, pp. 10–11; Ringe, 2015, p. 494). By responding to the changing environment, German firms stayed competitive and profitable. One characteristic and enabler of the formed relationships that did not dissipate are the well-connected, respected supervisory board members. Even though "Germany Incorporated" dissolved to some degree, listed firms are still governed by an elite group of individuals. It is reasonable that firms aim for having the most valuable board members since the firm's supervisory board and its composition influence organizational outcomes (Bonini et al., 2022, p. 1618; Post and Byron, 2015, p. 1559; Westphal, 1999, p. 17). Supervisory board members benefit the firm by using their knowledge, experience, and networks to advise the management, reduce uncertainty and dependencies on the environment, as well as transfer their reputation and legitimacy (Hillman and Dalziel, 2003, p. 386; Hillman et al.,

[1] Translated from "Deutschland AG"

2009, p. 1405; Pfeffer and Salancik, 1978, pp. 162–163). In anticipation of reaping those benefits, firms aim to select those who can especially fulfill these functions: elite board members.

Davis and Greve (1997, p. 1) first introduced the term "elite" to governance research. Their study examined the link between the adaptation of governance practices and the decision-makers network. These networks, which the authors based on board memberships and geographic proximity of the executives, were labeled "corporate elite networks" (Davis & Greve, 1997, pp. 12–13). More recently, Jensen and Zajac (2004, p. 507) used the term "corporate elites" to refer to corporate executives and supervisory board members in general. The present study uses the term elite to refer to a differentiated group of the best-connected, most respected individuals among German board members. Narrowing in on the research question at hand, elite board members differ from non-elite board members as they have exceptional social capital, which refers to the board member's network ties, status, and reputation. These attributes condition the board member's ability to benefit the firm (Hillman and Dalziel, 2003, p. 383; S. Johnson et al., 2011, p. 1783; S. Johnson et al., 2013, pp. 243–246). The present study examines whether elite board members hold what they promise. When having an elite member on their supervisory board, do firms perform better, or *is not all that glitters gold*?

Legally, a firm's supervisory board consists of individuals who are tasked with monitoring the top management team (Baysinger and Butler, 1985, pp. 108–109; Fama and Jensen, 1983, p. 303). Scholars of corporate governance acknowledge the supervisory board for having a more active role than the monitoring function would give it credit (Baysinger and Butler, 1985, pp. 108–109; Daily et al., 2003, p. 375; Pfeffer and Salancik, 1978, p. 170; Zahra and Pearce, 1989, p. 298). Specifically, the supervisory board provides resources, advises the top executives, and even has a role in strategic decision-making (Boivie et al., 2021, pp. 1648–1686; Daily et al., 2003, p. 375). Since the duties of the supervisory boards are complex, so are the requirements for their composition and characteristics (Zahra & Pearce, 1989, p. 298).

Previous research showed various analyses of how a board should be composed to benefit the organization it serves. Scholars do so by examining how group characteristics like board size (Dalton et al., 1999, p. 674) and diversity (Miller & del Carmen Triana, 2009, p. 755), as well as individual characteristics like the board member network (Zona et al., 2018, p. 589) or prior engagements (Hillman, 2005, p. 464), affect firm performance. These studies, for the most part, regard *aggregate* measures of *one* aspect of the board members' characteristics. This approach considers the supervisory board as a whole entity and tries to isolate the effect of one specific attribute. Yet, using one aspect of the board members' characteristics only allows for a narrow view of their ability to serve the firm and neglects the interdependent nature of the characteristics (Haynes & Hillman, 2010, p. 1147). Moreover, scholars argue that studying individual

board members, as opposed to aggregating the whole board, is more predictive of firm performance variations (Baysinger and Butler, 1985, p. 109; Hambrick et al., 2015, p. 325). Responding, Hambrick et al. (2015, pp. 329, 336) propose a model indicating several attributes for effective board monitoring that at least one supervisory board member should embody. Moreover, as advocates of the resource provision function of the board, S. Johnson et al. (2011, pp. 1782–1783) analyze individual board members and two attributes of their social capital. The authors argue that firms want to attract these individuals and empirically assess what firm or board characteristics motivate them to join a board.

The approach presented in this thesis introduces a measure that regards *several attributes* of social capital at once while focusing on an *individual* board member's contributions. Advancing previous research, the present study analyses whether having a board member who has superior social capital across several attributes impacts the performance of the firm they serve. To my knowledge, this relationship has not been tested empirically yet. Furthermore, I hypothesize and test whether this relationship is stronger if the firm has an elite chair*(wo)*man of the board. The board chair is of interest for this analysis due to their unique position among board members and the responsibilities that coincide with this position (Banerjee et al., 2020, p. 373; Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 13). In general, interest in the role of the board chair is growing in the field of corporate governance (Banerjee et al., 2020, p. 374). The majority of research in this area is focused on the consequences of CEO duality, which describes a governance structure in which the CEO and chairman of the board position are occupied by one individual (Banerjee et al., 2020, p. 390; for a review see Krause et al., 2014). However, recently scholars have indicated an interest in the board chair that goes beyond this configuration (Krause et al., 2014, pp. 1990–1991). The present study supports these efforts by analyzing the impact of the board chair's social capital on firm performance.

Specifically, to analyze the impact of elite board members and elite board chairs on firm performance, I use a ranking of board members, published yearly in the renowned German business journal Handelsblatt. The journal provides a list of the 30 most powerful supervisory board members in Germany, based on the social capital attributes reputation, network, and status (Fockenbrock, 2011, p. 24). I characterize these top 30 as elite board members in the given year and analyze whether having them on the board impacts the firm's accounting-based and market-based performance. The analyses' underlying sample consists of listed German firms between 2011 and 2018. Due to the German two-tier system, the management and supervisory role of the upper echelons can be clearly distinguished (Regierungskommission Deutscher Corporate Governance Kodex, 2022, pp. 4–5). In this thesis, boards always refer to supervisory boards and elite board members to elite supervisory board members. In accordance with previous corporate governance research, I use the resource dependence theory to link social capital to

the provision of resources, and ultimately to superior firm performance (Hillman & Dalziel, 2003, p. 383). Using a panel data structure and regression analysis, this study finds a significant and negative impact of having an elite board member on accounting-based performance, opposed to expectation. The evidence does not support the hypothesis that the effect is stronger if the board has an elite chair. Testing either hypothesis, there is no significant relationship to market-based performance.

In the following, the present thesis briefly covers the functions of the supervisory board and discusses the relationship between the board's resource provision role and firm performance based on the resource dependence theory (Pfeffer & Salancik, 1978) and empirical evidence from corporate governance research. Next, using the established theory and empirical evidence, I derive the hypotheses that having an elite board member is positively associated with the firm's performance and that the impact is stronger if the board chair is elite. After presenting the applied method, results, and robustness tests, the sixth chapter offers a discussion of potential reasons for the surprising results. Concluding, I present the study findings' implications, the study's limitations, and avenues for future research.

2. Theoretical background

The corporate board is at the heart of corporate governance. Following Daily et al. (2003, p. 371), this thesis defines corporate governance "as the determination of the board uses to which organizational resources will be deployed and the resolution of conflicts among the myriad participants in organizations". In their central position, boards are actively involved in strategic decision-making and fulfill functions that are necessary for the firm's success and survival (Baysinger and Butler, 1985, pp. 108–109; Zahra and Pearce, 1989, p. 298). In the following subchapter, I present how boards and their members bring value to the firm and ultimately influence organizational outcomes like firm performance. To establish the theoretical underpinnings of this relationship, I introduce the central tenets of the resource dependence theory (Pfeffer & Salancik, 1978). The second subchapter builds on empirical evidence to demonstrate that the supervisory board influences firm performance through its resource provision role.

2.1. Resource dependence theory

The literature on board characteristics and their influence on performance is rich in empirical evidence. However, scholars often propose and find contradicting results (Boivie et al., 2021, p. 1684; Dalton et al., 1999, p. 676). One reason for these inconsistencies is the complexity of the board's functions (Hillman et al., 2000, p. 253).

Boards need to fulfill several functions at once, which have different requirements for the board members (J. L. Johnson et al., 1996, pp. 430–431). Therefore, a dimension of the board's composition may be beneficial for one function

and detrimental for another, for example the ratio of outside directors in Dalton et al. (1998, pp. 270–271).

Early streams of corporate governance research mainly focus on the board's monitoring role, which is the board's basic function from a strictly legal perspective (Baysinger and Butler, 1985, pp. 108–109; Hillman and Dalziel, 2003, p. 383). Although this is still the dominant approach to board research, alternative perspectives gain more relevance. Focusing on a rather external perspective, many scholars stress the importance of the resource provision role of the board, arguing that board members bring value to the firm in form of their knowledge, connections to stakeholders, or legitimacy (Hoppmann et al., 2019, p. 439). I choose to focus on the resource dependence perspective while recognizing that there are other functions prevalent in the literature since research findings suggest it to be the most promising one (Hillman et al., 2009, p. 5). Additionally, research on social capital, which characterizes elite board members in the present study, builds mostly on the resource dependence theory (Hillman & Dalziel, 2003, pp. 387–388).

Pfeffer and Salancik's (1978) seminal work "The external control of organizations: A resource dependence perspective" is the basis for many studies in the field of corporate governance (for a review see Hillman et al. (2009)). The resource dependence theory describes that organizations are part of an open system and are therefore always dependent on other parties to receive resources necessary for their survival (Pfeffer & Salancik, 1978, p. 2). Moreover, organizations that are more successful in managing these dependencies are more effective than others since they gain power over other parties and reduce their uncertainties (Pfeffer & Salancik, 1978, p. 37). The authors describe organizational effectiveness as "an *external* standard of how well an organization is meeting the demands of the various groups and organizations that are concerned with its activities" (Pfeffer & Salancik, 1978, p. 11). Therefore, either managers of organizations need to change the environment to the advantage of the firm, or the firm's activities have to be adapted to the constraints that the environment forces on it (Pfeffer & Salancik, 1978, pp. 18–19).

The seminal paper on the resource dependence theory describes five distinct ways in which organizations can manage their interdependencies with the environment (Pfeffer & Salancik, 1978, pp. 113–252): absorbing them through merger or vertical integration (113), coordinating them through inter-organizational relationships as trade associations or joint ventures (144), coordinating them through interlocking board members (161), creating a more favorable environment with political actions (189), and aligning the organization with the environment through executive succession (225). As described above, one function of the supervisory board and its members is to provide resources to the organization, i.e., to "provide linkage to the environment" (Boivie et al., 2016, p. 9; Boivie et al., 2021, p. 1666; Pfeffer and Salancik, 1978, p. 169). Following the learnings from the resource dependence theory the supervisory board can help the organization reduce uncertainties and manage

interdependencies through this role. Boards are used as a means to do so, especially if the other four options (i.e., merger, joint ventures, political actions, executive succession) are not possible or more costly for the firm (Pfeffer & Salancik, 1978, p. 167).

Pfeffer and Salancik (1978, pp. 162–164) justify the appointment of specific individuals to the supervisory board. They argue that board members have the ability and motivation to benefit the firms they serve. First, these individuals have superior management experience and skills from other executive or supervisory positions. Their advice can be valuable to the focal firm, especially if resources are missing or not under the firm's power. If a board member is associated with a party that the firm depends on, the connection through them reduces this dependence and therefore uncertainty through information sharing and conformity pressures. Finally, since the individual on the board is affiliated with the organization, it is in their interest to represent and advise it well. First, to make sure that the affiliation does not reflect poorly on them, and second, to keep the power over the organization's activities.

Scholars analyzing boards and their influence on firm performance frame the members' ability to fulfill their resource provision function as board capital (Hillman & Dalziel, 2003, p. 386). Board capital is a combination of the member's human and social capital. Human capital consists of attributes such as experience, skills, and knowledge that ultimately affect how valuable they are to the firm as well as the firm's decision-making process (Hillman and Dalziel, 2003, p. 383; S. Johnson et al., 2013, pp. 240–243). Social (or relational) capital encompasses the board member's network, status, and reputation. As with human capital, those attributes condition the resources provided by the board member. Additionally, they also shape the dynamics within the board and their decision-making process as a group (Hillman and Dalziel, 2003, p. 383; S. Johnson et al., 2013, pp. 243–246). Combining the resource dependence theory and its advances in the field of corporate governance, an individual who brings superior human and social capital to the board reduces the firm's dependencies and uncertainties by means of resource provision and therefore, ultimately, improves the firm's performance[2]. In the following subchapter, I present empirical evidence supporting the link between the resource provision function of the board and firm performance. Chapter 3 then derives the relationship between board members' ability to provide resources, i.e., board capital, and firm performance.

2.2. The board-firm performance link

In their review of the resource dependence theory, Hillman et al. (2009, p. 1405) summarize Pfeffer and Salancik's (1978) description of how board members benefit the organization. They provide information to management through advice and counsel, enable access to channels of information between the firm and environmental contingencies, allow preferential access to resources, and bestow legitimacy on the firm and its actions. The corporate governance literature shows empirical support for the link between these forms of resource provision and firm performance.

To begin with, Kor and Misangyi (2008, pp. 1349–1350) find that if there is a shortage of knowledge among the top management team, the firm employs a supervisory board with experience that allows for advice and counsel on these issues, suggesting that the board is used to reduce dependency and uncertainty. Supporting this argument further, other study findings suggest that if board members have ties to strategically relevant organizations, relevancy being dependent on the given environment, the interactions with the board on strategic issues increase (Carpenter & Westphal, 2001, pp. 651–653). Furthermore, Westphal (1999, p. 17) finds a positive effect of advice and counsel interactions between the board and the chief executive officer (CEO), and firm performance, suggesting that the board does improve firm performance through the resource provision role. Judge and Zeithaml (1992, p. 775) hypothesize that increased involvement of the board in strategic decision-making improves firm performance since the board members introduce more opinions and objectivity in the decision-making process. Their study finds empirical evidence for this relationship (Judge & Zeithaml, 1992, pp. 782–784). Moreover, board members' knowledge about the strategic decisions of the firm is positively related to firm performance and negatively related to financial risk (Judge & Dobbins, 1995, p. 54). Additionally, when it comes to initial public offering performance, young firms benefit from advice and counsel of their board members (Kroll et al., 2007, p. 1209). All these empirical results suggest that if the board is involved in decision-making, and therefore provides resources in the form of advice and counsel, firm performance improves.

Second, the board benefits the firm by creating a connection to its environment. Empirical evidence shows that board members who provide such connections enable the transfer of knowledge to the focal firm (Beckman and Haunschild, 2002, pp. 110–112; Howard et al., 2017, p. 2000; Powell et al., 1996, p. 137) and allow for higher levels of innovation (Ahuja, 2000, p. 443) or the establishment of new practices (Bizjak et al., 2009, pp. 4844–4848; Davis, 1991, pp. 604–605; Westphal and Zajac, 1997, pp. 173–177). Furthermore, scholars find support for the notion that firms use the board and the connections it creates specifically to reduce uncertainties (Beckman et al., 2004, p. 272; Boyd, 1990, pp. 426–427; Drees and Heugens, 2013, pp. 1682–1684). Consequently, as the resource dependence theory predicts, scholars find a positive impact of links between firms, established by board members, and firm performance (Drees and Heugens, 2013, p. 1685; Horton et al., 2012, p. 419; Phan et al., 2003, p. 348). As with the arguments concerning advice and counsel, this indicates that board members reduce environmental uncertainty and dependence through their resource provision role, ultimately improving firm performance.

---

[2] While this thesis has a resource dependence perspective, agency theory oriented scholars argue that board capital is also a determinant of the members' monitoring ability (Hillman and Dalziel, 2003, p. 389; Tian et al., 2011, p. 743).

Further, the resource dependence theory suggests that board members improve organizational effectiveness by supporting the firm in acquiring resources under more favorable conditions (Hillman et al., 2009, p. 1405; Pfeffer and Salancik, 1978, pp. 16–163). One aspect of this relationship is the access to capital through board members that reduce dependencies between firms and financial institutions (Lang and Lockhart, 1990, p. 120; Mizruchi and Stearns, 1988, p. 206; Stearns and Mizruchi, 1993, pp. 613–615). Furthermore, using a sample of airlines undergoing deregulation, Hillman et al. (2000, p. 252) find that the changing environment leads to changes in board composition, reflecting the industry's new dependencies. Additionally, a study on hospitals finds that physicians would join the board if the hospital was missing, or dependent on hiring, medical staff (Boeker & Goodstein, 1991, p. 821). These findings imply that firms adjust their boards according to the dependencies they face if environmental conditions change. Furthermore, firms that are successful in managing their dependence by changing the composition of their board perform better than other firms (Lang & Lockhart, 1990, p. 120). Based on the presented literature, boards can support the organization and improve firm performance by enabling favorable conditions in gaining the resources needed in the specific environment.

Finally, board members provide legitimacy to the firm (Gales and Kesner, 1994, p. 272; Pfeffer and Salancik, 1978, pp. 162–163). Inter-organizational relationships through board members are positively related to organizational legitimacy (Drees & Heugens, 2013, pp. 1684–1685). Hence, board members bestow legitimacy on the firm and its strategic decisions by connecting it to the environment. In the context of initial public offerings, Certo et al. (2001, pp. 41–43) find that firms with prestigious board members experience less underpricing, i.e., better firm performance. Other studies also suggest that legitimacy is an aspect that explains variations in firm performance (Chung and Luo, 2013, p. 354; Lin et al., 2009, p. 935). As board members legitimize an organization and its actions, having them on board can improve firm performance (Hambrick and D'Aveni, 1992, p. 1460; Pfeffer and Salancik, 1978, p. 145). Overall, the literature supports the resource dependence theory and the relationship between the benefits boards provide to a firm and the firm's performance.

3. Hypotheses

In this chapter, I use the discussed learnings from Chapter 2 and research on social capital to derive my hypotheses. I present research findings suggesting that social capital improves firm performance through the resource provision role. According to the contributions of this study, I argue for a combination of several board characteristics in one individual to explain variations in firm performance.

Board capital refers to both human and social capital. The focus of this thesis is social capital. According to the German corporate governance code (Regierungskommission

Deutscher Corporate Governance Kodex, 2022, p. 8), supervisory board members are selected based on human capital attributes such as knowledge, skills, and professional experience, suggesting that members do not predominately vary with regard to human capital attributes. Therefore, the difference in abilities between board members stems from their social capital that allows for superior resource provision and therefore better firm performance (Hillman and Dalziel, 2003, p. 383; S. Johnson et al., 2011, p. 1783). To uncover whether board members can improve firm performance, this thesis introduces elite board members, a group of supervisory board members that excel in terms of social capital, compared to their peers. Nahapiet and Ghoshal (1998, p. 243) define social capital as "the sum of actual and potential resources embedded within, available through, and derived from, the network of relationships possessed by that individual". High social capital benefits the individual, as other parties in the environment are more willing to supply valuable resources to them, building on the environment's goodwill towards the individual (Adler & Kwon, 2002, p. 18). In turn, board members' high social capital benefits the firms they serve through the resource provision function (Hillman and Dalziel, 2003, p. 383; S. Johnson et al., 2011, p. 1783).

Scholars do not entirely agree on what attributes categorize as social capital. There is consensus on the two attributes that dominate the literature, network and status (S. Johnson et al., 2011, p. 1784). A board member's network includes ties to external organizations created through previous experiences or the individual serving on several boards simultaneously. As discussed in Chapter 2.1, board capital conditions the member's ability to provide resources. Concerning this particular attribute of social capital, board members with a superior network have more information sources, improving their ability to provide advice and counsel (Kor and Sundaramurthy, 2009, p. 997; Westphal, 1999, pp. 16–17). The network of a board member benefits the firm as it creates links to the environment and allows for preferential access to resources (Burt, 1980, pp. 577–578; Palmer, 1983, p. 40). Moreover, a board member's ties to legitimate organizations, can lead to the legitimization of the focal firm and its actions (Galaskiewicz, 1985, pp. 296–297; Mizruchi, 1996, p. 276).

Status refers to "a socially constructed, intersubjectively agreed-upon and accepted ordering or ranking of individuals" (Washington & Zajac, 2005, p. 284). High status, or prestige (S. Johnson et al., 2011, p. 1784), is established through being associated with elite circles (D'Aveni, 1990, p. 121), connections to other high-status parties (Pollock et al., 2019, pp. 25–26), sitting on several boards (D'Aveni, 1990, p. 121; Flickinger et al., 2016, p. 1109), or personal achievements (S. Johnson et al., 2011, p. 1785). Additionally, a long tenure can increase the status in the focal firm (Bonini et al., 2022, p. 1609). A high-status board member has an exceptional ability to provide resources. First, they bestow legitimacy upon the firm (Certo, 2003, p. 437; D'Aveni, 1990, p. 131; Pfeffer and Salancik, 1978, p. 145). Second, as high-status board members have several board memberships and connections to other high-status parties, they are better

providers of the other three forms of resources, advice and counsel, link to the environment, and preferential access to resources. Furthermore, high-status board members are motivated to provide resources to the firm they serve, as they want to protect their high status (Pfeffer & Salancik, 1978, pp. 162–164), and being affiliated with a poor-performing firm decreases their social capital (Certo, 2003, p. 437).

Another attribute that is referred to as social capital is reputation. Reputation is the awareness or opinion of the environment about an individual, based on past actions or behavior (Rindova et al., 2005, p. 1035)[3]. A board member's reputation depends on the reputation of the firms they serve (Lange et al., 2011, p. 177). Additionally, a good reputation is gained through media exposure, certifications, and affiliations with high-status entities (Rindova et al., 2005, p. 1044). Some scholars do not include reputation in the social capital category (Hillman & Dalziel, 2003, p. 383). However, reputation and status are not always clearly distinguished from one another and have overlapping antecedents (Washington & Zajac, 2005, p. 283). Second, social capital is created through relational interactions, which is fitting the assumed definition and antecedents of reputation (Coleman, 1988, p. 100). For these reasons, the present study considers reputation to be part of social capital following S. Johnson et al. (2013, p. 245). A highly reputable board member has a superior ability to provide resources to the firm they serve. As with high status, board members with a good reputation bestow legitimacy upon the firm (Bazerman and Schoorman, 1983, p. 211; Deutsch and Ross, 2003, p. 1104; Pfeffer and Salancik, 1978, p. 145), provide the other three benefits through the antecedents of a good reputation, and are especially motivated to provide resources to the firm they serve (Pfeffer & Salancik, 1978, pp. 162–164). After discussing the attributes of social capital and their influence on the benefits that board members provide firms, and recalling that these benefits have been previously linked to firm performance (see Chapter 2.2), I move on to the direct connection between social capital and firm performance.

High social capital improves the board's ability to perform the firm performance-improving function as resource providers described above (Daily et al., 2003, p. 372; Hillman and Dalziel, 2003, pp. 383–386). Scholars of corporate governance took various approaches to explore the relationship between board capital and firm performance. One stream of literature addresses structural characteristics such as the board size and the proportion of outsiders, arguing that more board members or more outsiders bring more social capital and therefore improve firm performance. A meta-analysis of the relationship between board size and performance finds a significant, positive association (Dalton et al., 1999, p. 678). Although the authors of the meta-analysis do not claim a causal relationship, Pfeffer and Salancik (1978, p. 172) convey that firms would increase the size of their boards to reduce uncertainty and dependencies. In another

meta-analysis, Dalton et al. (1998, pp. 278–280) find no systematic relationship between the proportion of outside board members and firm performance. Other scholars examine the demographic characteristics of board members and propose that a diverse board introduces more capital and therefore improves firm performance. Concise empirical evidence of the effect of board diversity on firm performance is limited (Carter et al., 2010, p. 399). Miller and del Carmen Triana (2009, pp. 771–773) do not find a significant relationship between gender diversity and firm performance, however, they do find a positive relationship between racial diversity and firm performance. Other scholars find no relationship between ethnic diversity and firm performance (Carter et al., 2010, pp. 410–411). In a meta-analysis of gender diversity, Post and Byron (2015, p. 1559) concluded that a higher ratio of female board members only influences certain aspects of firm performance. The corporate governance literature on structural or demographic characteristics of the board does not show a clear relationship to firm performance. Board research examining social capital attributes directly shows more concise evidence.

Research on corporate board interlocks indicates that the board's social capital influences performance by linking the firm to its environment, i.e., providing resources and reducing uncertainty (Hillman and Dalziel, 2003, p. 387; Mizruchi, 1996, p. 274). Board interlocks arise from board members serving on several boards simultaneously, creating linkages between organizations (Boyd, 1990, p. 420). In a meta-analysis, Drees and Heugens (2013, p. 1685) find that board interlocks are positively related to firm performance, this relationship is mediated by the reduction of dependencies, specifically increasing autonomy. Study findings from other analyses support this relationship further. For instance, firms that are better connected to the environment, through their executive and supervisory board members, perform better. Plus, members that create more links to the environment are compensated better, suggesting that firms value the benefits of the connections (Horton et al., 2012, p. 419). Especially in situations of uncertainty, ties to the environment that are aligned with the dependencies the firm is facing improve firm performance (Geletkanycz & Hambrick, 1997, p. 673). Likewise, in situations of crisis, interlocks decrease uncertainty and subsequently improve firm performance (Phan et al., 2003, p. 348). Zona et al. (2018, p. 607) also find that interlocks can improve firm performance, however, not necessarily for both firms that are being linked by a board member. The authors argue that the link is valuable only for the firm that has comparably fewer available resources. This finding does not contradict the other studies of this section, as it implies that firms that have dependencies will benefit from a board member that links them to other organizations. Nonetheless, focal firms that are rich in resources and therefore not dependent on the firm they are tied to might experience a decrease in performance.

Beyond board interlocks, the board member's social capital can also link the firm to governmental or financial institutions. When firms experience uncertainty due to changes

---

[3] Definitions of reputation in management literature often refer to organizational reputation, and are applied to individuals here.

in their environment, boards that create links to financial institutions are positively related to firm performance (Lang & Lockhart, 1990, p. 120). Moreover, firms operating in regulated industries perform better when they have a former politician on their board, or a board member that has other connections to the government (Hillman, 2005, p. 477; Hillman et al., 1999, p. 75). Although a study by Fan et al. (2007, p. 353) reports results suggesting an opposite relationship, politically connected board members being negatively associated with firm performance, the authors acknowledge that this finding is attributed to the Chinese context of the study.

Furthermore, high social capital implies that the board member is sitting on several boards simultaneously, i.e., they are a busy board member. Board members are considered busy if they have several seats on other firms' executive or supervisory boards. The number of board memberships is negatively related to lawsuits against the firm (Kassinis & Vafeas, 2002, p. 413) and positively related to market reactions to board decisions (Tian et al., 2011, p. 743). Moreover, busy board members have more resources to offer the focal firm. Therefore, they should improve firm performance (Boivie et al., 2016, p. 9; Kor and Sundaramurthy, 2009, p. 994). Empirical analyses find support for the positive effect of busyness on performance indicators such as firm value (Bøhren & Strøm, 2010, p. 1296), firm growth, and gross profits (Kor & Sundaramurthy, 2009, p. 994). Even from a monitoring perspective, scholars argue that busy board members with high social capital have better monitoring abilities and have a reputation for good monitoring, which they are motivated to maintain (Kassinis and Vafeas, 2002, p. 402; Tian et al., 2011, p. 732).

The board member's status and reputation are positively related to the performance of the firms they serve. Certo et al. (2001, p. 41) hypothesize and find that young firms with highly reputable or prestigious boards experience less initial public offering underpricing. Other study findings suggest that young firms will recruit supervisory board members with a high reputation or status when the executive board lacks it (Chahine et al., 2011, pp. 331–332). The board's social capital also improves firm performance by legitimizing the firm and its actions (Certo, 2003, p. 437; D'Aveni, 1990, p. 131; Deutsch and Ross, 2003, p. 1104; Pfeffer and Salancik, 1978, p. 145). Especially when facing uncertainty, legitimacy is crucial for firms to get support from stakeholders and survive (Geletkanycz & Hambrick, 1997, p. 676). For instance, Marcel and Cowen (2014) find that following financial fraud, firms will keep board members with high social capital to signal their legitimacy to the environment, whilst dismissing board members with low social capital. As board members' social capital improves the reputation of the firm they serve, this firm will experience better performance (Bazerman & Schoorman, 1983, p. 145). Empirical findings suggest that firms with a high reputation experience better investor reactions when they perform better than expected and are penalized less when they perform worse than expected (Pfarrer et al., 2010, p. 1144). A high firm reputation is positively related to performance (Deephouse, 2000, p. 1106),

and specifically to sustainable high performance (Roberts & Dowling, 2002, p. 1090). Summarizing the study findings on social capital and its attributes, there is empirical support for the direct link between the board's social capital and firm performance.

Individual board members bring more than one attribute of social capital to the firms they serve and studying them collectively acknowledges their interdependencies (Haynes & Hillman, 2010, p. 1147). Although the determinants of the attributes often overlap or the attributes predetermine each other, they are still distinct constructs (S. Johnson et al., 2011, p. 1799). Consequently, some scholars measure several social capital attributes collectively with a single construct but regard the aggregated social capital of the board (Belliveau et al., 1996, p. 1577; Certo et al., 2001, p. 40; D'Aveni, 1990, p. 128). Evidence from S. Johnson et al. (2011, p. 1799) suggests that although this method might show high levels of social capital across the board, this does not necessarily mean that individual board members have high social capital concerning all attributes. This ignores that certain attributes are more valuable, or only valuable when combined in a single director as opposed to distributed among several (Hambrick et al., 2015, p. 328). Furthermore, research by Jensen and Zajac (2004, p. 518) supports that aggregate measures might disguise disaggregated effects.

While a single board member is part of a group that makes decisions collectively, the individual can be highly influential over the other members' opinions and consequently, the decision. This is achieved through their authority from superior abilities or motivation (Hambrick et al., 2015, pp. 335–336). Pfeffer and Salancik (1978, p. 167) argue that the power which board members have over the decision-making process can stem from better access to resources or soecifically, to resources that the focal firm currently needs, i.e., from high social capital. Supporting this notion, Belliveau et al. (1996, p. 1588) find that status affects the board's decision-making, for instance, on CEO compensation. Scholars using interviews with board members find that social capital is a determinant of the member's position within the board (Stevenson and Radin, 2009, p. 29; Veltrop et al., 2017, pp. 1101–1102). In line with the determinants of status discussed above, Bonini et al. (2022, p. 1609) argue that long tenure is another determinant of the status that creates this hierarchy. The informal hierarchy achieved by differences in status among members is associated with better firm performance, especially if the firm did not perform well in the past or operates in an uncertain environment (Bonini et al., 2022, p. 1618; He and Huang, 2011, pp. 1131, 1133).

Responding to the lack of research on individual board members (Bonini et al., 2022, p. 1628), some scholars used the individual board member as the level of analysis. For instance, in their study on board members' knowledge of strategic decisions of the firm and firm performance, Judge and Dobbins (1995, p. 44) only focus on the most involved board member. Bonini et al. (2022, p. 1618) find that having one independent board member with at least fifteen years of tenure on the board is related to better market-based per-

formance. And, having an individual on the board that is a politician or has connections to politicians, improves performance, given a dependence between the firm and the government is in place (Hillman, 2005, p. 477; Hillman et al., 1999, p. 75). Hence, individual board members that have the social capital to provide resources to the firm, can impact organizational outcomes (Baysinger & Butler, 1985, p. 109), and studying one board member that fulfills several desired attributes, i.e., an elite board member, might be more predictive than aggregating the whole board (Hambrick et al., 2015, p. 325; Stalnaker, 1986, as cited in Judge and Dobbins, 1995, p. 44). Based on the empirical support for attributes of social capital improving firm performance, evidence that individual board members influence organizational outcomes, and scholars promoting studying several characteristics in one board member, I derive the following hypothesis:

> Hypothesis 1: Having an elite board member is positively associated with firm performance.

Above, I argue that board members with high social capital are at the top of the board's informal hierarchy. However, it may be that the board members also need to be at the top of the formal hierarchy to influence decision-making or be able to provide the resources they offer. Hence, they would need to be the chair of the board.

According to the German corporate governance code, the board chair's formal position gives them the responsibility to communicate to the executive board. Therefore, allowing them to influence decision-making. Additionally, the chair is the external representative of the board, and as such, they operate as a link to the environment (Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 13). Krause et al. (2016, pp. 1993, 1999) argue that, as the board chair has a unique role in managing environmental dependencies, their social capital is especially valuable for the firms they serve. They find that the firm values independent board chairs with high social capital as they are viewed as a resource. Moreover, previous research based on the resource dependence theory suggests that the board chair impacts firm performance, especially in complex environments (Withers & Fitza, 2017, pp. 1351–1352). As board chair, an individual with high-social capital is in a position to perform firm-performance-improving functions more effectively than other board members. For instance by advising the CEO and other top executives (Krause, 2017, p. 700) or legitimizing the firm and its actions (Lorsch & Zelleke, 2005, p. 72). Finally, reviewing work on board members and their ability to reduce dependencies and uncertainty, Pfeffer and Salancik (1978, p. 167) conclude that the board member that is best suited to manage dependencies will be the board member that has the control, or power, over the decision-making process, i.e., the board chair. Concluding this chapter, I derive the second and final hypothesis of this thesis:

> Hypothesis 2: If the chair of the board is elite, the impact on firm performance becomes stronger.

4. Method

After deriving the two hypotheses, the following chapter describes the method for testing the relationships between having an elite board member and firm performance, as well as having an elite board chair and firm performance. Using secondary data from databases and press articles, a panel dataset is generated. Below, the underlying sample and its idiosyncrasies are elaborated, as well as the choice and operationalization of the variables used in the analyses. Lastly, the chapter is concluded with the final models.

4.1. Sample

Most studies in corporate governance research are conducted in a U.S. context (S. Johnson et al., 2013, p. 253; Zahra and Pearce, 1989, p. 328). This study differs as it has a German context. Corporate governance systems do vary across countries and the U.S. and Germany are no exceptions to that. The existing differences are, however, of benefit for this particular analysis. According to the German corporate governance code (Regierungskommission Deutscher Corporate Governance Kodex, 2022, pp. 4–5), boards must operate under a two-tier system, which separates the executive and supervisory board. Since the entities are divided, the managing and supervisory functions can be distinguished. The German corporate governance system does not differ from the U.S. context when it comes to the functions of the supervisory board. They include a monitoring as well as an advice and a strategic role. The German supervisory board consists of shareholder and employee representatives, with shareholder representatives being independent (Regierungskommission Deutscher Corporate Governance Kodex, 2022, pp. 8–9). Supervisory board members, in the context of this study, refer to shareholder representatives. For reasons of comparability to previous work, employee representatives are excluded from the sample. The board members elect the board chair. The board chair's primary roles are the coordination of the board's activities, communication with the management board, and external representation (Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 13). Furthermore, shareholder representatives, as well as the board chair, are selected based on the human capital attributes knowledge, skills, and professional experience. Therefore, variation in the quality of human capital characteristics among board members is not expected. Social capital requirements are not specified in the governance code. The only recommendation is that board members shall not hold more than five supervisory board memberships outside of the focal firm, to ensure sufficient time to fulfill the functions on the focal firm's board (Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 8).

The present sample includes listed German firms in the period from 2010 to 2018, resulting in 947 firm-year observations (147 firms). The start of the period is chosen based on the operationalization of the independent variable and the

end to avoid biased results due to the covid-19 pandemic[4]. There are three major groups of listed firms in Germany. One of them is the DAX, which includes the 30 largest German firms by market capitalization trading on the Frankfurt Exchange[5] (Deutsche Börse Group, 2023a). Of the firms in the present sample, 20.41% were included in the DAX. The MDAX index includes the 60 largest firms after the DAX 30[5] (Deutsche Börse Group, 2023b). About half (49.66%) of the included firms in the sample are part of this index. Finally, the TecDAX covers the 30 largest firms in the technology sector after the DAX 30 (Deutsche Börse Group, 2023c). 44 firms (29.93%) in the given sample are part of this index. The total 147 firms in the sample are active in 36 different industries, the most common being industrial and commercial machinery and computer equipment (22 firms), chemicals and allied products (14), electronic and other electrical equipment and components (13), and business service (12)[6]. On the individual level, the sample includes 11,172 firm-year-director observations (2,338 directors). Out of the entire data set, 8.76% of directors hold CEO positions, 34.24% other top management team positions, 8.76% are chairs of a board, and 48.24% hold other supervisory board seats.

The structure of the data is an unbalanced panel, in which the firm identifier and the year uniquely identify each observation. The panel variable is the firm identifier (147 units) and the time variable is the year (9 units). A panel data structure is appropriate for the present study since it allows controlling for unobservable variables that change between firms but not over time, therefore accounting for individual heterogeneity (Torres-Reyna, 2007, p. 3).

4.2. Variables

The choice of variables and their operationalization is based on corporate governance literature and the hypothesized relationships. This study applies two binary independent variables, i.e., whether there is an elite member or chair on the supervisory board in the given year, and two measures of the dependent variable firm performance, an accounting- and a market-based measure. Furthermore, I include several control variables on the firm, as well as the board level.

Independent variable. As stated in the previous chapters, in the context of this study elite board members excel in terms of several social capital attributes. Therefore, following previous studies, I measure several attributes collectively with a single variable (Belliveau et al., 1996, p. 1577; Certo et al., 2001, p. 40; D'Aveni, 1990, p. 128). Specifically, I use a ranking published yearly in the Handelsblatt to identify these

board members. Handelsblatt is the biggest business and finance newspaper written in German and has over 500,000 readers per issue (Handelsblatt Media Group, 2023; MDS, 2023). Since 2011, Handelsblatt publishes a ranking of the 30 most powerful supervisory board members in Germany, rating board members of all German listed firms. The publisher conducts this study in cooperation with Michael Wolff, a professor at the Georg-August University in Göttingen, and his team. They rate board members along three attributes: reputation, network, and status. In each of these attributes, board members can reach up to 100 points, resulting in a maximum of 300 points combined. The scores for each attribute are assessed using the firms' annual reports. The 30 best-rated board members are listed from first to 30th in the published articles. Corresponding to the published ratings, the Handelsblatt articles report descriptions of the operationalization of the three attributes. Reputation is evaluated with respect to each board membership based on three factors: whether the firm is part of an index, the size of the firm based on the number of employees, and the relevance of the firm operationalized by market capitalization. Here, the factor's score is weighted double if the board member is chair of the board. The points for the network depend on the quantity and quality of the board members' ties to other firms. To evaluate status, the study considers each firm the individual is serving looking at whether the member is the chair of the board, whether they were a board member in the focal firm before, their tenure, and the number of other board memberships (Fockenbrock, 2011, p. 25; 2012, p. 26; 2013, p. 5; 2014, p. 18; 2015, p. 5; 2016, p. 6; 2017, p. 4; 2018; 2019, pp. 4–5; 2020; Kewes, 2021, pp. 4–5).

The articles do not offer more insight into how they allocate the points to individual board members. Comparing the given information with established measures of reputation, network, and status reveals that the operationalization is in line with the literature. The Handelsblatt study uses secondary data to assign scores to board members. Scholars that do so, predominately measure reputation using the number of board memberships held (Certo et al., 2001, p. 40; D'Aveni, 1990, p. 128). This is in line with the given measurement, which even goes beyond the convention and evaluates size and relevance of the firms served, as well as the position of the board member. Other scholars use alternatives such as surveys or media coverage to operationalize (firm) reputation (Pollock et al., 2019, p. 21). Unfortunately, not much information is available on the operationalization of the attribute network. Assuming the authors of the Handelsblatt study followed other corporate governance scholars, the quantity of board ties would be measured as the number of boards that the member serves (S. Johnson et al., 2011, p. 1709; Tian et al., 2011, p. 738) or the number of interlocks created by the board member (Zona et al., 2018, p. 601). In line with the attribute reputation, quality might be dependent on the firm the board member is tied to. Lastly, status is measured using the number of board memberships, consistent with previous research (Certo et al., 2001, p. 40; D'Aveni, 1990, p. 128). The present measure-

---

[4] Data for the independent variable is available from 2011 on, 2010 is included since a time lag is used on some of the control variables, this way less data is lost due to lagging.

[5] In 2021, The Frankfurt Stock Exchange extended the DAX to include 40 companies. Consequently, the MDAX decreased to 50 companies (Mannweiler, 2022). However, this change occurred outside of the sample period.

[6] For a list of industry representation in the sample, based on the database Worldscope, see Appendix 1.

ment also relies on tenure and position on the board, aligning with other scholars (Bonini et al., 2022, p. 1609). As with reputation, other authors use survey data instead of secondary data to establish a board member's status (Veltrop et al., 2017, p. 1088).

The present study is not the first to use rankings as an operationalization. One established method is using cutoffs, as the present study does with the top 30, and creating a binary variable (Pollock et al., 2019, p. 22). In the analysis of the first hypothesis, a board member is an elite board member if they are part of the top 30 in the year of observation (t). Following the example of multiple scholars (Bonini et al., 2022, p. 1614; Hillman, 2005, p. 475; S. Johnson et al., 2011, p. 1790; Kroll et al., 2007, pp. 1204–1205; Stevenson and Radin, 2009, p. 26), I operationalize my independent variable in the following way:

$$
\text{Elite board member} = \begin{cases} 0; & \text{if none of the firm i's supervisory} \\ & \text{board members is part of the top 30 in year } t \\ 1; & \text{if at least one of the firm i's supervisory} \\ & \text{board members is part of the top 30} \\ & \text{in year } t \end{cases}
$$

Likewise, the independent variable for the second hypothesis is operationalized as a binary variable. A firm has an elite board chair if the chair of the board is part of the top 30 in the year of observation (t):

$$
\text{Elite board chair} = \begin{cases} 0; & \text{if the chair of the supervisory board is not} \\ & \text{part of the top 30 in year } t \\ 1; & \text{if the chair of the supervisory board is part} \\ & \text{of the top 30 in year } t \end{cases}
$$

When testing the second hypothesis, the relationship between having an elite board chair and firm performance might be attributed to the fact that there is *an* elite member on board. To segregate the impact of the elite board chair, a control for the number of elite board members is introduced when testing the second hypothesis. The elite control variable is simply the number of elite members on the board in the year of observation (t), subtracting the elite board member that is the chair.

Dependent variable. I use two different approaches to operationalize the variable firm performance. First, since there is no agreement among scholars on what measure is appropriate for board research, using two approaches increases the generalizability of the findings (Boivie et al., 2016, p. 3; J. L. Johnson et al., 1996, p. 430). Second, firm performance is multi-dimensional, and accounting-based and market-based measures of firm performance differ in their interpretation (Carter et al., 2010, p. 403; Keats, 1988, p. 154). Accounting-based measures such as return on assets, return on equity, or return on investment capital, reflect a past- and present-oriented measure of the firm's success (Keats, 1988, p. 154; Keats and Hitt, 1988, p. 576). In general, boards have more control over accounting-based firm performance (Hambrick & Finkelstein, 1995, p. 190).

However, considering that this thesis is based on resource dependence theory, a market-based performance measure could be a more appropriate choice since the theory argues for an external view of firms (Hillman, 2005, p. 477; Pfeffer and Salancik, 1978, p. 2; Zahra and Pearce, 1989, p. 276). Market-based performance measures such as Tobin's Q, stock performance, or market capitalization, are future-oriented and consider the environment of the market (Keats, 1988, p. 154; Keats and Hitt, 1988, p. 576). Mirroring the arguments for accounting-based measures, a problem with market-based measures is that the board might not have as much control over the external forces that the measure reflects (Hambrick & Finkelstein, 1995, p. 190). Finally, regarding the empirical evidence of board capital studies, there is no clear tendency as to which measure is supported more often[7]. Consequently, like other scholars in board research, I use accounting-based and market-based firm performance measures in my analysis (Hillman, 2005, p. 471; Post and Byron, 2015, p. 1547; Tuschke and Sanders, 2003, p. 640; Westphal, 1999, p. 13).

For the accounting-based measure, I choose return on assets (ROA). ROA is one of the most widely used operationalizations of firm performance in board research (Becerra, 2009, p. 263; Gomez-Mejia and Palich, 1997, p. 318). It indicates the profitability of a firm (i.e., net income) in relation to its total assets (Carter et al., 2010, p. 403). I collect the ROA of listed German firms between 2010 and 2018 through the database Orbis. Since accounting-based performance measures vary across industries (Meindl et al., 1985, p. 84), following Hillman (2005, p. 471), R. A. Johnson et al. (1993, p. 41), and Tuschke and Sanders (2003, p. 640), I adjust the accounting-based measure for the industry the firm operates in. Grouping the observations according to industry divisions[8], I calculate the mean of the ROA in the given year. Next, I subtract each firm's ROA from the industry mean, resulting in the industry-adjusted ROA[9]. Following other scholars, I assume that changes in the firm's board do not immediately lead to changes in accounting results. It is reasonable to expect that an elite board member, or any board member, needs time to affect decision-making at the top of the firm by providing the previously discussed resources. Therefore, I measure ROA two years after the observation (t+2) (Carter

---

[7] For instance Hillman (2005, p. 472) and Bøhren and Strøm (2010, p. 1303) only find a significant relationship using market-based performance measures. Kor and Sundaramurthy (2009, p. 996) only find a significant relationship using accounting-based measures.

[8] The classification into divisions is based on the United States Department of Labor's classification of SIC codes, which is equivalent to the classification retrieved from the database Worldscope (Occupational Safety and Health Administration, 2023). The ten divisions are (A) Agriculture, Forestry, And Fishing, (B) Mining, (C) Construction, (D) Manufacturing, (E) Transportation, Communications, Electric, Gas, And Sanitary Services, (F) Wholesale Trade, (G) Retail Trade, (H) Finance, Insurance, And Real Estate, (I) Services, and (J) Public Administration. Public administration is excluded since no firm in the sample operates in this division.

[9] See Appendix 5 for the industry and market means, as well as corresponding adjustments.

et al., 2010, p. 405; Westphal, 1999, p. 13; Zahra and Pearce, 1989, p. 277).

Tobin's Q is the second, market-based, measure of firm performance included in the analysis. It is defined as the ratio of the market value of the firm's assets to the replacement value of the firm's assets (Carter et al., 2010, p. 403; Tobin, 1969 as cited in Bonini et al., 2022, pp. 1613–1614). A Tobin's Q greater than one indicates that the firm's assets are overvalued and Tobin's Q smaller than one indicates that they are undervalued (Carter et al., 2010, p. 403). Using secondary data from Orbis, I calculate Tobin's Q as the firm's market capitalization divided by total assets. On average, the market value of German listed firms increases (Deutsches Aktieninstitut, 2019). To account for this, I use a market-adjusted measure of Tobin's Q. After calculating the mean of Tobin's Q of all firms in a given year (t), I subtract the firm's Tobin's Q from the market mean[9]. As it is a market-based performance measure and therefore future-oriented, Tobin's Q is measured without year adjustment (t).

Control variables. I include several control variables in the models, on the firm and the board level, to account for influences on the proposed relationships. Based on previous research and the theoretical foundation of the hypotheses, I include the variables prior performance, firm size, board size, board member busyness, relative CEO power, and industry. As indicated above, I control for the number of elite board members to test the second hypothesis.

Individuals are motivated to join a board by the subsequent increase in reputation and power (Certo, 2003, p. 437; Pfeffer and Salancik, 1978, pp. 162–164). Therefore, high-performing firms might be better at attracting elite board members. Although this relationship was not yet tested for high social capital in general, there is evidence suggesting that prior performance positively influences the number of other board memberships held by members, which is a determinant of high social capital (Ferris et al., 2003, p. 1098). Consequently, prior performance might bias the proposed relationships. Following the example of Tuschke and Sanders (2003, p. 640) and Zona et al. (2018, p. 603) I include performance in the previous year as a control for both measures of firm performance. To avoid high correlations with the dependent variable, I include prior market-based performance in the model predicting accounting-based performance and prior accounting-based performance in the model predicting market-based performance. I use industry and market adjustment according to the nature of the dependent variable. Specifically, in the model predicting industry-adjusted ROA two years after the observation (t+2), I control for the difference between market-adjusted Tobin's Q in the year of observation (t) and market-adjusted Tobin's Q one year before (t – 1). In the model predicting market-adjusted Tobin's Q in the year of observation (t), I control for industry-adjusted ROA in the year before (t – 1).

Corporate governance scholars argue that firm size could play a role in several matters concerning the board and the board's influence on organizational outcomes (Dalton et al., 1998, p. 273). In large firms, it is more difficult for board

members to prompt changes due to established routines and strategies (Boivie et al., 2016, p. 23; Cooper et al., 1986, pp. 255–256). Furthermore, a large firm implies more dependencies on external parties, which would increase the importance of the supervisory board but also the challenges of providing resources due to increased complexity (Dalton et al., 1998, p. 273; Pfeffer and Salancik, 1978, p. 168). Pfeffer and Salancik (1978, pp. 162–164) point out, that board members are motivated to provide resources for firms that enhance their reputation and power. Accordingly, elite board members are motivated to join larger, more complex firms (S. Johnson et al., 2011, p. 1797). Supporting this, (Ferris et al., 2003, p. 1093) report that individuals with high social capital serve predominantly in large firms. Following Hillman (2005, p. 471) I operationalize firm size as the number of employees of firm i in year t.

Pfeffer and Salancik (1978, p. 172) suggest that the size of a firm's board reflects the external dependencies it has. Therefore, firms that face more uncertainty might have larger boards. Additionally, board size should be included as a control variable because it has been previously linked to financial performance (Dalton et al., 1999, p. 676). As an additional advantage, board size accounts for the proportion of elite board members to all board members, if the firm has exactly one elite board member (Hillman, 2005, p. 471). Following the example of multiple scholars (Bonini et al., 2022, p. 1614; Combs et al., 2007, p. 1313; Oehmichen et al., 2017, p. 650), I include the variable board size and operationalize it as the number of shareholder representatives of the firm i in year t.

Board members are considered busy if they have several seats on other firms' executive or supervisory boards. As indicated in Chapter 3, corporate governance literature points to the effects of a board member having several positions on firm performance (Bøhren and Strøm, 2010, p. 1296; Kor and Sundaramurthy, 2009, p. 994). Additionally, (Adams et al., 2010, pp. 88–89) point to the problem of the selection effect, i.e., the most capable board members get more opportunities for other board mandates and are therefore rather busy. Hence, I expect elite board members to serve on more boards simultaneously than non-elite board members. The control variable busy board refers to the average number of directorships of all members of the supervisory board of firm i in year t (Oehmichen et al., 2017, p. 650).

Boivie et al. (2016, pp. 22–23) argue that a powerful CEO can hinder members of the board to execute influence over decision-making. Therefore, high CEO power might hinder the board's ability to provide resources. Supporting this argument, Pearce and Zahra (1991, p. 150) found that less powerful boards compared to the CEO were not as active in resource provision. However, this study also pointed out that performance benefits occur if both the CEO and the board are powerful. Payne et al. (2009, p. 720) found that a powerful board, relative to the CEO, positively impacts firm performance. Therefore, I include relative CEO power as a control variable. Power is generally measured by CEO duality, tenure, ownership, or a composite of the three (Can-

nella Jr and Shen, 2001, p. 259; Zajac and Westphal, 1996, pp. 74–75). CEO duality does not apply to a German context, due to the strict separation of the executive and supervisory board (Regierungskommission Deutscher Corporate Governance Kodex, 2022, pp. 4–5). Since the present study takes a resource dependence perspective, tenure is the better fit to operationalize power compared to ownership. To account for the power relationship between the CEO and supervisory board members, I create a relative CEO power variable, calculated by dividing the average tenure of supervisory board members by the CEO's tenure (Zajac & Westphal, 1996, pp. 74–75), both in year t. If this variable is greater than one, this indicates that the board is more powerful compared to the CEO. If relative CEO power is smaller than one, the CEO is more powerful than the board. Since the second hypothesis emphasizes the role of the board chair, I create a second relative CEO power variable, in which I divide the board chair's tenure by the CEO's tenure. As the variable for the first hypothesis, if relative CEO power is greater than one, this indicates that the board chair is more powerful compared to the CEO and vice versa.

The industry a firm operates in influences its need for resource provision. For instance, firms in regulated industries might need board members that can provide legal advice or connections to the government (S. Johnson et al., 2013, pp. 251–252). Creating dummy variables for all 36 industries represented in my sample, using four-digit SIC codes, would limit the model's degrees of freedom. Therefore, I create the industry control based on the ten industry divisions in the sample, which group the four-digit SIC codes[8]. Since the underlying data structure is a panel, year fixed-effects are also included in the model, in the form of a dummy variable for every year.

After describing the sample and presenting the variables and their operationalization, I conclude Chapter 4 with the final models. The present study tests two hypotheses, using two models each. Hypothesis 1 (H1) tests the impact of having an elite board member, and Hypothesis 2 (H2) tests the impact of having an elite board chair. The control variables included are essentially the same, except for the relative CEO power variable and the inclusion of the elite control variable in H2 only. Models (a) test the impact on accounting-based performance, and models (b) test the impact on market-based performance. Otherwise, (a) and (b) only differ in the operationalization of the prior performance variables:

H1(a) Industry-adjusted ROA$_{i,t+2}$
$= \beta_0 + \beta 1 \cdot$ Elite board member$_{i,t} + \text{CV}_{i,t} + \varepsilon_{i,t}$

H1(b) Market-adjusted Tobin's Q$_{i,t}$
$= \beta_0 + \beta 1 \cdot$ Elite board member$_{i,t} + \text{CV}_{i,t} + \varepsilon_{i,t}$

H2(a) Industry-adjusted ROA$_{i,t+2}$
$= \beta_0 + \beta 1 \cdot$ Elite board chair$_{i,t} + \text{CV}_{i,t} + \varepsilon_{i,t}$

H2(b) Market-adjusted Tobin's Q$_{i,t}$
$= \beta_0 + \beta 1 \cdot$ Elite board chair$_{i,t} + \text{CV}_{i,t} + \varepsilon_{i,t}$

i – firm; t – year; CV – control variables vector; e – error term

5. Results

The following chapter includes elaborations and depictions of descriptive statistics of the underlying data. Next, I present inferential statistics from testing the proposed hypotheses using the models described in Chapter 4.2. Finally, Subchapter 5.3 includes additional inferential statistics, testing the robustness of the results.

5.1. Descriptive statistics

This subchapter covers summary statistics and pairwise correlations of all relevant variables included in the models. Furthermore, it includes descriptions of data transformation and the reduction of outliers to avoid biased results. First, I present demographic differences between elite board members and non-elite board members. Since, in creating the independent variable, I introduce a characterization of supervisory board members based on social capital criteria it is relevant to discuss in what other dimensions the two groups of supervisory board members differ.

In the given sample, 2.78% of all supervisory board members are elite. Comparing the demographics of elite and non-elite board members shows the following differences regarding gender, age, foreignness, and education (S. Johnson et al., 2013, p. 236). In the subgroup of non-elite board members, 14.12% are female, whereas, in the subgroup of elite board members, 12.31% are female. Elite board members are on average older than non-elite board members. The average age of non-elite board members is 54 years, and for elite board members, it is 61 years. 18.46% of elite board members are not born in Germany. For non-elite board members, 30.98% are not born in Germany. Moving on to education, in both subgroups, about ninety percent have a university degree. 35.00% of non-elite board members have a Ph.D. or habilitation. Among elite board members, 67.70% have at least one of these titles. The distribution of the type of education, distinguishing between specializations in business administration, engineering, law, and others does not differ between elite and non-elite board members. Based on the selection criteria for German supervisory boards discussed in Chapter 4.1, I do not expect human capital attributes to differ highly among elite and non-elite board members. The attribute of human capital available in the given data set is tenure (Kor & Sundaramurthy, 2009, p. 986). Elite board members have an average tenure of eight years. For non-elite board members, the average tenure is five years.

Table 1 includes summary statistics of the relevant variables for testing the hypotheses. The summary statistics do not show any inconsistencies with the definition and operationalization of the variables. The number of observations decreases from 947 to 900 due to missing data in creating the variables. The elite board member variables are binary, therefore the mean indicates that approximately one-third of the firms in the given sample have at least one elite board member, and 19.56% of the firms have an elite board chair. Excluding elite chairs, firms in the sample have between zero and five elite board members. On average, firms have around

Table 1: Summary statistics[a]

	Variable	Obs.	Mean	*SD*	Min	Max
1	Elite board member	900	0.333	0.474	0	1
2	Elite board chair	900	0.196	0.397	0	1
3	Elite control	900	0.513	0.997	0	5
4	Firm size	900	50904.83	95779.27	4	636156
5	Board size	900	7.22	2.370	2	15
6	Busy board	900	1.255	0.265	1	2.4
7	Relative CEO power	900	1.587	1.700	0.096	14.33
8	Board chair/CEO power	900	1.598	2.098	0.4	19
9	Industry-adjusted ROA	900	0.000	6.213	-53.21	31.33
10	Market-adjusted Tobin's Q	900	0.000	1.173	-1.364	7.812
11	Prior performance model a	754	-0.008	0.466	-2.720	2.268
12	Prior performance model b	754	0.346	5.808	-40.41	31.33

[a]Industry and year controls are not included in the table for visualization purposes. Their summary statistics are as expected.
For a complete table see Appendix 2.

fifty thousand employees, and one firm (Deutsche Euroshop) has four. The board size lies between two and fifteen board members, the mean being seven. Board members on the busiest board have 2.4 board memberships on average, the mean being 1.3 board memberships. No board member violates the German corporate governance code's recommendation of holding a maximum of five board memberships simultaneously[10]. In the given sample, on average, the board is more powerful than the CEO, as the mean of the relative CEO power variable is higher than one. The same conclusion can be drawn for the second relative CEO power variable that compares the power of the board chair and the CEO. As the performance variables are adjusted according to industry or market, their means are close to zero. Other than non-adjusted Tobin's Q, the adjusted variable has negative values. As prior performance variables are lagged and/or compare two years, there are missing values at the edges, explaining the smaller number of observations (754). There is no prior performance data available for the year 2010 since this is where the sample period starts. Therefore, the actual sample period considered for the hypothesis testing is 2011 to 2018, which aligns with the years when the Handelsblatt articles are available.

Pairwise correlations are reported in Table 2. Most of the pairwise correlations are below 0.5 and in the expected direction. Having at least one elite board member is positively correlated with firm size, the board size, the average number of board memberships, and to a small degree a relatively more powerful board. Against expectations, having at least one elite board member is negatively correlated with all firm performance measures. The correlations are similar for the elite board chair variable. Firm size is positively correlated with board size and the average number of board memberships but negatively correlated with the adjusted firm perfor-

mance variables. The average number of board memberships is negatively correlated with market-based performance and to a smaller degree with accounting-based performance. The accounting and market-based performance measures have a positive correlation. The busy board variable has a moderate to high correlation with the binary elite board member variable (0.635*) and the binary elite board chair variable (0.554*). To avoid multicollinearity issues, I create an alternative variable, which is the average number of board memberships of the non-elite members of the board. The correlations between the independent variables and the new control variable are lower and negative (-0.247* and -0.221*) due to the exclusion of elite board members, which have more board memberships than non-elite board members do[11]. Therefore, I choose the alternative operationalization. The relatively high correlation (0.683*) between industry-adjusted ROA and the prior performance variable for model b (market-based performance) does not need to be addressed, since the two variables are not used in the same model. The same logic applies to the high correlations between the two independent variables, the elite board member and the elite control variable, and the two power variables.

Table 3 lists the frequencies of the number of elite members on firms' boards. Out of the 900 firm-year observations represented in the sample, one-third have at least one elite board member. About twenty percent have at least two elite board members, ten percent have at least three, and five percent have at least four. In nineteen observations (2.11%), a firm has five or six elite board members and no firm has more than six in any year.

Moving on to the dependent variables, detailed summary statistics do not show any outliers or inconsistencies with the operationalization. The histograms of either adjusted firm

---

[10] In the given sample, 76% of all supervisory board members hold only one board seat, 15% hold two, 6% hold three, 2% hold four, and 1% hold five.

[11] In the given sample, 76.92% of elite board members sit on more than one board, whereas 3.34% on non-elite board members sit on more than one board.

Table 2: Pairwise correlations[a]

	Variable	1	2	3	4	5	6	7	8
1	Elite board member								
2	Elite board chair	0.690*							
3	Elite control	0.720*	0.486*						
4	Firm size	0.383*	0.275*	0.439*					
5	Board size	0.341*	0.259*	0.416*	0.482*				
6	Busy board	0.635*	0.554*	0.591*	0.336*	0.330*			
7	Relative CEO power	0.090*	0.117*	0.090*	0.062	0.016	0.120*		
8	Board chair/CEO power	0.050	0.088*	0.056	0.044	0.012	0.105*	0.788*	
9	Industry-adjusted ROA	-0.056	-0.072	-0.100*	-0.086*	-0.164*	-0.085	-0.038	-0.010
10	Market-adjusted Tobin's Q	-0.212*	-0.146*	-0.243*	-0.231*	-0.362*	-0.232*	-0.046	0.039
11	Prior performance model a	-0.054	-0.032	-0.037	-0.016	-0.034	-0.044	0.026	0.016
12	Prior performance model b	-0.095*	-0.090	-0.129*	-0.108*	-0.226*	-0.112*	-0.032	-0.018

	Variable	9	10	11
9	Industry-adjusted ROA			
10	Market-adjusted Tobin's Q	0.446*		
11	Prior performance model a	0.004	0.272*	
12	Prior performance model b	0.683*	0.420*	-0.146*

*Correlation is significant at the 0.01 level.

[a] Industry and year controls are not included in the table for visualization purposes.
Pairwise correlations are < 0.5. For a complete table see Appendix 3.

Table 3: Frequencies of the number of elite board members

Number of elite board members	Frequency	Percent	Cum.
0	595	66.11	66.11
1	141	15.67	81.78
2	67	7.44	89.22
3	46	5.11	94.33
4	32	3.56	97.89
5	17	1.86	99.78
6	2	0.22	100.00

performance measure do not represent a normal distribution. However, a transformation with logarithm or square root is not possible for variables that have negative values[12]. Some control variables are altered to avoid biased results due to outliers or not normal distributions. The two variants of the past performance data are not transformed, since both have negative values. In both cases, no outliers are dropped and the histograms approach a normal distribution. For firm size, nine outliers are dropped, associated with a firm that has four to five employees during the sample period. Additionally, the variable is logarithmized. The board size variable is not transformed. As discussed above, the busy board variable is altered to avoid multicollinearity issues. There were no addi-

tional adjustments to this variable. Both relative power variables are logarithmized and afterwards, approach a normal distribution[13].

Tables 4 and 5 include the summary statistics and pairwise correlations after the modifications described in this chapter. Dropping outliers reduces the number of observations to 891 (746 for prior performance). All pairwise correlations of variables that are used in the same model are low to moderate. To ensure that the models do not suffer from multicollinearity, I estimate variance inflation factors for all four models. As described in the last chapter, for both hypotheses the first model (a) predicts industry-adjusted ROA two years after the observation (t+2), and the second model (b) predicts market-adjusted Tobin's Q without time adjustment (t). If the industry controls are included in either model, one

---

[12] See Appendix 4 for detailed summary statistics of the dependent variables before adjustment and Appendix 6 for summary statistics after adjustment. For histograms and box plots of adjusted and non-adjusted dependent variables, see Appendix 7.

[13] For histograms and box plots of control variables, see Appendix 8.

Table 4: Summary statistics after modifications[a]

	Variable	Obs.	Mean	*SD*	Min	Max
1	Elite board member	891	0.342	0.475	0	1
2	Elite board chair	891	0.198	0.398	0	1
3	Elite control	891	0.519	1.000	0	5
4	Firm size	891	9.491	1.791	4.477	13.363
5	Board size	891	7.211	2.314	2	15
6	Busy board	891	1.100	0.193	0.684	2.4
7	Relative CEO power	891	0.082	0.836	-2.347	2.663
8	Board chair/CEO power	891	-0.057	1.040	-3.219	2.944
9	Industry-adjusted ROA	891	-0.025	6.236	-53.21	31.33
10	Market-adjusted Tobin's Q	891	0.007	1.177	-1.368	7.815
11	Prior performance model a	746	-0.010	0.468	-2.726	2.285
12	Prior performance model b	746	0.317	5.830	-40.41	31.33

[a]Industry and year controls are not included in the table for visualization purposes. Their summary statistics are as expected.
For a complete table see Appendix 10.

Table 5: Pairwise correlations after modifications[a]

	Variable	1	2	3	4	5	6	7	8
1	Elite board member								
2	Elite board chair	0.688*							
3	Elite control	0.719*	0.484*						
4	Firm size	0.507*	0.389*	0.515*					
5	Board size	0.346*	0.263*	0.420*	0.624*				
6	Busy board	-0.247*	-0.221*	-0.352*	0.094*	0.069			
7	Relative CEO power	0.134*	0.128*	0.143*	0.148*	0.094*	-0.052		
8	Board chair/CEO power	0.059	0.091*	0.069	0.091*	0.064	0.013	0.757*	
9	Industry-adjusted ROA	-0.053	-0.070	-0.098*	-0.098*	-0.167*	-0.020	-0.071	-0.013
10	Market-adjusted Tobin's Q	-0.217*	-0.149*	-0.247*	-0.384*	-0.360*	-0.068*	-0.104*	0.036
11	Prior performance model a	-0.054	-0.032	-0.038	-0.037	-0.033	-0.023	0.016	0.012
12	Prior performance model b	-0.090	-0.088	-0.127*	-0.136*	-0.231*	-0.002	-0.045	0.008

	Variable	9	10	11
9	Industry-adjusted ROA			
10	Market-adjusted Tobin's Q	0.450*		
11	Prior performance model a	0.005	0.272*	
12	Prior performance model b	0.683*	0.424*	-0.146*

*Correlation is significant at the 0.01 level.

[a]Industry and year controls are not included in the table for visualization purposes. Their pairwise correlations are < 0.5.
For a complete table see Appendix 11.

individual variance inflation factor is slightly above the suggested threshold of ten. As the mean variance inflation factors are still rather low for all models and there are no exceedingly high pairwise correlations between divisions or with other variables, I do not exclude the industry controls from the models[14]. After describing the data, performing relevant transformations, and ensring that the models do not suffer from multicollinearity, I move on to testing the hypotheses.

5.2. Inferential statistics

In this subchapter, I test the hypotheses that (H1) having an elite board member is positively associated with firm performance, and that (H2) if the board chair is elite, this impact becomes stronger, using two operationalizations of firm performance.

---

[14] As all models are tested using a fixed effects model that omits the industry control, the decision does not influence the results. For variance inflation factors, see Appendix 9.

Hypothesis 1a predicts adjusted accounting-based performance, two years after the observation (t+2). Using the Breusch and Pagan Lagrangian multiplier test, I reject the null hypothesis that there is no panel effect (p = 0.000). Subsequently, the result of the Hausman test suggests that the difference in coefficients is systematic (p = 0.026). Therefore, a fixed-effects regression is appropriate to test the model. Testing the assumption of homoscedasticity with the modified Wald test, the homoscedasticity null hypothesis is rejected (p = 0.000). This suggests using the robust function. Performing the tests for Hypothesis 1b that predicts market-based performance, renders similar results with the same conclusions. As expected, there is a panel effect (p = 0.000), the difference in coefficients is systematic (p = 0.000), and homoscedasticity cannot be assumed (p = 0.000). The tests discussed here as well as the variable modifications and multicollinearity tests in Chapter 5.1 suggest that the assumptions for fixed-effects regressions are fulfilled (Stock & Watson, 2003, p. 375). Therefore, testing the first hypothesis, I use fixed effects with the robust function to predict accounting- and market-based performance.

In Table 6, Models 1 to 2 report the fixed-effects regression results of testing Hypothesis 1a predicting adjusted accounting-based performance. Model 1 is a control model, which excludes the elite board member dummy. Model 2 includes all independent variables. Against expectations, the elite board member coefficient is negative and significant at the 10% level (ß = - 0.932+). This suggests that having an elite board member is negatively associated with accounting-based firm performance. Specifically, in the given sample firms with at least one elite board member have an industry-adjusted ROA that is on average about 0.9 units smaller, all else being equal. The coefficient of the prior performance variable is positive and significant at the 5% level (ß = 1.150*), suggesting that, on average, firms in the sample perform well if they performed well in the past. The other control variables in the model (firm size, board size, busy board, relative CEO power) are not significant, which may be attributed to the conservative approach of adding a past performance variable (Achen, 2001 as cited in Zona et al., 2018, p. 604). Except for 2015, year-fixed effects are not significant. The overall model is significant (p = 0.009) and the adjusted R-squared increases from Model 1 (adjusted R-squared = 0.036) to Model 2 (adjusted R-squared = 0.041), indicating that the variables included in Model 2 explain 4.1% of the variation in firm performance and that the elite board member variable partly explains variation in firm performance. The number of observations in the models predicting accounting-based performance decreased to 491 (108 firms), due to the lagging of variables for both the dependent variable and the prior performance variable.

The results for the second operationalization of firm performance, adjusted market-based performance, are reported in Table 6, Models 3 and 4. The results regarding elite board members do differ from the accounting-based performance model, as the coefficient is negative but not significant (ß = - 0.069). The prior performance control has a positive coeffi-

cient, which is significant at the 5% level (ß = 0.018). Conclusions about the other control variables and the year-fixed effects are equivalent to Models 1 and 2. The overall model is significant at the 10% level (p = 0.057). The adjusted R-squared slightly increases from Model 3 (adjusted R-squared = 0.025) to Model 4 (adjusted R-squared = 0.026), indicating that the variables included in Model 4 explain 2.6% of the variation in firm performance. The number of observations in the models predicting market-based performance is 746 (132 firms).

Regarding the second hypothesis of the study, Hypothesis 2a predicts accounting-based performance two years after the observation year. The panel effect is significant (p = 0.000), as suggested by the Breusch and Pagan Lagrangian multiplier test. The difference in coefficients is systematic (Hausman test: p = 0.000), thus, fixed effects is the appropriate model to test the hypothesis. The modified Wald test rejects the homoscedasticity null hypothesis (p = 0.000), so the robust function is used. Similar results and conclusions are drawn for Hypothesis 2b, which predicts market-based performance. A panel effect (p = 0.000) and a systematic difference in coefficients (p = 0.000) suggest to use fixed effects. Homoscedasticity cannot be assumed (p = 0.000). As with Hypothesis 1, the assumptions for fixed-effects regressions are fulfilled (Stock & Watson, 2003, p. 375). I use fixed effects with the robust function for both models to test the second hypothesis.

In Table 7, Models 5 to 8 report the fixed-effects regression results of testing Hypothesis 2. The elite board chair coefficient is negative and non-significant for both measurements of firm performance (H2a: ß = - 0.496; H2b: ß = - 0.025). The coefficient of the prior performance variable is positive and significant at the 5% level (H2a: ß = 1.169*; H2b ß = 0.018*), suggesting that, on average, firms in the sample perform well, if they performed well in the past. The other control variables in the models (elite control, firm size, board size, busy board, board chair/power, and for the most part, year) are not significant. Model 6 is significant (p = 0.005), whereas Model 8 is not (p = 0.127). A non-significant model implies that there is no relationship between the independent variables and the dependent variable. Moreover, in both cases the adjusted R-squared decreases compared to the control models (H2a: from 0.043 to 0.042; H2b: from 0.021 to 0.020), indicating that the variables included explain 4.2% and 2% of the variation in firm performance and that the elite board chair variable does not add to the explanatory power of either model.

Concluding, under the specifications of the models reported here, the results do not support the hypotheses derived in this thesis. Testing the first hypothesis yields significant results. However, the results suggest that having an elite board member is negatively associated with firm performance. Moreover, this relationship is only observed if predicting accounting-based performance. This study does not find support for the second hypothesis. There is no significant relationship between the elite board chair and firm performance. Therefore, it cannot be assumed that an elite board

Table 6: Fixed-effects regression results for accounting and market-based performance (H1)

	Accounting-based performance (a)		Market-based performance (b)	
	Model 1	Model 2	Model 3	Model 4
Elite board member		-0.932+		-0.069
		(0.521)		(0.110)
Prior performance model a	1.209*	1.150*		
	(0.533)	(0.534)		
Prior performance model b			0.018*	0.018*
			(0.009)	(0.009)
Firm size	-1.382	-1.327	0.121	0.136
	(1.505)	(1.486)	(0.130)	(0.131)
Board size	0.103	0.104	-0.000	0.000
	(0.199)	(0.199)	(0.024)	(0.023)
Busy board	0.808	0.067	0.063	0.001
	(1.487)	(1.634)	(0.196)	(0.190)
Relative CEO power	-0.111	-0.147	-0.043	-0.044
	(0.291)	(0.292)	(0.033)	(0.033)
2011	0.932	0.932	0.131+	0.141+
	(0.723)	(0.719)	(0.077)	(0.084)
2012	0.966	0.979	0.088	0.099
	(0.628)	(0.623)	(0.075)	(0.084)
2013	0.702	0.717	0.072	0.082
	(0.528)	(0.521)	(0.094)	(0.104)
2014	0.127	0.157	0.125	0.136
	(0.432)	(0.430)	(0.082)	(0.091)
2015	0.687+	0.684*	0.048	0.059
	(0.347)	(0.344)	(0.080)	(0.088)
2016			0.011	0.020
			(0.068)	(0.075)
2017			0.100	0.107
			(0.068)	(0.074)
Constant	11.119	11.777	-1.301	-1.367
	(14.683)	(14.609)	(1.317)	(1.324)
Observations	491	491	746	746
Number of firms	108	108	132	132
F-statistics	2.243	2.469	1.804	1.757
p-value	0.020	0.009	0.054	0.057
Adjusted R-squared	0.038	0.041	0.025	0.026

Robust standard errors in parentheses I *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

chair impacts firm performance more strongly than an elite board member does.

5.3. Robustness tests

As reported in Chapters 4.2 and 5.1, I choose the operationalization of variables in accordance with corporate governance literature and partly transform the underlying data for testing the hypothesis. In this chapter, I report whether an alternative operationalization of the independent and dependent variables affects the results and whether the results are driven by transformations of the underlying data[15].

The reported results suggest that having an elite board member negatively impacts the accounting-based performance of the firm. I choose to construct the independent variable so that it is one if the firm has at least one elite board member. To test whether the specification of the binary variable affects the results, I test an alternative model of Hypothesis 1 where the elite board member variable is one if there are at least two elite members. 18.41% of firms in

---

[15] The results of robustness tests not reported in this chapter are reported in Appendix 14 - 18.

Table 7: Fixed-effects regression results for accounting and market-based performance (H2)

	Accounting-based performance (a)		Market-based performance (b)	
	Model 5	Model 6	Model 7	Model 8
Elite board chair		-0.496		-0.025
		(0.489)		(0.105)
Elite control	-0.276	-0.365	-0.001	-0.004
	(0.277)	(0.302)	(0.030)	(0.031)
Prior performance model a	1.200*	1.169*		
	(0.541)	(0.543)		
Prior performance model b			0.018*	0.018*
			(0.009)	(0.009)
Firm size	-1.194	-1.137	0.119	0.122
	(1.516)	(1.500)	(0.135)	(0.134)
Board size	0.110	0.125	0.002	0.002
	(0.212)	(0.216)	(0.024)	(0.024)
Busy board	0.226	-0.248	0.070	0.051
	(1.804)	(1.940)	(0.224)	(0.213)
Board chair/CEO power	-0.287	-0.282	-0.015	-0.015
	(0.249)	(0.250)	(0.025)	(0.025)
2011	0.989	1.009	0.128+	0.131
	(0.713)	(0.719)	(0.076)	(0.080)
2012	1.021	1.030+	0.085	0.087
	(0.615)	(0.616)	(0.075)	(0.078)
2013	0.706	0.721	0.068	0.070
	(0.510)	(0.506)	(0.095)	(0.099)
2014	0.092	0.120	0.126	0.129
	(0.418)	(0.420)	(0.082)	(0.087)
2015	0.685*	0.711*	0.049	0.052
	(0.345)	(0.354)	(0.080)	(0.085)
2016			0.008	0.010
			(0.068)	(0.071)
2017			0.096	0.098
			(0.068)	(0.071)
Constant	10.030	10.052	-1.309	-1.318
	(14.831)	(14.751)	(1.360)	(1.362)
Observations	491	491	746	746
Number of firms	108	108	132	132
F-statistics	2.708	2.542	1.589	1.480
p-value	0.004	0.005	0.096	0.127
Adjusted R-squared	0.043	0.042	0.021	0.020

Robust standard errors in parentheses I *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

the given sample have at least two elite board members. As reported in Table 8, Models 9 and 10, accounting-based firm performance is not significantly affected by the elite board member variable (ß = 0.216). Opposed to the main results (Model 2), the adjusted R-squared decreases when introducing the variable, suggesting that the original independent variable explains more variation in accounting-based firm performance across firms. Results for the model predicting market-based performance do not change. Furthermore, the elite board member variable is operationalized as a binary variable, following the method of several scholars (Bonini et al., 2022, p. 1614; Hillman, 2005, p. 475; S. Johnson et al., 2011, p. 1790; Kroll et al., 2007, pp. 1204–1205; Stevenson and Radin, 2009, p. 26). To test whether this specification influences the results, I perform an additional test using a count variable, i.e., the number of elite board members in the given year, as the independent variable (Hillman, 2005, p. 470). The results (Models 11 and 12) suggest that there is

no significant relationship between the number of elite board members and firm performance for either firm performance measure.

Next, the model's robustness to variations in the dependent variables is tested. For the model predicting accounting-based performance, a time lag is introduced. It may be that the results are affected by the choice of this time lag. Testing the underlying hypothesis without a time lag, a one-year time lag, or the moving average for three consecutive years, the coefficient of the elite board member variable is positive, but not significant (ß = 0.604, ß = 0.163, ß = 0.085). Therefore, this does not support the underlying hypothesis and suggests that the results in Model 2 are not robust to changes in the operationalization of the performance measure.

I adjust the accounting-based performance variable for the industry and the market-based performance variable for the overall market development. Concerning the first hypothesis, results are robust to changes concerning this operationalization. If the accounting-based variable is not adjusted, the coefficient of the elite board member variable is negative and significant on the 5% level (ß = - 1.302*). Moreover, the model is now only significant at the 5% level (p = 0.037) and the adjusted R-squared is lower compared to Model 2, suggesting that using the adjusted accounting-based variable is a better fit for the data. Using a non-adjusted market-based performance measure allows a transformation of Tobin's Q. Taking the natural logarithm of the underlying values, results in a distribution that approaches normality. Using this specification, the results for the elite board member variable do not differ from Model 4, meaning that the coefficient is negative and not significant (ß = - 0.025). Most year controls are significant and positive, suggesting that, on average, the firm's market-based performance improves throughout the sample period. The overall model is significant (p = 0.000) and explains 30.6% of the variation in firm performance, suggesting that the non-adjusted measure might be a better fit for the underlying data[16].

I modified some of the control variables (see Chapter 5.1). It should be noted that modifications to the controls are made to avoid biased results. Therefore, the results reported in this section should be interpreted with caution. First, I altered the busy board variable due to multicollinearity concerns. Using the original operationalization of the busy board variable, i.e., the average number of board memberships including elite board members, indicates that the results are robust to this specification. The coefficient of the elite board member variable is negative and significant at the 5% level (ß = - 1.139*) when predicting accounting-based performance. The effect is stronger compared to the main results in Model 2. Otherwise, the results do not differ from the main models considerably. The firm size and relative CEO power variables are transformed to reach a distribution approaching normality. Performing regression analysis with a non-transformed

---

[16] In models without adjustment, the prior performance control is not adjusted accordingly.

firm size or non-transformed relative CEO power variable does not change the results.

Models 5 to 8 suggest that there is no significant effect of having an elite board chair on firm performance. These results are robust to alternative time lags of the accounting-based performance variable, non-adjusted dependent variables, a busy board control including elite members, and non-transformed firm size and chair-CEO power controls.

In conclusion, consistent with the main results reported in Chapter 5.2, the robustness tests do not indicate that there is a significant relationship between having an elite board member and market-based performance, or between having an elite board chair and accounting or market-based performance. The negative association between having an elite board member and accounting-based firm performance is not robust to alternative operationalizations of the independent variable or alternative time lags of the dependent variable.

6. Discussion

The results from the empirical assessment in the present thesis suggest that, under certain conditions, having an elite board member is negatively associated with firm performance. These results contradict the first hypothesis of this thesis. Moreover, I do not find support for the second hypothesis that the impact on firm performance is stronger if the firm has an elite board chair. In the following chapter, I discuss the results and offer potential reasons for the surprising findings.

The results of the empirical analysis are somewhat counterintuitive and do not reflect the predictions derived from the resource dependence theory and previous research. First, the evidence suggests that having an elite board member is negatively associated with accounting-based performance. A potential reason might be that elite board members sit on more boards simultaneously compared to non-elite board members (see Chapter 5.1). Although, as presented in Chapter 3, scholars following the resource dependence perspective find evidence for a positive impact, other studies find that a high number of board memberships decreases the board's ability to monitor the executive board and has negative implications for the firm's performance. From a monitoring perspective, outside job demands are considered to lessen the board's ability to control the executive team (Boivie et al., 2016, p. 16; Falato et al., 2014, p. 411). Results from a natural experiment conducted by Falato et al. (2014, p. 423) suggest that busyness harms board monitoring quality and firm value. Analyzing busyness' effect on the diversification efforts of the firm, Jiraporn et al. (2008, p. 427) support the notion that busy board members are poorer monitors and harm firm performance. Specifically, busy outside directors, or shareholder representatives in a German context, are associated with decreases in firm performance (Fich & Shivdasani, 2006, pp. 701–703). Anticipating an influence from board busyness, I control for the average number of board memberships. Although the control variable is not significant, the negative effect size from having an elite board mem-

Table 8: Fixed-effects regression results for accounting-based performance (H1 robustness test)[a]

	Accounting-based performance			
	Model 9	Model 10	Model 11	Model 12
Elite board member (2)		0.216		-0.396
		(0.475)		(0.303)
Elite board member (count)				
Prior performance	1.209*	1.206*	1.209*	1.194*
	(0.533)	(0.533)	(0.533)	(0.537)
Firm size	-1.382	-1.398	-1.382	-1.255
	(1.505)	(1.504)	(1.505)	(1.468)
Board size	0.103	0.104	0.103	0.141
	(0.199)	(0.199)	(0.199)	(0.212)
Busy board	0.808	0.934	0.808	-0.266
	(1.487)	(1.597)	(1.487)	(1.948)
Relative CEO power	-0.111	-0.113	-0.111	-0.109
	(0.291)	(0.291)	(0.291)	(0.288)
Constant	11.119	11.081	11.119	11.106
	(14.683)	(14.712)	(14.683)	(14.482)
Observations	491	491	491	491
Number of firms	108	108	108	108
F-statistics	2.243	2.055	2.243	2.180
p-value	0.020	0.030	0.020	0.021
Adjusted R-squared	0.038	0.036	0.038	0.039

Robust standard errors in parentheses I *** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.1$
[a]For regression results including year fixed-effect see Appendix 12 and 13.

ber increases if elite members' memberships are included in the busyness control. This indicates that including this control improves the accuracy of the relationship by controlling for the performance effect of busyness. Inferring from the results of this study as well as previous research on board monitoring, the drawbacks of having a high social capital and therefore busy, board member seem to outweigh the benefits. This is further supported by Ruigrok et al. (2006, p. 1215), who demonstrate that highly interlocked boards are less involved in strategy. Hence, the members have less opportunity to provide resources to the firm that might improve performance.

Moreover, literature on celebrity CEOs might be valuable in exploring the reasons for the results. Celebrity CEOs are characterized as executives which are publicly regarded as the best CEOs, for instance by being awarded prizes in combination with increased media attention (Wade et al., 2006, pp. 654, 648). This is similar to the elite's operationalization, which is being portrayed in the Handelsblatt articles as the top 30. Scholars argue that the celebrity status of CEOs prompts overconfidence in their ability and subsequently, risky decision-making that leads to poor performance (Hayward et al., 2004, pp. 645–646; Wade et al., 2006, p. 646). According to empirical findings, having a celebrity CEO has mixed or even negative effects on firm per-

formance. Malmendier and Tate (2009, pp. 1610–1614) find that firms led by celebrity CEOs underperform in matched samples. The authors attribute the negative effect to increased opportunities for distractions such as writing books or invitations to join supervisory boards in other firms (Malmendier & Tate, 2009, p. 1596). Another study by Wade et al. (2006, pp. 653–654) concludes that having a celebrity CEO has a negative influence on the long-term market performance of the firm. However, they also find evidence that a celebrity CEO will improve market-based performance in the short term and has no short-term effect on accounting-based performance. Relating these findings to the present study, elite board members potentially suffer from overconfidence, which might lead to advice or provision of resources that results in poorer firm performance in the long term (here, two years after the observation). Additionally, other board members of the executive board might not question an elite board member's advice as their high social capital results in others' overconfidence in the elite board member's abilities (D'Aveni, 1990, p. 121). Moreover, Malmendier and Tate (2009, p. 1596) suggestions might translate to the present study, explaining poorer firm performance by a distraction from the monitoring and resource provision responsibilities due to other engagements.

Taking into account the results of the robustness tests for Hypothesis 1a, the negative effect of having an elite board member on firm performance is even stronger if performance is not adjusted by industry. This suggests that the effect differs across industries, and by not adjusting I capture the effect on performance in industries where the effect is stronger. Although the opposite effect was expected, these results support the notion that the need for resource provision will vary depending on the environment. For instance, Pfeffer and Salancik (1978, e.g. 121-122, 166) create models for predicting the number of measures firms take to manage interdependencies and uncertainty. According to this model, competitive uncertainty is highest when industrial concentration is intermediate and the number of organizations increases. In light of this study's findings, the negative effects of having an elite board member will be stronger in certain industries.

Several robustness tests of this study suggest that under some specifications in the accounting-based performance model, there is no significant effect of having an elite board member. Specifically, this is the case if the model predicts accounting-based performance with alternative time lags. The finding that there is no effect of having an elite board member on firm performance in the same year or one year later, supports the argumentation that the effects on accounting-based performance are not immediate (Carter et al., 2010, p. 405; Westphal, 1999, p. 13; Zahra and Pearce, 1989, p. 277). Moreover, relating to the celebrity CEO literature, these findings mirror (Wade et al., 2006, pp. 653–654) results that there is no effect on accounting-based performance one year after observation. As with the hypothesized positive effects, it might take some time for the negative effects, perhaps stemming from overconfidence or busyness, to be reflected in the ROA. An alternative explanation might be that the benefits from the board member's high social capital outweigh the drawbacks in the short-term, but depreciate over time (Lester et al., 2008, pp. 1009–1010). However, this claim cannot be supported using the present method, since it does not consider the year of appointment of the board member.

While there is a negative association between having an elite board member and firm performance, there are no significant results if a board has at least two elite members or if the elite board member variable is a count instead of a binary measure. This suggests that the negative effects occur only if there is one elite board member[17]. Hambrick et al. (2015, p. 336) suggest that while having one board member that combines several attributes for good monitoring benefits the firm, those benefits could be greater for two or more of these board members. It may be that the resource provision benefits for firm performance only occur if there is more than one elite board member, and otherwise the drawbacks over-

weigh. Conversely, building on social identity theory, having only one elite board member might trigger destructive group dynamics (Ely, 1994, pp. 205–206). The social capital disparity between the elite member and non-elite members could harm team performance by disturbing the flow of information and, therefore, no longer allowing for effective resource provision (Harrison and Klein, 2007, p. 1207; Van Knippenberg et al., 2004, pp. 1015–1016).

Further, this study does not find a significant effect of having an elite board member on market-based performance. This suggests that the market does not value a high social capital member on the supervisory board of a firm. One potential explanation is that elite board members join boards that are already prestigious (S. Johnson et al., 2011, p. 1795). Thus, they do not add additional benefits. The present results do not indicate whether firms with prestigious boards perform better, they just suggest that having elite board members is not a differentiator across firms. Furthermore, it is conceivable that the focus on large firms plays a role in the results. Deutsch and Ross (2003, p. 1003) argue that the resource provision function is especially important in entrepreneurial firms. Moreover, as discussed in Chapter 4.2, high social capital members are attracted to large firms, again supporting the argument that elite board members might serve on boards where they do not add many resources.

The empirical findings do not support the hypothesis that the impact on firm performance is stronger if the board chair is elite, as there is no significant relationship between having an elite board chair and firm performance. Banerjee et al. (2020, p. 374) argue that the pressure on board chairs from stakeholders increases. They are expected to focus on diversity, transparency, and sustainability, while still fulfilling the time-intense responsibilities of their role on the board (Meineke et al., 2019, p. 229; Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 20). It is conceivable that high social capital does not necessarily improve firm performance with these pressures and additional functions. At the same time, the board chair's responsibilities steer the focus away from their resource provision function. Furthermore, the question remains why the negative association between elite board members and performance is not stronger for elite board chairs. One potential reason might be that the negative effects of board member busyness are not as dominant with the board chair, because the number of other supervisory board seats is limited more strongly for the board chair, as recommended by the German corporate governance code (2022, p. 9)[18]. It should be noted that the share of elite board members in the sample was higher compared to elite board chairs, which might influence the results (see Chapter 5.1).

Finally, this analysis might suffer from endogeneity. Many empirical analyses in board research treat board capital as exogenous without considering the underlying reasons for

---

[17] A post-hoc regression analysis reveals that if the independent variable is operationalized as elite board member = 1; if one of the firm i's supervisory board members is part of the top 30 in year t, the results do not change considerably compared to Models 1 to 4 (Table 6). See Appendix 19 for the results.

[18] However, in the underlying sample there is no difference in the number of board memberships between shareholder representatives and board chairs.

how firms attract it (S. Johnson et al., 2011, p. 1782; S. Johnson et al., 2013, p. 250). In the context of this study, the self-selection bias would suggest that elite individuals choose the firms they want to serve. Therefore, the association with firm performance would be wrongly attributed to the elite board member's contributions, rather than their choice to join. Previous research suggests what attracts individuals to join boards. Greater compensation may influence individuals who have greater social capital to agree to serve on a board. However, S. Johnson et al. (2011, p. 1798) find that it is rather the complexity of the firm and the attached reputational benefits that make a board member with high social capital accept an offer. Moreover, it is conceivable that board members want to join a well-performing firm to avoid affiliation with poorly performing firms that might harm their social capital (Pfeffer & Salancik, 1978, pp. 164–165). The present study acknowledges the self-selection problem by controlling for prior performance and firm size (see Chapter 4.2). Furthermore, I assume that reverse causality is not a problem in this particular analysis, since I introduce a time lag in my models, Additionally, previous research suggests that firms cannot attract board members with high social capital, specifically, many board memberships, if they perform poorly (Fich & Shivdasani, 2006, p. 708). Nevertheless, I do not claim to test a causal relationship between elite board members and firm performance, as endogeneity problems cannot be dismissed entirely.

Summarizing, several fields of research offer potential reasons for the empirical results of this thesis. First, the number of board memberships might be an important factor as to why elite board members are associated with negative firm performance. Further, the cause may lay in the overconfidence of the board member in themselves, as well as the overconfidence of others in this individual. Group processes might explain the finding that the negative association is only apparent if there is one elite board member. Finally, the changing role of the board chair might shed light on the non-significant relationship with firm performance.

7. Conclusion

While scholars in the field of corporate governance agree that the board is increasingly important and should take an active role in the firm, there is still no consensus on how it shapes firm behavior and outcomes (Boivie et al., 2021, p. 1663). Especially in an environment where parties have different and often conflicting claims, reducing uncertainty and increasing power over these parties is both more crucial and more difficult to accomplish (Pfeffer & Salancik, 1978, pp. 92–93). The present thesis aimed to progress board research by arguing that individuals who have an extraordinary ability to link the firm to its environment and provide valuable resources, can reduce uncertainty, and consequently improve firm performance. Introducing a novel conceptualization of elite board members, this analysis shows that, against expectations, having one individual on the board who is elite, i.e., has a high social capital along the attributes reputation,

network, and status, is negatively associated with firm performance. Moreover, I do not find a significant relationship between having more than one elite board member or an elite board chair.

The present study makes several contributions to board research and its findings have concrete implications. This thesis answers both, the call to consider several attributes of board capital at the same time and to not neglect the individual as an important level of analysis (Bazerman and Schoorman, 1983, p. 209; Hambrick et al., 2015, p. 328; Hillman et al., 2000, p. 252; Hillman et al., 2008, p. 452; S. Johnson et al., 2011, p. 1799; Withers et al., 2012, p. 248). The findings imply that there is indeed value in regarding the individual board member. However, I cannot claim that analyzing individuals instead of aggregating the board's social capital is more predictive of firm performance since the chosen dataset does not inform about all social capital attributes of non-elite board members. Moreover, I argue that the elite board chair should be considered a person of interest when discussing individual board members' contributions. Although I do not find a significant relationship between elite board chairs and firm performance, the findings differ from other elite board members. This indicates that the board chair does take a differentiated role and their responsibilities distinguish them from other shareholder representatives.

The finding's implications for executives, board members, or shareholders are, not to categorically assume that having an elite board member will translate into better firm performance. It may be that overconfidence or disturbed group dynamics might even harm it in the long run (Harrison and Klein, 2007, p. 1207; Hayward et al., 2004, pp. 654–646; Van Knippenberg et al., 2004, pp. 1015–1016; Wade et al., 2006, p. 646). Moreover, it is an additional indication to follow the German corporate governance code's recommendation to limit the number of board memberships (Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 8). Further, firms need to consider their environment in the choice of board members. Overall, firms should consider the possibility that a board member or board chair with high social capital will not improve performance. However, this is not to say that the benefits suggested by the resource dependence theory are not provided, only the relationship to firm performance might not be as direct.

The findings and conclusions from this thesis need to be considered in light of its limitations. First, I focus on social capital. Although the descriptive comparison between elite and non-elite board members does not give a strong indication that the groups differ in demographics, and the German corporate governance code suggests that board members should not vary highly in their human capital (Regierungskommission Deutscher Corporate Governance Kodex, 2022, p. 8), it is plausible that there are differences between the two groups beyond social capital that drive the results. Further, some human capital attributes are suggested to be the results of superior social capital. For instance, determinants of social capital are argued to predetermine board members' human capital such as knowledge or ex-

pertise (Bailey and Helfat, 2003, pp. 350–354; Carpenter and Westphal, 2001, p. 640; Kor and Sundaramurthy, 2009, p. 985). Congruently, social capital attributes are party regarded functions of human capital. As Certo (2003, p. 436) and Veltrop et al. (2017, p. 1100) argue, the boards' prestige or status is a result of the members' knowledge and skills. This suggests that human and social capital are determining one another and future research should consider these interdependencies and complementary effects when linking a board member's ability with firm performance (Hillman & Dalziel, 2003, p. 393). While doing so, this study recommends combining several attributes in individual board members and not aggregating the whole board.

Moreover, the focus on resource dependence theory limits this study's hypotheses deviation. Although research using the agency theory does not necessarily disagree with the claim that a board member's social capital should improve firm performance, it did offer an explanation for the surprising results (Hillman and Dalziel, 2003, p. 389; Tian et al., 2011, p. 743). More perspectives should be regarded to understand the discussed relationships. As presented in Chapter 2, board members' functions are complex. Future research should consider using combined approaches of resource dependence and alternative perspectives, such as agency theory or social identity theory, to offer a broader perspective on board capital. Hillman and Dalziel (2003, p. 390) and Zona et al. (2018, p. 590) offer two examples of how to integrate even two seemingly opposing views on the board's role.

Another shortcoming of the present thesis is that I do not consider whether the dependencies the firms face align with the resources that elite board members can provide through their social capital. As described in this thesis, several scholars consider the environment of the firm in establishing a relationship between board and performance (for example Hillman, 2005, p. 477; McDonald et al., 2008, pp. 1168–1170; Withers and Fitza, 2017, p. 1344). The findings in this study further support that there is value in considering the environment in future research. Furthermore, the present study does not observe what is happening inside the boardroom. As other scholars already suggested (Boivie et al., 2016, p. 347; Stevenson and Radin, 2009, p. 17), future research should consider the group and power dynamics within the board and among board members.

When it comes to the applied method, the study also suffers from limitations that might affect the results, but also represent opportunities for future research. The Handelsblatt rankings are used as an operationalization for the independent variable, i.e., elite board members who excel in social capital. Since there is limited information about the methods in the Handelsblatt articles, there is no sufficient background as to how the rankings are established. One problem that is visible from the given information, is that the number of board memberships affects each of the three attributes in the ranking. There are no clear boundaries between the measures and the attributes' interdependencies are not directly adressed. Although the elite board members measure has

clear limitations for the present study design, it could still be promising for future research. Referring to the literature on celebrity CEOs and the resource dependence theory, being part of the top 30 and on the board of a firm might have a positive signaling effect on the stock market (Pfeffer and Salancik, 1978, p. 16; Wade et al., 2006, pp. 653–654). Using an event study method, future research might analyze the short-term market reaction to elite board members joining a board. This method would also allow testing how the value of social capital changes over time (Lester et al., 2008, pp. 1009–1010). Alternatively, an event study might shed light on an elite board member's behavior if the firm's performance declines. As Fich and Shivdasani (2006, p. 711) find, highly interlocked board members tend to leave poor-performing firms. This might be the case for elite board members as well.

Finally, despite this study's limitations, the construct of elite board members is promising for future research. The rather surprising findings of this thesis suggest two complementary conclusions. First, the relationship between elite board members and firm performance is more complex, and future research should unravel the underlying mechanisms. And second, elite board members do not directly or positively affect the firm's performance: *all that glitters is not gold*.

References

Achen, C. H. (2001). *Why lagged dependent variables can suppress the explanatory power of other independent variables*. University of Michigan, Ann Arbor.

Adams, R. B., Hermalin, B. E., & Weisbach, M. S. (2010). The role of boards of directors in corporate governance: A conceptual framework and survey. *Journal of Economic Literature*, *48*(1), 58–107.

Adler, P. S., & Kwon, S.-W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, *27*(1), 17–40.

Ahrens, R., Gehlen, B., & Reckendrees, A. (2013). *Die »Deutschland AG«: Historische Annäherungen an den bundesdeutschen Kapitalismus* (1st ed.). Klartext Verlag.

Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, *45*(3), 425–455.

Bailey, E. E., & Helfat, C. E. (2003). External management succession, human capital, and firm performance: An integrative analysis. *Managerial and Decision Economics*, *24*(4), 347–369.

Banerjee, A., Nordqvist, M., & Hellerstedt, K. (2020). The role of the board chair—A literature review and suggestions for future research. *Corporate Governance: An International Review*, *28*(6), 372–405.

Baysinger, B. D., & Butler, H. N. (1985). Corporate governance and the board of directors: Performance effects of changes in board composition. *Journal of Law, Economics, & Organization*, *1*(1), 101–124.

Bazerman, M. H., & Schoorman, F. D. (1983). A limited rationality model of interlocking directorates. *Academy of Management Review*, *8*(2), 206–217.

Becerra, M. (2009). *Theory of the firm for strategic management: Economic value analysis*. Cambridge University Press.

Beckman, C. M., & Haunschild, P. R. (2002). Network learning: The effects of partners' heterogeneity of experience on corporate acquisitions. *Administrative Science Quarterly*, *47*(1), 92–124.

Beckman, C. M., Haunschild, P. R., & Phillips, D. J. (2004). Friends or strangers? Firm-specific uncertainty, market uncertainty, and network partner selection. *Organization Science*, *15*(3), 259–275.

Belliveau, M. A., O'Reilly III, C. A., & Wade, J. B. (1996). Social capital at the top: Effects of social similarity and status on CEO compensation. *Academy of Management Journal*, *39*(6), 1568–1593.

Bizjak, J., Lemmon, M., & Whitby, R. (2009). Option backdating and board interlocks. *The Review of Financial Studies*, *22*(11), 4821–4847.

Boeker, W., & Goodstein, J. (1991). Organizational performance and adaptation: Effects of environment and performance on changes in board composition. *Academy of Management Journal*, *34*(4), 805–826.

Bøhren, Ø., & Strøm, R. Ø. (2010). Governance and politics: Regulating independence and diversity in the board room. *Journal of Business Finance & Accounting*, *37*(9-10), 1281–1308.

Boivie, S., Bednar, M. K., Aguilera, R. V., & Andrus, J. L. (2016). Are boards designed to fail? The implausibility of effective board monitoring. *Academy of Management Annals*, *10*(1), 319–407.

Boivie, S., Withers, M. C., Graffin, S. D., & Corley, K. G. (2021). Corporate directors' implicit theories of the roles and duties of boards. *Strategic Management Journal*, *42*(9), 1662–1695.

Bonini, S., Deng, J., Ferrari, M., John, K., & Ross, D. G. (2022). Long-tenured independent directors and firm performance. *Strategic Management Journal*, *43*(8), 1602–1634.

Boyd, B. (1990). Corporate linkages and organizational environment: A test of the resource dependence model. *Strategic Management Journal*, *11*(6), 419–430.

Bundeszentrale für politische Bildung. (2016). Deutschland AG. Retrieved February 17, 2023, from https://www.bpb.de/kurz-knapp/lexika/lexikon-der-wirtschaft/19038/deutschland-ag/

Burt, R. S. (1980). Cooptive corporate actor networks: A reconsideration of interlocking directorates involving American manufacturing. *Administrative Science Quarterly*, 557–582.

Cannella Jr, A. A., & Shen, W. (2001). So close and yet so far: Promotion versus exit for CEO heirs apparent. *Academy of Management Journal*, *44*(2), 252–270.

Carpenter, M. A., & Westphal, J. D. (2001). The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making. *Academy of Management Journal*, *44*(4), 639–660.

Carter, D. A., D'Souza, F, Simkins, B. J., & Simpson, W. G. (2010). The gender and ethnic diversity of US boards and board committees and firm financial performance. *Corporate Governance: An International Review*, *18*(5), 396–414.

Certo, S. T. (2003). Influencing initial public offering investors with prestige: Signaling with board structures. *Academy of Management Review*, *28*(3), 432–446.

Certo, S. T., Daily, C. M., & Dalton, D. R. (2001). Signaling firm value through board structure: An investigation of initial public offerings. *Entrepreneurship Theory and Practice*, *26*(2), 33–50.

Chahine, S., Filatotchev, I., & Zahra, S. A. (2011). Building perceived quality of founder–involved IPO firms: Founders' effects on board selection and stock market performance. *Entrepreneurship Theory and Practice*, *35*(2), 319–335.

Chung, C. N., & Luo, X. R. (2013). Leadership succession and firm performance in an emerging economy: Successor origin, relational embeddedness, and legitimacy. *Strategic Management Journal*, *34*(3), 338–357.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*, S95–S120.

Combs, J. G., Ketchen Jr, D. J., Perryman, A. A., & Donahue, M. S. (2007). The moderating effect of CEO power on the board composition–firm performance relationship. *Journal of Management Studies*, *44*(8), 1299–1323.

Cooper, A. C., Willard, G. E., & Woo, C. Y. (1986). Strategies of high performing new and small firms: A reexamination of the niche concept. *Journal of Business Venturing*, *1*(3), 247–260.

Daily, C. M., Dalton, D. R., & Cannella Jr, A. A. (2003). Corporate governance: Decades of dialogue and data. *Academy of Management Review*, *28*(3), 371–382.

Dalton, D. R., Daily, C. M., Ellstrand, A. E., & Johnson, J. L. (1998). Meta-analytic reviews of board composition, leadership structure, and financial performance. *Strategic Management Journal*, *19*(3), 269–290.

Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. (1999). Number of directors and financial performance: A meta-analysis. *Academy of Management Journal*, *42*(6), 674–686.

D'Aveni, R. A. (1990). Top managerial prestige and organizational bankruptcy. *Organization Science*, *1*(2), 121–142.

Davis, G. F. (1991). Agents without principles? The spread of the poison pill through the intercorporate network. *Administrative Science Quarterly*, 583–613.

Davis, G. F., & Greve, H. R. (1997). Corporate elite networks and governance changes in the 1980s. *American Journal of Sociology*, *103*(1), 1–37.

Deephouse, D. L. (2000). Media reputation as a strategic resource: An integration of mass communication and resource-based theories. *Journal of Management*, *26*(6), 1091–1112.

Deutsch, Y., & Ross, T. W. (2003). You are known by the directors you keep: Reputable directors as a signaling mechanism for young firms. *Management Science*, *49*(8), 1003–1017.

Deutsche Börse Group. (2023a). DAX. Retrieved January 12, 2023, from https://deutsche-boerse.com/dbg-en/our-company/knowledge/glossary/glossary-article/DAX-242866

Deutsche Börse Group. (2023b). MDAX. Retrieved January 12, 2023, from https://deutsche-boerse.com/dbg-en/our-company/knowledge/glossary/glossary-article/MDAX-243032

Deutsche Börse Group. (2023c). TecDAX. Retrieved January 12, 2023, from https://deutsche-boerse.com/dbg-en/our-company/knowledge/glossary/glossary-article/TecDAX-243274

Deutsches Aktieninstitut. (2019). 50 Jahre Aktien-Renditen. Retrieved March 7, 2023, from https://www.dai.de/files/dai_usercontent/dokumente/renditedreieck/181231%20DAX-Rendite-Dreieck%2050%20Jahre%20Web.pdf

Drees, J. M., & Heugens, P. P. (2013). Synthesizing and extending resource dependence theory: A meta-analysis. *Journal of Management*, *39*(6), 1666–1698.

Ely, R. J. (1994). The effects of organizational demographics and social identity on relationships among professional women. *Administrative Science Quarterly*, 203–238.

Falato, A., Kadyrzhanova, D., & Lel, U. (2014). Distracted directors: Does board busyness hurt shareholder value? *Journal of Financial Economics*, *113*(3), 404–426.

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law and Economics*, *26*(2), 301–325.

Fan, J. P., Wong, T., & Zhang, T. (2007). Politically connected CEOs, corporate governance, and Post-IPO performance of China's newly partially privatized firms. *Journal of Financial Economics*, *84*(2), 330–357.

Ferris, S. P., Jagannathan, M., & Pritchard, A. (2003). Too busy to mind the business? Monitoring by directors with multiple board appointments. *The Journal of Finance*, *58*(3), 1087–1111.

Fich, E. M., & Shivdasani, A. (2006). Are busy boards effective monitors? *The Journal of Finance*, *61*(2), 689–724.

Flickinger, M., Wrage, M., Tuschke, A., & Bresser, R. (2016). How CEOs protect themselves against dismissal: A social status perspective. *Strategic Management Journal*, *37*(6), 1107–1117.

Fockenbrock, D. (2011). Die mächtigsten Räte der Republik. *Handelsblatt*, (248), 24–25. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2012). Cromme verteidigt Spitzenposition. *Handelsblatt*, 26. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2013). Abschied vom Multi-Aufseher. *Handelsblatt*, (119), 4–5. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2014). Die Deutschland AG wird aufgemischt. *Handelsblatt*, (119), 18. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2015). Man(n) bleibt fast unter sich. *Handelsblatt*, (123), 4–5. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2016). Der mühsame Wandel. *Handelsblatt*, (130), 6–7. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2017). Aufstieg aus der zweiten Reihe. *Handelsblatt*, (121), 4–5. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Fockenbrock, D. (2018). Immer mehr Digitalexperten und Ausländer in Deutschlands Aufsichtsräten. *Handelsblatt*. Retrieved June 10,

2022, from https://www.handelsblatt.com/unternehmen/mana gement/handelsblatt-ranking-immer-mehr-digitalexperten- und -auslaender-in-deutschlands-aufsichtsraeten/22817408.html

Fockenbrock, D. (2019). Kontrollgremien erneuern sich. *Handelsblatt*, (138), 4–5. Retrieved June 10, 2022, from https://archiv.handelsblatt .com/

Fockenbrock, D. (2020). Aufsichtsräte unter Druck. *Handelsblatt*, (211), 6–7. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Galaskiewicz, J. (1985). Interorganizational relations. *Annual Review of Sociology*, *11*(1), 281–304.

Gales, L. M., & Kesner, I. F. (1994). An analysis of board of director size and composition in bankrupt organizations. *Journal of Business Research*, *30*(3), 271–282.

Geletkanycz, M. A., & Hambrick, D. C. (1997). The external ties of top executives: Implications for strategic choice and performance. *Administrative Science Quarterly*, 654–681.

Gomez-Mejia, L. R., & Palich, L. E. (1997). Cultural diversity and the performance of multinational firms. *Journal of International Business Studies*, *28*(2), 309–335.

Hambrick, D. C., & D'Aveni, R. A. (1992). Top team deterioration as part of the downward spiral of large corporate bankruptcies. *Management Science*, *38*(10), 1445–1466.

Hambrick, D. C., & Finkelstein, S. (1995). The effects of ownership structure on conditions at the top: The case of CEO pay raises. *Strategic Management Journal*, *16*(3), 175–193.

Hambrick, D. C., Misangyi, V. F., & Park, C. A. (2015). The quad model for identifying a corporate director's potential for effective monitoring: Toward a new theory of board sufficiency. *Academy of Management Review*, *40*(3), 323–344.

Handelsblatt Media Group. (2023). Handelsblatt. Retrieved January 12, 2023, from https://handelsblattgroup.com/marken/handelsblat t/

Harrison, D. A., & Klein, K. J. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, *32*(4), 1199–1228.

Haynes, K. T., & Hillman, A. J. (2010). The effect of board capital and CEO power on strategic change. *Strategic Management Journal*, *31*(11), 1145–1163.

Hayward, M. L., Rindova, V. P., & Pollock, T. G. (2004). Believing one's own press: The causes and consequences of CEO celebrity. *Strategic Management Journal*, *25*(7), 637–653.

He, J., & Huang, Z. (2011). Board informal hierarchy and firm financial performance: Exploring a tacit structure guiding boardroom interactions. *Academy of Management Journal*, *54*(6), 1119–1139.

Hillman, A. J. (2005). Politicians on the Board of Directors: Do Connections Affect the Bottom Line? *Journal of Management*, *31*(3), 464–481. https://doi.org/10.1177/0149206304272187

Hillman, A. J., Cannella Jr, A. A., & Paetzold, R. L. (2000). The resource dependence role of corporate directors: Strategic adaptation of board composition in response to environmental change. *Journal of Management Studies*, *37*(2), 235–256.

Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review*, *28*(3), 383–396.

Hillman, A. J., Nicholson, G., & Shropshire, C. (2008). Directors' multiple identities, identification, and board monitoring and resource provision. *Organization Science*, *19*(3), 441–456.

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource dependence theory: A review. *Journal of Management*, *35*(6), 1404–1427.

Hillman, A. J., Zardkoohi, A., & Bierman, L. (1999). Corporate political strategies and firm performance: indications of firm-specific benefits from personal service in the US government. *Strategic Management Journal*, *20*(1), 67–81.

Hoppmann, J., Naegele, F., & Girod, B. (2019). Boards as a source of inertia: Examining the internal challenges and dynamics of boards of directors in times of environmental discontinuities. *Academy of Management Journal*, *62*(2), 437–468.

Horton, J., Millo, Y., & Serafeim, G. (2012). Resources or power? Implications of social networks on compensation and firm performance. *Journal of Business Finance & Accounting*, *39*(3-4), 399–426.

Howard, M. D., Withers, M. C., & Tihanyi, L. (2017). Knowledge dependence and the formation of director interlocks. *Academy of Management Journal*, *60*(5), 1986–2013.

Jensen, M., & Zajac, E. J. (2004). Corporate elites and corporate strategy: How demographic preferences and structural position shape the scope of the firm. *Strategic Management Journal*, *25*(6), 507–524.

Jiraporn, P., Kim, Y. S., & Davidson III, W. N. (2008). Multiple directorships and corporate diversification. *Journal of Empirical Finance*, *15*(3), 418–435.

Johnson, J. L., Daily, C. M., & Ellstrand, A. E. (1996). Boards of directors: A review and research agenda. *Journal of Management*, *22*(3), 409–438.

Johnson, R. A., Hoskisson, R. E., & Hitt, M. A. (1993). Board of director involvement in restructuring: The effects of board versus managerial controls and characteristics. *Strategic Management Journal*, *14*(S1), 33–50.

Johnson, S., Schnatterly, K., Bolton, J. F., & Tuggle, C. (2011). Antecedents of new director social capital. *Journal of Management Studies*, *48*(8), 1782–1803.

Johnson, S., Schnatterly, K., & Hill, A. D. (2013). Board composition beyond independence: Social capital, human capital, and demographics. *Journal of Management*, *39*(1), 232–262.

Judge, W. Q. J., & Dobbins, G. H. (1995). Antecedents and effects of outside director's awareness of CEO decision style. *Journal of Management*, *21*(1), 43–64.

Judge, W. Q. J., & Zeithaml, C. P. (1992). Institutional and strategic choice perspectives on board involvement in the strategic decision process. *Academy of Management Journal*, *35*(4), 766–794.

Kassinis, G., & Vafeas, N. (2002). Corporate boards and outside stakeholders as determinants of environmental litigation. *Strategic Management Journal*, *23*(5), 399–415.

Keats, B. W. (1988). The vertical construct validity of business economic performance measures. *The Journal of Applied Behavioral Science*, *24*(2), 151–160.

Keats, B. W., & Hitt, M. A. (1988). A causal model of linkages among environmental dimensions, macro organizational characteristics, and performance. *Academy of Management Journal*, *31*(3), 570–598.

Kewes, T. (2021). Deutschlands Top-Kontrolleure. *Handelsblatt*, (224), 4–5. Retrieved June 10, 2022, from https://archiv.handelsblatt.com/

Kor, Y. Y., & Misangyi, V. F. (2008). Outside directors' industry-specific experience and firms' liability of newness. *Strategic Management Journal*, *29*(12), 1345–1355.

Kor, Y. Y., & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. *Journal of Management*, *35*(4), 981–1006.

Krause, R. (2017). Being the CEO's boss: An examination of board chair orientations. *Strategic Management Journal*, *38*(3), 697–713.

Krause, R., Semadeni, M., & Cannella Jr, A. A. (2014). CEO duality: A review and research agenda. *Journal of Management*, *40*(1), 256–286.

Krause, R., Semadeni, M., & Withers, M. C. (2016). That special someone: When the board views its chair as a resource. *Strategic Management Journal*, *37*(9), 1990–2002.

Kroll, M., Walters, B. A., & Le, S. A. (2007). The impact of board composition and top management team ownership structure on post-IPO performance in young entrepreneurial firms. *Academy of Management Journal*, *50*(5), 1198–1216.

Lang, J. R., & Lockhart, D. E. (1990). Increased environmental uncertainty and changes in board linkage patterns. *Academy of Management Journal*, *33*(1), 106–128.

Lange, D., Lee, P. M., & Dai, Y. (2011). Organizational reputation: A review. *Journal of Management*, *37*(1), 153–184.

Lester, R. H., Hillman, A., Zardkoohi, A., & Cannella Jr, A. A. (2008). Former government officials as outside directors: The role of human and social capital. *Academy of Management Journal*, *51*(5), 999–1013.

Lin, Z., Yang, H., & Arya, B. (2009). Alliance partners and firm performance: resource complementarity and status association. *Strategic Management Journal*, *30*(9), 921–940.

Lorsch, J. W., & Zelleke, A. (2005). Should the CEO be the chairman? *MIT Sloan Management Review*, *46*(2), 71.

Malmendier, U., & Tate, G. (2009). Superstar ceos. *The Quarterly Journal of Economics*, *124*(4), 1593–1638.

Mannweiler, A. (2022). Hat sich der größere DAX bewährt? Retrieved January 12, 2023, from https://www.tagesschau.de/wirtschaft/finanzen/dax-40-erweiterung-reform-airbus-zalando-101.html#:~:text=Am%203.,in%20den%20wichtigsten%20Index%20Deutschlands

Marcel, J. J., & Cowen, A. P. (2014). Cleaning house or jumping ship? Understanding board upheaval following financial fraud. *Strategic Management Journal*, *35*(6), 926–937.

McDonald, M. L., Westphal, J. D., & Graebner, M. E. (2008). What do they know? The effects of outside director acquisition experience on firm acquisition performance. *Strategic Management Journal*, *29*(11), 1155–1177.

MDS. (2023). Reichweitenübersicht. Retrieved January 12, 2023, from https://www.ma-reichweiten.de/reach

Meindl, J. R., Ehrlich, S. B., & Dukerich, J. M. (1985). The romance of leadership. *Administrative Science Quarterly*, 78–102.

Meineke, A., Hellerstedt, K., & Nordqvist, M. (2019). The changing role of the chairperson of the board: an analysis of business press articles in the UK, US and Germany. In *Research Handbook on Boards of Directors* (pp. 229–254). Edward Elgar Publishing.

Miller, T., & del Carmen Triana, M. (2009). Demographic diversity in the boardroom: Mediators of the board diversity–firm performance relationship. *Journal of Management Studies*, *46*(5), 755–786.

Mizruchi, M. S. (1996). What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. *Annual Review of Sociology*, 271–298.

Mizruchi, M. S., & Stearns, L. B. (1988). A longitudinal study of the formation of interlocking directorates. *Administrative Science Quarterly*, 194–210.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, *23*(2), 242–266.

Occupational Safety and Health Administration. (2023). Standard Industrial Classification (SIC) Manual. Retrieved February 21, 2023, from https://www.osha.gov/data/sic-manual

Oehmichen, J., Schrapp, S., & Wolff, M. (2017). Who needs experts most? Board industry expertise and strategic change—a contingency perspective. *Strategic Management Journal*, *38*(3), 645–656.

Palmer, D. (1983). Broken ties: Interlocking directorates and intercorporate coordination. *Administrative Science Quarterly*, 40–55.

Payne, G. T., Benson, G. S., & Finegold, D. L. (2009). Corporate board attributes, team effectiveness and financial performance. *Journal of Management Studies*, *46*(4), 704–731.

Pearce, J. A., & Zahra, S. A. (1991). The relative power of CEOs and boards of directors: Associations with corporate performance. *Strategic Management Journal*, *12*(2), 135–153.

Pfarrer, M. D., Pollock, T. G., & Rindova, V. P. (2010). A tale of two assets: The effects of firm reputation and celebrity on earnings surprises and investors' reactions. *Academy of Management Journal*, *53*(5), 1131–1152.

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: A resource dependence perspective*. Stanford University Press.

Phan, P. H., Lee, S. H., & Lau, S. C. (2003). The performance impact of interlocking directorates: The case of Singapore. *Journal of Managerial Issues*, 338–352.

Pollock, T. G., Lashley, K., Rindova, V. P., & Han, J.-H. (2019). Which of these things are not like the others? Comparing the rational, emotional, and moral aspects of reputation, status, celebrity, and stigma. *Academy of Management Annals*, *13*(2), 444–478.

Post, C., & Byron, K. (2015). Women on boards and firm financial performance: A meta-analysis. *Academy of Management Journal*, *58*(5), 1546–1571.

Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 116–145.

Regierungskommission Deutscher Corporate Governance Kodex. (2022). German Corporate Governance Code. Retrieved January 12, 2023, from https://www.dcgk.de/en/code.html

Rindova, V. P., Williamson, I. O., Petkova, A. P., & Sever, J. M. (2005). Being good or being known: An empirical examination of the dimen-

sions, antecedents, and consequences of organizational reputation. *Academy of Management Journal*, *48*(6), 1033–1049.

Ringe, W.-G. (2015). Changing Law and Ownership Patterns in Germany: Corporate Governance and the Erosion of Deutschland AG. *The American Journal of Comparative Law*, *63*(2), 493–538. https://doi.org/10.5131/ajcl.2015.0014

Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. *Strategic Management Journal*, *23*(12), 1077–1093.

Ruigrok, W., Peck, S. I., & Keller, H. (2006). Board characteristics and involvement in strategic decision making: Evidence from Swiss companies. *Journal of Management Studies*, *43*(5), 1201–1226.

Stearns, L. B., & Mizruchi, M. S. (1993). Board composition and corporate financing: The impact of financial institution representation on borrowing. *Academy of Management Journal*, *36*(3), 603–618.

Stevenson, W. B., & Radin, R. F. (2009). Social capital and social influence on the board of directors. *Journal of Management Studies*, *46*(1), 16–44.

Stock, J. H., & Watson, M. W. (2003). *Introduction to Econometrics (Vol. 104)*. Addison Wesley Boston.

Tian, J., Haleblian, J., & Rajagopalan, N. (2011). The effects of board human and social capital on investor reactions to new CEO selection. *Strategic Management Journal*, *32*(7), 731–747.

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, *1*(1), 15–29.

Torres-Reyna, O. (2007). Panel Data Analysis: Fixed and Random Effects using Stata. Retrieved January 12, 2023, from https://dss.princeton.edu/training/

Tuschke, A., & Sanders, W. G. (2003). Antecedents and consequences of corporate governance reform: The case of Germany. *Strategic Management Journal*, *24*(7), 631–649.

Van Knippenberg, D., De Dreu, C. K., & Homan, A. C. (2004). Work group diversity and group performance: an integrative model and research agenda. *Journal of Applied Psychology*, *89*(6), 1008.

Veltrop, D. B., Molleman, E., Hooghiemstra, R. B., & van Ees, H. (2017). Who's the boss at the top? A micro-level analysis of director expertise, status and conformity within boards. *Journal of Management Studies*, *54*(7), 1079–1110.

Wade, J. B., Porac, J. F., Pollock, T. G., & Graffin, S. D. (2006). The burden of celebrity: The impact of CEO certification contests on CEO pay and performance. *Academy of Management Journal*, *49*(4), 643–660.

Washington, M., & Zajac, E. J. (2005). Status evolution and competition: Theory and evidence. *Academy of Management Journal*, *48*(2), 282–296.

Westphal, J. D. (1999). Collaboration in the boardroom: Behavioral and performance consequences of CEO-board social ties. *Academy of Management Journal*, *42*(1), 7–24.

Westphal, J. D., & Zajac, E. J. (1997). Defections from the inner circle: Social exchange, reciprocity, and the diffusion of board independence in US corporations. *Administrative Science Quarterly*, 161–183.

Withers, M. C., & Fitza, M. A. (2017). Do board chairs matter? The influence of board chairs on firm performance. *Strategic Management Journal*, *38*(6), 1343–1355.

Withers, M. C., Hillman, A. J., & Cannella Jr, A. A. (2012). A multidisciplinary review of the director selection literature. *Journal of Management*, *38*(1), 243–277.

Zahra, S. A., & Pearce, J. A. (1989). Boards of directors and corporate financial performance: A review and integrative model. *Journal of Management*, *15*(2), 291–334.

Zajac, E. J., & Westphal, J. D. (1996). Who shall succeed? How CEO/board preferences and power affect the choice of new CEOs. *Academy of Management Journal*, *39*(1), 64–90.

Zona, F., Gomez-Mejia, L. R., & Withers, M. C. (2018). Board interlocks and firm performance: Toward a combined agency–resource dependence perspective. *Journal of Management*, *44*(2), 589–618.

Looking Behind the Fading Feminist Façade of #Girlboss

Cornelia Kees

Technical University of Munich

Abstract

This study investigates the media representation of female entrepreneurs in newspaper and magazine articles from 2014 to 2022. By employing a quantitative content analysis of 192 articles, the study examines dominant narratives, entrepreneurial identities, ethical behaviors, challenges depicted, and tone used across various mediums and countries, thereby addressing a gap in literature focused on single media or country contexts. Results indicate a predominantly positive portrayal of female entrepreneurship, often framed within a heroic narrative. Representations of entrepreneurial femininities are conspicuously underrepresented in the analyzed articles, with relational entrepreneurial femininity prevailing as the principal depiction. However, while ethical behaviors are more frequently highlighted than non-ethical ones, attributes of female entrepreneurs as innovative or genius are notably absent. The most commonly cited challenge is resource constraints. These insights suggest that while entrepreneurship remains a male-dominated concept in media, positive depictions of female entrepreneurs and their relevant skills are emerging, potentially inspiring and supporting future female entrepreneurs.

Keywords: entrepreneurial femininity; ethical behaviour; female entrepreneurship; media portrayal; sentiment analysis

1. Female Entrepreneurship and Gender Stereotypes in the Workplace

Female entrepreneurs contribute significantly to economies and societies worldwide and by starting new businesses they drive innovation and generate income as well as new jobs (Bosma et al., 2021). Empirical data from the German start-up ecosystem reveals that, on average, a team of female entrepreneurs accounts for greater employee growth and creates more jobs per founder than a male or mixed one (Startbase, 2021). In addition, research indicates that businesses founded or co-founded by women exhibit superior revenue generation and return on investment compared to businesses founded by men (Abouzahr et al., 2018). Moreover, the global number of female-led startups that became unicorns – privately held startup companies that are valued at over one billion U.S. dollars – has increased by more than 400 % since 2013 (Statista Research Department, 2020). Nonetheless, existing literature predominantly suggests that male entrepreneurs, particularly in terms of financial success, are perceived as more successful (Gódány & Mura, 2021; Gottschalk & Niefert, 2013; Irene, 2017). Gender

disparities persist, with men still exhibiting higher rates of entrepreneurship compared to women in many countries (Bosma et al., 2021).

In many business settings and across cultures, aspiring female entrepreneurs are still challenged and often held back by persistent gender biases and stereotypes that they lack fit (Ettl et al., 2016; Global Entrepreneurship Research Association, 2021). Gender stereotypes refer to the categorization of people into groups based on their gender and developing self-enhancing beliefs about the common characteristics and behaviors of members of various groups which tend to be quite stable for fairly long time spans (Hilton & von Hippel, 1996; Tajfel, 1963). Extensive research rooted in social role theory substantiated those shared beliefs about characteristics attributed to either women or men. The theory postulates that social perceivers' beliefs about social groups within their society derive from their experiences with members of these groups in their typical social roles, referring to those in which they are overrepresented relative to their number in the general population. Its key principle is that similarities of and differences between men and women mainly arise from the

observation of the distribution in a society's social roles and that they are impacted by social psychological as well as biological influences. The resulting division of labor is further cemented through socialization and the collective formation of gender roles (Eagly, 1987, 2013; Eagly & Wood, 2012).

According to Cuddy et al. (2008), the literature suggests that a majority of beliefs about the assumed differences between men and women can be categorized into either the communal or the agentic dimension which originated in personality psychology as the "two fundamental modalities in the existence of living beings, agency for the existence of the organism as an individual, and communion of the individual with belonging to some larger organism" (Bakan, 1956 as cited in Cuddy et al., 2008, p.65). Gender stereotypes often associate communal qualities, such as kindness, affection, support, and tactfulness, more strongly with women, while agentic qualities, including courage, assertiveness, daring, and competitiveness, are ascribed more strongly to men (Haines et al., 2016; Malmström et al., 2017). Consequently, the division of labor tends to be regarded as inevitable by members of a society because by observing women engaging in rather domestic roles that require superior relational skills and men engaging in occupational roles within the paid economy, "perceivers tend to essentialize [emphasis added] gender by viewing the different behaviors of the sexes as due to inherent differences in the natures of men and women" (Eagly & Wood, 2012, p. 466). Furthermore, gender stereotypes both reflect and reinforce this division of labor (Wood & Eagly, 2012). Conversely, Eagly and Wood (2012) argue that people can develop new beliefs about women's characteristics when they engage in nontraditional roles because beliefs are partly reflected by role performance.

According to Heilman (2001), gender stereotypes encompass both descriptive stereotypes, which depict how men and women typically are, and prescriptive stereotypes, which pertain to societal expectations of how they should be. Moreover, she points out that women who challenge these notions are likely to face disapproval and even penalty, for instance, backlash in the form of negative social sanctions. The early formation of these gender stereotypes contributes to unconscious alignment with them, guiding individuals towards gender-congruent career paths. Several studies support the association between stereotyping and the perpetuation of occupational sex segregation (Cejka & Eagly, 1999; Seron et al., 2016; Thébaud & Charles, 2018), including within the domain of entrepreneurship (Gupta et al., 2009; V. Meyer et al., 2017). The impact of gender stereotypes extends to various aspects such as industry sector, business size, employee count, and household income. For instance, research indicates that female entrepreneurs tend to operate smaller businesses with fewer employees and report lower household incomes compared to their male counterparts (Global Entrepreneurship Research Association, 2021)

Scholars postulate that entrepreneurship is inherently a male concept (Ahl, 2006; V. Meyer et al., 2017). Even though the number of female entrepreneurs has increased, stereotypical notions of masculinity still prevail the image of an entrepreneur. Within entrepreneurship literature, there is a recurring theme of gendered language that positions women as deviating from the male norm (Achtenhagen & Welter, 2011; Malmström et al., 2017). Notably, the presence of the pre-fix 'female' or 'woman' in front of the word entrepreneur highlights that the male entrepreneur is the normative standard "against which their performance and behaviour as entrepreneurs is measured and judged" (Lewis, 2006, p. 456). Evidence suggests that entrepreneurship is associated with masculine characteristics by both men and women (Gupta et al., 2009). According to an analysis of foundational texts as well as articles in the management and entrepreneurship domain conducted by Ahl (2006), typically masculine words and connotations are used to describe entrepreneurs, such as strong willed, courageous, and achievement oriented. Feminine words, such as gentle, loyal and sympathetic are not present in the entrepreneurship discourse or contradict typical entrepreneurial characteristics. Swail and Marlow (2018) cement this dichotomy by arguing that "this discourse ontologically positions the feminine as 'other' and opposite to the ideal entrepreneurial prototype conferring a status detriment upon women and fueling a negative perception of their legitimacy as credible entrepreneurial actors even before they initiate business operations" (p. 258). However, some scholars argue that in spite of the masculine gender framework applied to entrepreneurship research, some of the feminine characteristics are highly beneficial in achieving entrepreneurial success and refer inter alia to cooperation and the preservation of relationships (Bird & Brush, 2002; Gupta et al., 2009).

Different factors influence the perseverance of gender stereotypes within society. In order to understand how these are passed on, many scholars have turned to mass media as gender is not only constructed through interactions between people but also in the media where gender stereotypes are replicated and adherence to those is encouraged (Achtenhagen & Welter, 2011; Bruni et al., 2004b). Achtenhagen and Welter (2011) highlight the power of language and "argue that styles of reporting about entrepreneurship in media, which allow the readers to identify with the content, can trigger people's interest in entrepreneurial activities" (p. 781). Ettl et al. (2016) suggest that the perception of entrepreneurship as an attractive, feasible, and socially desirable career option for women is influenced by media reporting. A substantial body of research examines the portrayal of entrepreneurial role models and associated narratives across various media outlets (Byrne et al., 2019; Eikhof et al., 2013; Nadin et al., 2020). Moreover, the literature examines the concept of entrepreneurial identity and its formation in response to prevailing discourses. Through her postfeminist analysis of empirical studies and discursive analyses in the domain of gender and organization studies, Lewis (2014) maps out several entrepreneurial femininities that describe how the entrepreneurial identity of a female entrepreneurs is shaped and how they 'do' entrepreneurship, focusing on themes like masculinity, femininity, domestic roles and leadership.

However, the existing literature has primarily focused on specific mediums or confined itself to a particular country, indicating a limited scope of investigation. To address this gap, the present study adopts a broader approach by examining national and international newspaper and magazine articles about female entrepreneurship. The objective is to identify prevalent themes that emerge in the portrayals of female entrepreneurs across these media sources. Through an analysis of narratives, entrepreneurial femininities, challenges and other attributions presented in the media, this study aims to provide a comprehensive understanding of the portrayal of female entrepreneurs, thereby increasing awareness of their diverse experiences within contemporary organizational culture.

The remainder of this article is structured as follows. First, a concise overview on the intersection of capitalism, neoliberal values, and feminism will be provided. This will be followed by a section that explores the intersection of gender, entrepreneurship, and the media. Subsequently, the research methodology and obtained results will be presented. This will be followed by a comprehensive discussion of the findings. Finally, the paper will conclude with a summary of the findings, the outlining of limitations and implications, as well as suggestions for future research.

2. The Intersection of Capitalism, Neoliberal Values and Feminism

2.1. The Capitalization of Feminism

Within the last decade, the feminist discourse has risen to popularity and has become ingrained into mainstream culture. Prominent figures, including celebrities and other prominent women, have publicly embraced feminism and confidently identified themselves as feminists. Examples include the 2012 'We should All be Feminists' TEDx talk by the renowned Nigerian author Chimamanda Ngozi Adichie which turned into a best-selling book later (Adichie, 2013, 2015). Additionally, actress Emma Watson, in her capacity as the U.N. Women Goodwill Ambassador, delivered a widely shared speech titled 'Why I'm a Feminist' in 2014 stating "I decided that I was a feminist, and this seemed uncomplicated to me" (Rottenberg, 2017; United Nations, 2014). Furthermore, singer Beyoncé made a powerful statement during her performance at the 2014 MTV Video Music Awards by unveiling a prominent sign displaying the word 'FEMINIST' (Mastrangelo, 2021).

The concept of feminism and the self-perception of associated movements has progressed rapidly over the years. But in order to understand current circumstances, it is crucial to comprehend how these have evolved. While there never has been just one feminist movement in a certain era, the literature suggests primary issues tied to certain time periods and their cultural and political landscape. Feminism in the 1960s was concerned with ending gender-based discrimination in the domain of labor and employment as well as the realms of divorce law and proprietorship while the focus on women's

career ambitions and their consumer potential came to the forefront of the feminist movement during the 1970s and 1980s, conventionalizing women to competitive actors in the market. This focus on freedom and economic advancement acts as a first indicator of the link between neoliberalism and feminism (Mastrangelo, 2021). The following decade is commonly referred to as the era of postfeminism which is characterized by a "disidentification from feminism" (Agostinho, 2016, p. 7) and the coexistence of both feminist and antifeminist discourses (R. Gill, 2007b). According to Alexandersson and Kalonaityte (2021), "this particular framing of femininity treats gender equality as an already accomplished fact in Western societies, assuming that women need to take an enterprising approach in order to succeed in any – or every – area of their life" (p. 419). Hence, postfeminist discourses neglect power imbalances and other inequalities and shift the focus on the individual woman's choice and empowerment (R. Gill, 2007b). The concepts of personal choice and individualism are also understood to be two of the key elements of neoliberalism, indicating not only the existence of a postfeminist feminism but also of a neoliberal feminism and a strong resonance between the two of them (Banet-Weiser et al., 2020; R. Gill, 2007b).

Many scholars argue that neoliberalism is less an economic system and more of a political rationality or philosophy (Banet-Weiser et al., 2020; Feher, 2009; Mastrangelo, 2021). Under liberalism, human beings were considered subjects who own and sell their labor power, however, in neoliberalism, human capital becomes the dominant subjective form and while subjects can invest in it, they cannot own it (Feher, 2009). According to Cruz and Brown (2016), neoliberalism "has economised everything and everyone, it's rendered everything as a market and it's rendered everything we do as market action" (p. 72). Hence, individuals are urged to increase their own value in every aspect of life. R. Gill (2007b) argues that, "neoliberalism is understood increasingly as constructing individuals as entrepreneurial actors who are rational, calculating, and self-regulating. The individual must bear full responsibility for their life biography, no matter how severe the constraints upon their action" (p. 163).

Feminism appears to be more popular than ever now and the literature suggests that neoliberal values, such as entrepreneurialism and individualism, worked in favor of ingraining feminism into the current media and cultural landscape. Neoliberal feminism urges women to adjust their behaviors and attitudes in order to promote gender equality, therefore amplifying the ethos of optimizing themselves in order to succeed within a capitalist context instead of shifting the focus towards structural inequalities. Embracing these neoliberal values while simultaneously ignoring privileges and oppressive structures of all kinds illustrates how neoliberal feminism is a logical consequence of capitalism (Mastrangelo, 2021; Rottenberg, 2018). Banet-Weiser et al. (2020) state that:

This kind of hyper-individualising neoliberal feminism, which construes women not only as entrepreneurial subjects but also as individual enterprises (. . .) has helped to render feminism palatable and legitimate, which has, in turn, facilitated feminism's widespread diffusion, embrace and circulation within the Anglo-American mainstream cultural landscape. (p. 9)

In the literature, this phenomenon is also referred to as 'popular feminism' which is not only popular because of its accessibility and widespread visibility of corresponding practices and discourses circulating within various media platforms but also because of its uplifting nature which accommodates various audiences and refrains from open display of anger at injustices. Popular feminism is characterized by a great amount of activism within social media and other digital spaces. Therefore, it fits perfectly into today's 'economy of visibility' as well as the 'attention economy' (Banet-Weiser, 2018; Banet-Weiser et al., 2020).

According to Banet-Weiser et al. (2020), the neoliberal capitalist context is essential to popular feminism as the circulation of its messages within its expanded markets and various platforms is key to its popularity. Moreover, they argue that neoliberal key concepts, such as individualism and entrepreneurialism, are major elements of popular feminist culture. Thus, in order to succeed within this capitalist context, women are required to modify their individual behavior and to adjust their attitudes which is connected to the enhancement of women's confidence and self-esteem (Mastrangelo, 2021). However, "within popular feminism, the frame of confidence is typically about economic confidence, a confidence in being economically successful within a capitalist context" (Banet-Weiser, 2018, p. 92). Various campaigns, advertisements and products entail feminist messages and punchlines that signal support for the popular feminist cause. In contemporary society, individuals have the ability to express their support for feminism through various consumer products, such as wearing a shirt with a feminist slogan, using a mug that advocates against the patriarchy, or engaging with feminist-themed content on social media platforms. Nonetheless, this commodification has elicited critique. While it is important to make feminism visible, simply acknowledging or purchasing something with a feminist branding, does not inherently contribute to feminist goals, referring to changing patriarchal structures (Banet-Weiser, 2018; Banet-Weiser et al., 2020). Rottenberg (2018) emphasizes that women's ambitions are channeled into achieving individual goals and away from fighting for systemic change and the elimination of gender inequalities. Other points of criticism refer to the exclusionary nature of this type of feminism which is predominantly shaped by heteronormativity, white privilege as well as class privilege (Banet-Weiser, 2018; Banet-Weiser et al., 2020; Prügl, 2015).

To summarize, instead of a single feminist agenda, one can observe an increasing fragmentation of feminist discourses and representations. However, popular feminism, neoliberal feminism and postfeminism are contemporaneously existing sensibilities which are linked to each other and whose boundaries can be described as fluid (Banet-Weiser et al., 2020; Prügl, 2015).

2.2. The Rising of the #Girlboss

In the post-2010 era, a new thread of neoliberal feminism began to take traction: girlboss feminism. The term 'girlboss' describes a professionally successful woman that has broken through the proverbial glass ceiling of a male-dominated corporate culture and was coined by female entrepreneur Sophia Amoruso, founder of the online clothing outlet 'Nasty Gal', who published her bestselling memoir '#Girlboss' in 2014, which subsequently turned into a brand itself entailing a Netflix show and a podcast (Banet-Weiser, 2018; Blank, 2022; McGrath & Sternlicht, 2022). Based on Amoruso's book, Alexandersson and Kalonaityte (2021) argue that "a girlboss is someone that pursues her own ambitions in life and refuses to blend in and settle for less" (p. 424). With popular, celebrity-endorsed feminism already quite prevalent in mainstream culture, Mastrangelo (2021) notes that "amidst this cultural zeitgeist of celebrity feminist identification, the word girlboss grew into a omnipresent force" (p. 88).

The rising of girlboss feminism coincided with and is also further fueled by the increasing prevalence of social media and digital platforms in everyday life. Through different platforms and formats, it "leverages digital spaces in particular to disseminate neoliberal feminist logics through rhetoric, aesthetics, and attitudes that resonate with millennial and Gen Z audiences" (Mastrangelo, 2021, p. 88). Practices of girlboss feminism can be found on various social media platforms such as YouTube or Instagram (Alexandersson & Kalonaityte, 2021; Heizmann & Liu, 2022; Roivainen, 2023). The latter has a relatively young user base with more than two thirds of it being younger than 35 years (Statista, 2023). The popularity of the girlboss movement on this platform is further attested when searching for the girlboss hashtag that returns more than 26 million posts as well as other entrepreneurship-related social media tags such as '#bossbabe' with more than 21 million posts (Instagram, 2023a, 2023b; Mastrangelo, 2021). Accounts that lean in to the girlboss brand often adhere to a certain feminine aesthetic, namely, the utilization of a pink color scheme, elements that evoke cuteness, certain fonts as well as fictional female characters from popular culture and films. However, this feminine aesthetic is frequently accompanied by phrases or taglines that convey aggressiveness and assertiveness, hence, attributes commonly associated with masculinity. Examples of this phenomenon include phrases such as 'crush competitors' or 'build your empire' (Eagly, 1987; Eagly & Wood, 2012; Heizmann & Liu, 2022; Malmström et al., 2017; Mastrangelo, 2021).

On the one hand, girlboss feminism is thought of as creating a supportive environment for a female community to inspire and connect like-minded female entrepreneurs in both offline and online realms. However, on the other hand, there is considerable criticism regarding the clear neoliberal orientation of entrepreneurial guides, self-help books and

memoirs such as Amoruso's '#Girlboss' which emphasize conformity with existing structures and avoid complex intersectional issues, instead, highlighting the transformative potential of confidence when it comes to the pursuit of gender equality (Banet-Weiser, 2018; Mastrangelo, 2021). Girlboss feminism not only blurs the boundaries between personal and professional spheres but also between entrepreneurialism and feminism by perpetuating aspirational narratives and amplifying neoliberal values such as individualism and self-responsibilization, rendering girlboss feminism more desirable as the political activism connected to feminism which takes a backseat while personal brand-building comes to the fore (Mastrangelo, 2021). Moreover, the term 'girlboss' lends itself as a subject of critique. Much like the criticism around the term 'female entrepreneur' that manifests the male entrepreneur as the normative standard, the term 'girlboss' lacks a male equivalent, thereby cementing powerful leadership positions as something inherently male (Lewis, 2006).

Even though the literature argues that a 'girlboss' is typically a rather young woman, during the peak of the post-2010 girlboss era, they are in many cases too old to actually be considered a girl (McGrath & Sternlicht, 2022). However, this focus on girlhood is embedded in the wider cultural phenomenon of 'girl culture' which "has been characterized in various, different – and sometimes even incompatible – ways; it has been described as consumerist, individualist, anti-feminist, post-feminist, or feminist and mostly apolitical" (Szücs, 2015, p. 657). Since the late 1990s, the era of postfeminism, many girls have been born into circumstances where feminist achievements are taken for granted. However, they have to navigate an increasingly complex reality. Within Western societies with their neoliberal capitalist culture, they do not only have countless possibilities, but they also have to deal with various external and internal expectations as well as an omnipresent consumerism (Boschma & Daalmans, 2021; Szücs, 2015). In fact, Alexandersson and Kalonaityte (2021) argue that girlhood has become an integral part of popular and commercial culture through the incorporation of "pink and plush alongside agency and rebellion, reflected in merchandise, brands, pop icons, and fictive characters" (p. 417). Furthermore, they define girlhood as "a distinct form of femininity that can be deployed by a person of any age, as a way of challenging (or ignoring) social norms, associated with adult self-expression" (p. 420). Hence, 'girlbosses' turn girlhood into their enterprising femininity in order to capitalize on the rebellious adolescent element. Similarly, Alexandersson and Kalonaityte (2021) find that 'girlboss' accounts on Instagram make use of that as well by moving between ambitious, business-savvy messages and lazy, juvenile ones.

In addition, girls are linked to power, nonetheless, the concept of 'girl power' is often equated with the power to consume and in the broader sense, economic confidence. Similar to girlboss culture, this can be easily commodified allowing it to thrive within the 'economy of visibility'. Consequently, various organizations strive to capitalize on this power through selling, for instance, corresponding books and apparel (Banet-Weiser, 2018; Banet-Weiser et al., 2020; Becker-Herby, 2016). However, these discourses about female empowerment extend beyond advertising and encompass various forms of media. Boschma and Daalmans (2021) highlight individual characteristics of empowered girls in their analysis of contemporary girl magazines such as ambition and independence while Heizmann and Liu (2022) identify different discursive strategies used by female entrepreneurs within social media spaces, including motivational quotes and a positive rhetoric. Nonetheless, the latter is contested by the fact that 'girl power' is also about reclaiming derogatory terms like 'bitch' or 'slut' (Heizmann & Liu, 2022; Snyder, 2008).

Hence, empowerment plays a major role within girlboss feminism. Mastrangelo (2021) suggests that "by generating opportunities for affective connections to entrepreneurship as a cultural logic, girlboss feminism works to equate feminist empowerment with financial success, market competition, individualized work-life balance, and curated digital and physical presences driven by self-monetization" (pp. 6-7). According to Banet-Weiser (2018), empowerment of the individual woman is also the central logic of postfeminism as opposed to the historical goal of liberation from oppressive societal structures. Yet, she criticizes that certain cultural and economic privileges are a prerequisite for a girl or woman to become empowered. Likewise, both popular and girlboss feminism are criticized for displaying a predominantly white, middle-class-centered type of feminism (Mastrangelo, 2021).

3. The Intersection of Entrepreneurship, Gender, and the Media

3.1. Ethical Perspectives, Business Performance and Economic Relevance of Female Entrepreneurs

Across the globe, entrepreneurship forms a significant part of economic undertakings (Batjargal et al., 2019). Male entrepreneurs have had a stronghold in the business world for decades, while women have faced obstacles in starting their own companies or reaching top positions within firms. Although women have been striving to overcome these challenges and break through the 'glass ceiling', a gender gap still exists in entrepreneurship, and it is more pronounced than in other areas of the job market (Ughetto et al., 2020). As the term 'entrepreneur' includes several abstract concepts which are hard to measure comprehensively, the term's definition and precise function is still a topic of debate among scholars (Jha & Alam, 2022; Moore & Buttner, 1997). There are also various attempts to define the concept of female entrepreneurs who become more prevalent within the entrepreneurship realm (Batjargal et al., 2019). According to Moore and Buttner (1997), the term female entrepreneur refers to "a woman who has initiated a business, is actively involved in managing it, owns at least 50% of the firm, and has been in operation 1 year or longer" (p. 13). Minniti (2009) stresses that the study of female entrepreneurship is

necessary because of its distinctive characteristics that differentiate it from male entrepreneurship. Therefore, it not only enhances the comprehension of entrepreneurship in general, but also explores human behavior in a broader sense. Kamberidou (2013) argues that "integrating a gender perspective means eliminating the wastage of talent – utilizing all human resources, the entire talent pool - and as a result, boosting innovation which is a prerequisite for economic growth and sustainable development" (p. 2). A nation's competitiveness is dependent on female talents' education and utilization. Thus, looking at it from an economic perspective, closing the gender gap is important in terms of efficiency (World Economic Forum, 2013). Wilson (2015) points out that this promotes a neoliberal point of view on gender as an increase in the number of women who participate in the labor market is equated with greater gender equality. Viewed from a less explicit neoliberal stance, efforts to close the gender gap are also reflected in the United Nations 2030 Agenda for Sustainable Development which includes seventeen Sustainable Development Goals (SDGs) that aim to eradicate poverty, protect the planet and ensure that all people live in peace and prosperity. Goal number five explicitly states that achieving gender equality and empowering women and girls is essential to achieving all other goals. This includes, among other things, equal access to education, economic resources, political participation, and employment opportunities (United Nations, 2015).

However, the gender gap in business ownership remains on a high level in many countries (Meunier et al., 2017). Despite female entrepreneurs' contributions, there is a strong belief that in comparison to their male counterparts' businesses, theirs are bound to underperform. That is reflected in the research agenda on women's entrepreneurship which is primarily centered on the shortcomings of female entrepreneurs (Marlow & McAdam, 2013). Various studies find that compared to male entrepreneurs, their businesses' financial performance is inferior (Rosa et al., 1996), their businesses are smaller (Bardasi et al., 2011; Global Entrepreneurship Research Association, 2021) and growth ambitions are lower (Davis & Shaver, 2012; Global Entrepreneurship Research Association, 2021; Morris et al., 2006). Yet, according to Marlow and McAdam (2013), the "assumptions about the alleged under-performance of women business owners are (...) ill founded, poorly informed and merely act to reproduce and reinforce mythical axioms pertaining to women, gender and entrepreneurship" (p. 118). Thus, understanding underlying assumptions and where alleged differences between male- and female-owned businesses come from, is crucial for public policy as well as scholar understanding (Kepler & Shane, 2007). Often when gender is positioned as a key variable in analyses of business performance, the notion of men and women being essentially different is enhanced and other variables such as the choice of industry, location or structural factors are left aside (Marlow & McAdam, 2013). Scholars argue that female-owned businesses are often concentrated in market sectors such as retail trade and services which are usually composed of a large population of small

firms. This also served as a severe disadvantage during the Covid-19 pandemic as these sectors were most affected by the various shutdowns and led to a higher number of business closures reported by female entrepreneurs (Global Entrepreneurship Research Association, 2021; Marlow & McAdam, 2013). However, there is evidence to suggest that the failure rates of women's businesses are not significantly different from men's, especially when factors such as business size and sectoral distribution are corrected for (Marlow & McAdam, 2013; Perry, 2002).

Scholars often report significant differences between male and female entrepreneurs when researching within the entrepreneurial realm. Yet, "treating gender as a dichotomous variable, without measuring the social and psychological components of such a complex construct, may limit the value of these research findings" (McCabe et al., 2006, p. 102). Ahl (2002) argues that there are very few differences between male and female entrepreneurs and the overlaps are considerably larger. Furthermore, Sexton and Bowman-Upton (1990) find that, overall, they possess similar traits.

The benefits of female entrepreneurship for society are numerous and multifaceted. It is argued that relational leadership skills are highly important in today's economy. The opportunistic 'economic man' is not the rationale, instead, female entrepreneurs fostering a culture of collaboration, trust and team orientation through listening, sharing and teambuilding, play an increasing role in organizations (Kamberidou, 2013; Rosener, 2011). Moreover, businesses of female entrepreneurs promote long-term economic growth and generate employment (Cuberes & Teignier, 2016; Kamberidou, 2013; Startbase, 2021)). Another domain, which has been widely explored, is the relationship between gender and ethics. Although it is often presumed that women are less likely to engage in unethical behaviors than men, however, the evidence supporting this is inconclusive. Numerous studies find that women perceive certain acts as more unethical than men (Luthar & Karri, 2005; Mason & Mudrack, 1996; P. L. Smith & Oakley, 1997; Stedham et al., 2007), they are more ethically predisposed (S. Gill, 2010) and are more likely to report ethical intentions (Bateman & Valentine, 2010; Beu et al., 2003; Valentine & Rittenburg, 2007). However, many other studies find no evidence of ethical differences between men and women (Das, 2005; McCabe et al., 2006; Roxas & Stoneback, 2004).

Studying business ethics refers to "the identification and evaluation of the right thing (...) to do in business" (Grosser et al., 2017, p. 543). Implementing business ethics into the organizational structure means agreeing on standards of conduct that ensure that the business will not exert a negative impact on its stakeholders (Cant, 2012). Relevant issues include acting with integrity and in a manner that is environmentally sustainable, valuing and respecting the organization's workforce as well as fundamental human rights and running the business based on the organization's core values without making profit the sole focus of the business (St. James Ethical Center, 2009 as cited in Cant, 2012). Andrews

(1989) argues that business ethics are ultimately a personal issue as they reflect individuals' beliefs and values within an organization. In addition, Fassin (2000) highlights the great influence of ethical issues on entrepreneurs which come up during the different steps of the start-up process for innovative businesses, impacting information and insider trading, marketing, negotiation, information confidentiality and intellectual property. Furthermore, entrepreneurs report the presence of unethical practices in various management fields. Among others, they refer to "lies and deception, breaches of promise, passive corruption, unfair competition, personal advantages for management and the manipulation of communication" (Fassin, 2005, p. 266). According to Fassin (2005), the reasons hereof are numerous and complex. The author lists, inter alia, pressures from stakeholders, the economy's globalization, the disproportional importance of communication and the media, business motives and the psychology of entrepreneurs. However, businesses are expected to juggle the often conflicting goals of adhering to ethical standards and simultaneously maximizing the organization's long-term value (Ibrahim et al., 2009). Henceforth, the following research question is formulated in order to analyze the relationship between female entrepreneurs and their degree of ethicality.

> *RQ1: To what extent are female entrepreneurs depicted as ethical or non-ethical in the media?*

3.2. Social Constructionism of Gender and Entrepreneurship in the Media

The categorization of specific traits and behaviors as male or female is not inherent, rather it is based on societal conventions. The identification of certain features and practices as conventionally masculine or feminine is a product of social construction (Milestone & Meyer, 2012). From the late 1960s onwards, social constructionism has been adopted and adapted by various academic fields. According to Allen (2004), social constructionism is "a theoretical orientation to sociocultural processes that affect humans' basic understandings of the world" (p. 35). It challenges humans to call their own beliefs to question and theorizes that the ideas and categories humans use for thinking and communication are socially constructed, rather than inherent aspects of reality. Furthermore, they are assumed to be embedded in a particular culture and era, which means that our 'knowledge' of the world and the concept of 'truth' are relative instead of absolute (Allen, 2004; Burr & Dick, 2017). Thus, it is argued that social identity categories are social constructs. This includes gender, which is considered to be a social construct, rather than a natural fact, which serves to define societal norms surrounding what it means to be masculine or feminine (Bobrowska & Conrad, 2017; D. Brooks & Hébert, 2006; C. Carter & Steiner, 2004; Milestone & Meyer, 2012). Hence, within the critical theorizing of entrepreneurship, gender has also been a significant topic of concern. This refers especially to the masculine construction of entrepreneurs and the re-

sulting highly gendered discourse around entrepreneurship (Ahl, 2002).

Mass media play an integral part in this by implicitly or explicitly representing gendered narratives (D. Brooks & Hébert, 2006). The complex relationship between gender and media has therefore attained extensive academic interest, not only in the domain of media and communication studies, but also in sociology, cultural studies and many more (Kosut, 2012; Krijnen, 2020). R. Gill (2007a) highlights the media's involvement in the construction of reality, which also entails the active production of gender. According to Milestone and Meyer (2012), the media represent "reality through symbolic codes of language and images" (p. 19). Social constructionism assumes that social processes are essential in maintaining knowledge, with language being a fundamental part of these processes. Language enables humans to create and recreate knowledge through their different roles within different contexts. Moreover, it helps to comprehend the world and share experiences and meanings with others (Allen, 2004; Burr & Dick, 2017). C. Carter and Steiner (2004) argue that the media are able to "allocate, or more usually withhold, public recognition, honour and status to groups of people" (p. 1).

The media's portrayal of women entrepreneurs plays a crucial role in shaping the reality of female entrepreneurs. The way they are depicted by the media affects people's perceptions of what they typically do and how they experience it. Especially the strength and direction of females' entrepreneurial aspirations but also the potential business stakeholders who are crucial for female entrepreneurs' success are affected (S. Carter et al., 2007; Eikhof et al., 2013; Hindle & Klyver, 2007; Radu & Redien-Collot, 2008). According to Eikhof et al. (2013), "media representations of female entrepreneurs thus not only mirror existing gender inequalities in entrepreneurial activity, but also provide the interpretive framework for reproducing these gender inequalities" (p. 548). People outside of academics, but also many scholars, use the term 'the media' often to subsume a range of media and especially "the importance of the meanings of popular messages and images that are consumed by a mass audience" (Kosut, 2012, p. xix). D. Brooks and Hébert (2006) argue that "much of what audiences know and care about is based on the images, symbols, and narratives in radio, television, film, music, and other media. How individuals construct their social identities (. . .) is shaped by commodified texts produced by media" (p. 297). Hence, self-identity is, at least partly, shaped by media content (Kosut, 2012; Milestone & Meyer, 2012). In the realm of media content, diverse formats exist through which information is disseminated. Weischenberg (2001) provides a comprehensive categorization of journalistic formats based on distinct characteristics such as length, level of detail, structure, linguistic style, and subjectivity. Within this framework, the author delineates the message and report as two forms of news presentation. The former emphasizes brevity and the conveyance of essential information, while the latter entails more extensive coverage and utilizes various linguistic nar-

rative techniques. Furthermore, Weischenberg identifies the commentary as an evaluative and interpretative format that incorporates the journalist's perspective. Additionally, he underscores the interview format as a prevalent journalistic approach employed to obtain statements from individuals or expert opinions pertaining to a specific topic. Expanding the categorization, the author also includes a range of textual forms that complement news coverage, shed light on underlying contexts, and analyze events, collectively referred to as 'feature' articles. These pieces serve to provide guidance, offer interpretation aids, and simultaneously entertain and inform the audience (Weischenberg, 2001).

The analysis of tone or sentiment is a crucial aspect of content analysis when examining press articles. As is the length of an article or the media outlet, tone or sentiment of an article is considered a formal variable. Moreover, because of increasing volumes of data, automated sentiment analyses currently grow in popularity (Kessler et al., 2023). According to Hase (2021), "sentiment/tone describes the way issues or specific actors are described in coverage" (p. 1). The effect of the tone of an article on the way readers perceive and think about a certain topic is convincingly evidenced (Gunther, 1998; Hester & Gibson, 2007; Kim et al., 2007). Usually, tone or sentiment are measured in varying gradations within a scope of negative, neutral, positive or both positive and negative respectively mixed (Dunstone et al., 2017; Hase, 2021; Jacobs & Meeusen, 2021; Meijer & Kleinnijenhuis, 2006). Several studies have confirmed that nowadays, female entrepreneurship in the media is consistently portrayed as beneficial both for the economy and society without critical discussion (Bobrowska & Conrad, 2017; Nadin et al., 2020). In order to make meaningful assertions regarding the tone of media portrayals of female entrepreneurs, the following research question is proposed.

RQ2: Is the tone of the media portrayal of female entrepreneurs skewed in a positive way?

Through media consumption, people are frequently exposed to images and narratives of entrepreneurial role models. Scholars argue that from the 1950s onwards until the 1990s, media portrayal of women in the working place and female entrepreneurs was predominantly confined to stereotypical roles and more usually positioned outside of the economic sphere as housewives, mothers and consumers. These depictions vanished during the 2000s and early 2010s, however, gender stereotyping remains prevalent (Bobrowska & Conrad, 2017; Kosut, 2012). Instead of challenging the notion that entrepreneurship is inherently a male-gendered concept (Ahl, 2006), Bobrowska and Conrad (2017) find that in the Japanese business press, female entrepreneurs' achievements were predominantly attributed to their naturally feminine traits, innovative concepts, or their remarkable talent in managing work and family responsibilities. Hence, there seems to be an apparent contradiction when it comes to entrepreneurial potential as feminine characteristics are appraised as both favorable and unfavorable.

Looking at the increasing number of studies investigating these portrayals and their impact on people's views of female entrepreneurship, the significance of media portrayals of female entrepreneurship seems to be acknowledged (Achtenhagen & Welter, 2011; Bobrowska & Conrad, 2017; Eikhof et al., 2013; Nadin et al., 2020). Notions of self-fulfillment, empowerment and independence through entrepreneurship are brought to the forefront. Oftentimes, it is considered a "liberation from the career rat-race and as leading to a highly desirable, emotionally satisfying work-life style" (Eikhof et al., 2013, p. 559). Especially for women with childcare or other family obligations flexibility is important and thus, "many engage[d] in low growth or 'home based' service businesses" (Byrne et al., 2019, p. 177). Both Achtenhagen and Welter (2011) analysis of German newspapers' representation of female entrepreneurs and Eikhof et al. (2013) analysis of a UK-based women's magazine on the same topic reveal that when female entrepreneurs are rendered visible, their chosen type of entrepreneurship is often subject to trivialization and marginalization. Nadin et al. (2020) discourse analysis of a major UK broadsheet newspaper, however, concludes the exact opposite. Thus, there seems to be differences in media representation of female entrepreneurship both on a country level but also on a media format level.

By analyzing newspaper and magazine articles, scholars could identify various narratives present in the media's portrayal of female entrepreneurs. However, the 'heroic female entrepreneur' or 'superwoman' narrative is quite prevalent in the media discourse on female entrepreneurship (Bobrowska & Conrad, 2017; Byrne et al., 2019; Nadin et al., 2020). She is characterized by effectively balancing her entrepreneurial endeavors and her family obligations, being successful in both realms (Bobrowska & Conrad, 2017; Byrne et al., 2019). Moreover, entrepreneurial superwomen are "empowered, enjoying work/life, doing good in the world, overcoming all obstacles" (Byrne et al., 2019, p. 175). The notion of overcoming barriers and taking one's destiny into its own hands is grounded in the postfeminist discourse with its strong focus on individual efforts and its lack of acknowledgment of systemic issues (Byrne et al., 2019). Nadin et al. (2020) argue that this postfeminist sensibility is expressed through the overarching meta-narrative they reveal in their discourse analysis of a major UK broadsheet newspaper which exists in accordance with the 'heroic female entrepreneur' narrative. The authors' 'entrepreneurial superwoman' explicitly functions as an inspiring role model that overcomes barriers and turns failures into success, and heroic metaphors are used to describe her endeavors. In addition to their so-called 'women as heroines of enterprise' meta-narrative, they also identify four interpretive repertoires. First, there is the "promotion of entrepreneurship as a route to greater equality with men" (p. 569) which presents the necessity for an increase in female entrepreneurs as a matter of gender equality, thereby also supporting economic growth and reducing the gender pay gap while simultaneously preventing women from suffering within a culture of sexism in corporate organizations. Second, the authors list the interpretive reper-

toire "entrepreneurship as an emancipatory and egalitarian 'space'" (p. 570) which emphasizes the autonomy and fulfillment women can find through entrepreneurship in all aspects of personal as well as business life. However, the existence of gender-based discrimination is rejected while putting more effort into one's work instead of criticizing social structures or gender role obligations is emphasized. Third, there is the "desirable vs undesirable entrepreneurship" (p. 570) interpretive repertoire which also promotes hard work and persistence but is predominantly concerned with depreciating entrepreneurship in low-growth or feminized sectors and simultaneously valorizing high-growth entrepreneurship in more male-dominated sectors such as IT and tech. Fourth, there is the interpretive repertoire of "success as a result of overcoming and exploiting gender differences" (p. 570) which argues that female entrepreneurs have to overcome their unsuitable traits, such as, allegedly, being less ambitious and confident than their male counterparts. Simultaneously, they are urged not to mirror traditional male behavior too much and still emphasize their alleged intrinsic caring tendencies. Those are also the reason why female entrepreneurs are expected to support other women through networks and mentoring. An understanding of the prevalence of narratives used in the media is sought by proposing the following research question.

RQ3: To what extent is the media portrayal of female entrepreneurs constructed along narratives?

Another prominent research stream within the entrepreneurship research field revolves around 'entrepreneurial identity' with a focus on the performance of identity (Byrne et al., 2019; Radu-Lefebvre et al., 2021; R. Smith, 2021). Within discursive practices, women's entrepreneurial identities are not fixed but 'done', that means "theorized, practiced, narrated" (Bruni et al., 2004b, p. 265). Scholars argue that female entrepreneurs are excluded from the dominant discourses and therefore, they need to adopt specific identity performances (Bruni et al., 2004a, 2004b).

Lewis (2014) proposes that femininity, or rather femininities, can contribute to our comprehension of inequality in entrepreneurship by accounting for various women's entrepreneurial experiences. Using a postfeminist framework, she identifies four entrepreneurial femininities, namely the individualized, maternal, relational, and excessive femininity. These are characterized by varying degrees of femininity and masculinity, and hence, demonstrate women's diverse approaches to 'doing' entrepreneurship. Women entrepreneurs doing the individualized entrepreneurial femininity are described as strongly individualist, actively separating their domestic and private spheres so that they do not interfere with each other, refuting gender inequality in the entrepreneurship domain and enacting a combination of masculine and feminine characteristics in spite of distancing themselves from traditional femininity. Various studies confirm that this is the dominant entrepreneurial identity and the most promoted and valued one (Byrne et al., 2019; Lewis,

2014; Nadin et al., 2020). Lewis (2014) identifies women entrepreneurs doing the maternal entrepreneurial femininity as mothers – 'mumpreneurs' – who seek independence and self-reliance through their entrepreneurial endeavors, linking the latter with motherhood and incorporating both masculine and feminine aspirations. They often operate from and in the home and offer products or services associated with families. However, this is merely a progressive façade as it cements the gendered division of labor with women acting as the primary caregivers for children (Byrne et al., 2019). Women entrepreneurs doing the relational entrepreneurial femininity have a uniquely feminine viewpoint, believe that men and women are complementary but at the same time avoid being too feminine. Their leadership style includes an emphasis on relational interaction and the sharing of power. However, they reject businesses' growth orientation and rather opt for stable small businesses. Furthermore, independent from motherhood, they argue for a more equal balance of the domestic and professional sphere. Women entrepreneurs doing the excessive entrepreneurial femininity enact traditional femininity, including traits such as passivity, vulnerability and dependence, and fail to compensate their stereotypical behavior by drawing on more masculine behaviors. They are often rejected and consequently labeled as illegitimate 'non-preneurs' (Byrne et al., 2019; Lewis, 2014). To gain deeper insight into how female entrepreneurs' 'doing' of entrepreneurship is portrayed in the media, the following research question is proposed.

RQ4: To what extent is the media portrayal of female entrepreneurs constructed along their entrepreneurial femininities?

On the one hand, Bobrowska and Conrad (2017) highlight the connection of power and discourse production: "as certain groups enjoy greater access to means of discourse production and maintenance through text production, language is used to legitimize and reproduce hegemonic beliefs within a social order" (p. 3). Moreover, Krijnen (2020) suggests that the number and type of female representation in the media is affected by the number of women involved in media production. On the other hand, Kosut (2012) argues that the connection between power and the social construction of gender also cannot be overlooked. Men typically hold more political, cultural, and economic power than women, and this is reflected in the media industry. For instance, men are overrepresented in upper-level positions, and they also own a larger proportion of major media outlets. Until fairly recently, this hierarchical pattern could also be detected in print newsrooms. Typically, women held lower-paying, lower-level positions within these organizations, also referred to as the 'pink ghetto', and female reporters were usually assigned to report on 'soft' news stories, including topics such as beauty, health, fashion and celebrities, which were considered of interest to female readers. However, 'hard' news, which cover culturally and politically significant topics, were reserved for male reporters. Broadly speaking, this tradition of exclusion

and gender stereotyping implies that men are naturally better suited to handle serious and important issues. Furthermore, within society, "the idea that exceptional creative talent, creative genius, is a masculine force" (Milestone & Meyer, 2012, p. 211) prevails. However, Maden (2015) finds that female entrepreneurs in Turkey are described as "visionary and innovative" (p. 326). Moreover, Brush et al. (2012) confirm that when it comes to creating innovative products, female entrepreneurs are just as capable as their male counterparts. Thébaud (2015) even argues that "women entrepreneurs had less to lose and more to gain by introducing an innovative business model; by doing so, they signaled personal qualities that better fit with the agentically masculine stereotype of the entrepreneur" (p. 20). Thus, the following research questions are proposed:

> RQ5: To what extent are articles on female entrepreneurship written by female authors?

> RQ6: To what extent do articles on female entrepreneurship portray female entrepreneurs as genius?

> RQ7: To what extent do articles on female entrepreneurship portray female entrepreneurs as innovative?

3.3. Challenges Reinforced by Gender Inequalities in Entrepreneurship

Despite the significant contributions made by entrepreneurs to society, female entrepreneurs still face various challenges that impede their success in the field. Isaga (2019) argues that despite the similarity of challenges faced by entrepreneurs in developed and developing countries, there are certain issues that are distinct to particular contexts. Furthermore, there are different factors that hinder the development of businesses. The author differentiates between external factors which cannot be controlled by the entrepreneurs and internal factors which are directly linked to the entrepreneurs and certain attributes of their businesses. Nonetheless, however the challenges are attributed to, it is crucial to be aware of these constraints in order to understand why male and female entrepreneurs perform differently.

First, the literature suggests that social norms and cultural values impose challenges for female entrepreneurs. Carranza et al. (2018) state that "social norms are most likely to be the origin for external constraints that affect labor market, financial market, sectoral choice and many other aspects of women's entrepreneurial choices and outcomes" (p. 31). Social norms establish gender roles by defining the acceptable behavior and favorable traits for men and women as well as boys and girls. They can be restricting for female entrepreneurs as they may constrain business establishment and growth (Carranza et al., 2018). Welter (2004) argues that "societal values implicitly view female entrepreneurship as less desirable" (p. 215). Thus, the competences and abilities of female entrepreneurs are often devalued when compared to male entrepreneurs (Shastri et al., 2022; Thébaud, 2015).

Second, cultural norms are also mirrored in gender-specific role distributions (Shastri et al., 2022). Welter (2004) finds that the predominant definition of women in German society still revolves around their responsibilities and roles within the household and family. Female entrepreneurs often work a double shift as in addition to their entrepreneurial endeavors, they usually shoulder the burden of a majority of domestic responsibilities (Isaga, 2019; Maden, 2015). Household and family obligations are portrayed as an obstacle to female entrepreneurs binding their resources. Hence, there is a conflict between the business and the domestic sphere and therefore, female entrepreneurs face an ongoing struggle to create a work-life balance (Carranza et al., 2018; Shastri et al., 2022).

Third, the literature suggests that having robust networks and social connections is crucial for achieving success in business and has many more advantages such as encouragement, the creation of new opportunities, the identification of resources and the enhancement of general well-being (Carranza et al., 2018; Leskinen, 2011). However, female entrepreneurs face more difficulties in establishing networks compared to their male counterparts (Shastri et al., 2022). The literature highlights the importance of networking to improve business performance and advises female entrepreneurs to build better networks (Ahl, 2002; Jha & Alam, 2022). Yet, they rely on their extended family more than male entrepreneurs because in some cases this is the only network they have (Carranza et al., 2018). According to Renzulli et al. (2000), "actors with networks that draw information from multiple sources - those with high heterogeneity and a low percentage of kin - are much more likely to start a new business than are those with more homogeneous networks" (p. 541). Thus, the composition of a network seems to impact business creation. Moreover, there seem to be differences in the networks of female and male entrepreneurs. Kwong et al. (2012) argue that social ties to established entrepreneurs tend to decrease an individual's perception of financial barriers in starting a business. However, women's entrepreneurial networks have a comparatively weaker impact in reducing these financial constraints than those of men.

Fourth, resource constraints are faced by various female entrepreneurs. The literature largely focuses on financial resources and suggests that women are severely disadvantaged when it comes to access to finance. However, access to capital is crucial in order to start a business (S. L. Carter & Shaw, 2006; Jha & Alam, 2022; Maden, 2015) as well as to enhance its performance (Bosma et al., 2021; Xie & Lv, 2018). Various studies find that female entrepreneurs are discriminated when trying to obtain access to capital. Female entrepreneurs enter business with only a fraction of the starting capital that their male counterparts have at their disposal (S. L. Carter & Shaw, 2006). Xu et al. (2016) reveal that women encounter stricter credit access and their likelihood of being asked to provide collateral is higher. However, they often lack the latter and are unable to use household assets for that matter (Isaga, 2019). On the one hand, evidence suggests that

women are more inclined to feel financially constrained compared to men (Kwong et al., 2012). Moreover, Orser et al. (2006) state that women show a lower inclination towards obtaining any type of external funding at all such as "commercial loans, leases, supplier financing, external equity" (p. 659). Yet, when they do apply for credits, they tend to opt for smaller amounts than men (Welter, 2004). On the other hand, in terms of acquiring financial resources for their business ventures, Alsos et al. (2006) find hardly any variations between men and women when looking at their perceptions and behaviors. Furthermore, S. L. Carter and Shaw (2006) argue that here is no indication that women face higher rejection rates than men, or that their understanding of financial products is less advanced.

Fifth, female entrepreneurs face personal constraints that might prevent them from engaging in entrepreneurial endeavors. Cech et al. (2011) argue that men and women might cultivate different degrees of professional role confidence in professional fields that are strongly sex-typed. This type of confidence is defined as one's "ability to fulfill the expected roles, competencies and identity features of a successful member of their profession (. . .) not just mastery of a profession's core intellectual skills (. . .) but also the cultivation of confidence in, identification with, and commitment to the profession" (p. 642). N. Meyer and Landsberg (2015) find that even women with many years of professional experience lack self-confidence and think that they do not possess the skills necessary for entrepreneurship. This is also reflected by the findings of Cavada et al. (2018), which indicate a lack of confidence as well as low self-esteem in many female entrepreneurs they interviewed. They also proclaim that most of these female entrepreneurs are more risk-averse than men.

Last, the literature suggests that in some contexts female entrepreneurs may be challenged by educational constraints. According to Robinson and Sexton (1994), education and entrepreneurship are closely associated within their U.S. sample as those who are self-employed usually have a greater level of education than individuals working in salaried positions. In contrast, Noguera et al. (2015) cannot find a correlation between education and female entrepreneurial activity in their Spanish sample. The gap in educational level between male and female entrepreneurs is more pronounced in low-income countries where women have lower levels of education whereas female entrepreneurs in high-income regions such as North America are more highly educated than male entrepreneurs (Global Entrepreneurship Research Association, 2021). Bates (1995) argues that "relative to men, women are relying much more heavily upon advanced education and work experience as their route to self-employment" (p. 154). This is mirrored by previous studies that advice female entrepreneurs to focus on getting more management experience, entrepreneurial training and business education (Ahl, 2002). In order to get an overview of which challenges of female entrepreneurs are depicted in the media, the following research question is proposed.

RQ8: Which challenges are most prevalent in the media portrayal of female entrepreneurs?

4. Methodology

4.1. Data Collection

To investigate the portrayal of female entrepreneurs in the press, a comprehensive selection of newspaper and magazine publications was accessed through the Nexis Uni database. It offered access to a global content collection including more than 17,000 news, business and legal sources (LexisNexis, 2023). Building upon the preceding chapters, it has been established that the publication of Sophia Amoruso's memoir '#Girlboss' in May 2014, along with the widespread circulation of the term 'girlboss' within the context of neoliberal feminist discourse, has influenced the emphasis, understanding, and relevance of female entrepreneurship. Covering the time period from May 2014 to December 2022, the search term 'female founder' was entered into the database to identify all articles containing this expression. Only English-language articles published in newspapers, magazines and journals – including the respective online counterparts – were considered for the empirical analysis and duplicates were grouped to prevent a potential double inclusion in the final sample. The initial search query generated a collection of 1475 articles, which was subsequently exported in .xlsx format for further analysis.

As the research topic of interest was female entrepreneurship, articles which covered female entrepreneurs and female entrepreneurship explicitly – that means as their main topic – were included in the final sample. However, based on the predefined exclusion criteria (see Table B1 in Appendix B), a total of 1283 articles were excluded after briefly scanning their content. Consequently, a final dataset of 192 articles was retained for further quantitative in-depth analysis (see C1 in Appendix C).

4.2. Data Analysis

Based on the aforementioned literature, a comprehensive codebook was developed in an .xlsx format to systematically capture relevant categories for the analysis of the articles. Subsequently, each article was read thoroughly, and information pertaining to the predetermined categories of interest was recorded in the data file. The codebook with extensive information on the categories including their measurement scales can be found under C2 in Appendix C.

In this research, the focus lay on a period of approximately nine years – May 2014 until December 2022 – to examine the portrayal of female entrepreneurs in the media. Specifically, the analysis investigated the narratives employed to depict female entrepreneurs, including the heroic, equality, emancipatory, desirability, and exploiting/overcoming gender differences narratives (Nadin et al., 2020). Additionally, it explored the presence of entrepreneurial femininities as identified by Lewis (2014), which encompassed

the individualized, maternal, relational, and excessive entrepreneurial femininity. Furthermore, descriptions of female entrepreneurs as 'innovative' or 'genius' and their corresponding synonyms were analyzed, as well as the tone of the articles and the gender of the author. The analysis also included an examination of the portrayal of female entrepreneurs' ethical behavior and the challenges they face. Additionally, if applicable and relevant, key quotes from each article were documented. Finally, general information for each article was gathered, such as the year of publication, media outlet, scope, journalistic format, and title (see C3 in Appendix C).

The coding process for the majority of categories in this study was conducted manually. However, the analysis of article tone was facilitated by employing the text analysis tool LIWC-22 which "is designed to accept written or transcribed verbal text which has been stored as a digital, machine-readable file (...) During operation, the LIWC-22 processing module accesses each text in your dataset, compares the language within each text against the LIWC-22 dictionary" (Boyd et al., 2022b, pp. 2-3). To measure the positive and negative tone dimensions within the text, the tool calculated a score ranging from 1 to 100. A higher score indicated greater overall emotional positivity (Boyd et al., 2022b; Cohn et al., 2004; LIWC, 2023). The resulting scores for each article were recorded and inserted into the data file (see C3 in Appendix C).

Hereafter, the data set was uploaded to JASP (Version 0.17.1) and descriptive statistics were calculated for the respective categories. Frequency tables and contingency tables were generated to establish relationships between the categories. To investigate potential effects of gender on other variables, one-way analyses of variance (ANOVAs) were conducted (see C4 in Appendix C). Subsequently, some of the JASP outputs were utilized to facilitate statistical analyses within Microsoft Excel (Version 2304 Build 16.0.16327.20200) as well as to create more nuanced and easily adaptable graphs within the program (see C3 in Appendix C).

5. Results

Overall, a sample of 192 articles from 103 different media outlets was analyzed. The outlet with the most articles analyzed was *The Guardian* (n = 11), followed by the *Financial Times* (n = 10) and *Forbes* (n = 10). However, the majority of media outlets could only be found once in the sample. Details can be found in Figure A1 (see Appendix A). Regarding the scope of the articles – measured by the number of words – the data revealed a wide range of values within the sample (M = 1271.32; Mdn = 1020.5; Min = 237; Max = 5900) (see Figure A2 in Appendix A). Accounting for 43.23 %, the most common journalistic format in the sample was the feature (n = 83), followed by the report (n = 52) with 27.08 % and the commentary (n = 29) with 15.10 %. Interviews (n = 21) and other journalistic formats (n = 7) were also present, however, no message could be identified in the sample (see

Table B2 in Appendix B). The majority of the articles was written by female authors (n = 133), male authors only accounted for 19.27 % within the sample (n = 37). Moreover, 11.46 % of the articles did not indicate the author's gender (n = 22). In addition, most articles were published in 2021 (n = 35), followed by the years 2022 (n = 31) and 2019 (n = 27) (see Figure A3 in Appendix A).

The following results offer answers to research question number one regarding the extent to which female entrepreneurs are depicted as ethical or non-ethical. It was found that more articles mention female entrepreneurs' ethical behavior than their non-ethical behavior. The ethical behaviors most often referenced included *benefitting the community* (n = 18), followed by *treating the company's employees well and with respect* (n = 17) and *conducting business according to the values and beliefs of the organization* (n = 15). However, as summarized in Figure A4 (see Appendix A), most articles did not specifically address ethical behavior.

The non-ethical behaviors mentioned in the articles included *lies and deception* (n = 11), *manipulation of communication* (n = 3) and *breaches of promise* (n = 1). *Passive corruption*, *unfair competition* and *personal advantages for management* were not mentioned within this sample. Similar to ethical behavior, most articles did not specifically address non-ethical behavior (see Figure A5 in Appendix A).

Analyzing the presence of ethical and non-ethical behavior in the articles over the years, no clear pattern became evident. The first evidence of female entrepreneurs' ethical behavior occurred in 2015 while non-ethical behavior was mentioned first in 2019. However, each year less than 20 % of all articles published contained any reference to these behaviors. Figure A6 depicts the percentage of articles each year that mentioned female entrepreneurs' ethical behavior while Figure A7 (see Appendix A) shows the equivalent for non-ethical behavior.

The following paragraphs address research question two and reveal whether the tone of female entrepreneurs' media portrayal is skewed in a positive way. The results shown in Table B3 (see Appendix B) indicate that the articles' tone was more positive than negative ($M_{positive}$ = 2.68; $M_{negative}$ = 0.78). Figure A8 shows both the values for positive and negative tone for each article, illustrating that most articles scored higher on positive than on negative tone (see Appendix A).

Moreover, potential differences between positive and negative tone used in articles written by male and female authors were analyzed. To examine the impact of author's gender on positive tone, a one-way analysis of variance (ANOVA) was conducted. Positive tone was the dependent variable and author's gender – male, female, not identified – the independent variable. The ANOVA results revealed a significant main effect of author's gender on positive tone, $F(2, 189)$ = 3.13, p = .046. The effect size, as measured by η^2, was found to be 0.032, indicating that approximately 3.2 % of the variance in positive tone could be attributed to author's gender (see Table B4 in Appendix B). However, post-hoc comparisons using Tukey's HSD test indicated that this main effect is not driven by specific pairwise comparisons between the gender groups

(see Table B5 in Appendix B). Overall, the data revealed that male authors' articles have a more positive tone compared to those of their female counterparts and those that did not identify the author's gender ($M_{positive\_male} = 2.97$; $M_{positive\_female} = 2.56$, $M_{positive\_gender\ not\ identified} = 2.91$). Furthermore, an ANOVA was conducted to examine the impact of author's gender on negative tone with the latter being the independent variable and gender being the dependent variable. The ANOVA results revealed no significant main effect of author's gender on negative tone, $F(2, 189) = 0.768$, $p = .466$ (see Table B6 in Appendix B).

Analyzing potential differences in positive and negative tone over the years, the data revealed that the respective means and medians are quite stable within a limited range of values and the differences between the respective means and medians were often quite small (see Figure A9 in Appendix A).

By analyzing the presence and type of narratives within the sample, the following results offer answers to research question three. Table B7 (see Appendix B) shows that the *heroic narrative* was used most often (n = 69), followed by the *equality narrative* (n = 39) and the *emancipatory narrative* (n = 22). The majority of the articles analyzed contained at least one narrative. 10.94 % contained two narratives and 2.08 % even contained three narratives (see Table B8 in Appendix B). No article contained four or five narratives.

Furthermore, the analysis revealed no clear pattern regarding the use of the different narratives over the years. Until 2018, the narratives used the most were the *heroic*, the *equality* and the *emancipatory narrative*. However, since 2019, the proportion of the *heroic narrative* clearly dominated all other narratives. Another interesting finding was the sharp increase in the use of the *overcoming/exploiting gender differences narrative* as seen in the year 2022 (see Figure A10 in Appendix A).

In addition, potential differences between the use of narratives in articles written by male and female authors were analyzed. To examine the impact of author's gender on the narratives, an ANOVA was conducted for each of the five narratives. The respective narratives acted as the dependent variable and author's gender – male, female, not identified – as the independent variable. The ANOVA results revealed no significant main effect of author's gender on the use of the *heroic, emancipatory, desirability* and *overcoming/exploiting gender differences narrative* (see Table B9 in Appendix B). However, a significant main effect of author's gender on the *equality narrative* was found, $F(2, 189) = 9.38$, $p < .001$. The effect size, as measured by η^2, was found to be 0.09, indicating that approximately 9 % of the variance in the use of the *equality narrative* could be attributed to author's gender (see Table B10 in Appendix B). Post-hoc comparisons using Tukey's HSD test revealed a large significant difference between male and female authors, $t(df) = 4.24$, $p < .001$, $d = .79$ (see Table B11 in Appendix B). The data provided evidence that male authors are most likely to use the *equality narrative* in articles about female entrepreneurship. This narrative was used in 43.24 % of the articles written by male

authors, compared to 12.78 % of female authors' articles and 27.27 % of articles where author's gender was not indicated (see Table B12 in Appendix B).

To address research question four, the following results were obtained. Most common in the sample were the *relational* (n = 35), followed by the *individualized* (n = 26) and *maternal entrepreneurial femininity* (n = 4). The *excessive entrepreneurial femininity* was not present in the sample (see Table B13 in Appendix B). One third of the articles analyzed depicted at least one entrepreneurial femininity. However, the maximum of two entrepreneurial identities was only depicted in one article and two thirds of the articles did contain none at all (see Table B14 in Appendix B).

Furthermore, the analysis revealed no clear pattern regarding the use of the different entrepreneurial identities over the years. While the *relational* one was used most often when looking at frequency, in 2017, 2018 and 2022 it was used proportionately equal or even less than the *individualized entrepreneurial femininity*. The *maternal entrepreneurial femininity* was not used at all in one half of the years analyzed and in the other half always accounted for less than 10 % of all articles published in that specific year (see Figure A11 in Appendix A).

In addition, potential differences between the depiction of entrepreneurial femininities in articles written by male and female authors were analyzed. To assess the influence of author's gender on this depiction, separate ANOVAs were conducted for each of the four entrepreneurial femininities. The dependent variable was the respective entrepreneurial femininity, while the independent variable was the author's gender categorized as male, female, or not identified. The ANOVA results indicated that there were no significant main effects of author's gender on the depiction of the *individualized, maternal* and *relational entrepreneurial femininity* (see Table B15 in Appendix B).

The findings in the following paragraph answer research question five and thereby shed a light on the gender distribution in authorship. It was found that more articles are written by female authors (n = 133) than male authors (n = 37). However, several articles did not indicate the author's gender at all (n = 22) (see Table B16 in Appendix B). Findings revealed that even though female authors account for more articles about female entrepreneurship each year, since 2019, the proportion of male authors has steadily increased. Additionally, findings indicated that an increase in the percentage of female authors often went hand in hand with a decrease in percentage of male authors and vice versa which was visible, for example, in the years 2017 – 2020 (see Figure A12 in Appendix A).

To address research questions six and seven regarding the portrayal of female entrepreneurs as *genius* and/or *innovative*, the subsequent results were obtained. No article described a female entrepreneur as *genius* or something similar. However, in 7.29 % of all articles in the sample female entrepreneurs were portrayed as *innovative* (n = 14).

Looking at the distribution of this description over the years, it was found that in 2014 as well as in 2020 no arti-

cle described a female entrepreneur as *innovative*. Nonetheless, the results showed that in 2022, 12.90 % of all articles published described a female entrepreneur as *innovative* or something similar (see Figure A13 in Appendix A).

Moreover, potential differences between the depiction of female entrepreneurs as *innovative* in articles written by male and female authors were analyzed. To assess the influence of author's gender on this depiction, an ANOVA was conducted. The depiction of female entrepreneurs as *innovative* was the dependent variable and author's gender – male, female, not identified – the independent variable. As can be seen in Table B17 in Appendix B, the ANOVA results indicated that there are no significant main effects of author's gender on the depiction of female entrepreneurs as *innovative*, $F(2,189) = 0.988$, $p = .374$.

In response to research question eight, which attempted to find out which challenges are most prevalent in the media portrayal of female entrepreneurs, the subsequent results emerged. Examined challenges included *societal and cultural constraints, networking constraints, multiple responsibilities, resource constraints, personal constraints* and *educational constraints*. Table B18 (see Appendix B) summarizes the frequency of appearance of each of the challenges including their different sub-categories. The data revealed that *resource constraints* are the challenge cited most often ($n = 91$), above all the *difficulty in accessing external finance* ($n = 83$) as a female entrepreneur. Furthermore, *societal and cultural constraints* ($n = 81$) acted as a major challenge, especially *social prejudices* ($n = 44$). *Networking constraints* ($n = 35$) also proved to be challenging for female entrepreneurs, particularly the *lack of female role models* ($n = 20$) was emphasized in the articles. Female entrepreneurs' *multiple responsibilities* and the resulting *lack of balance between work and imposed family and household responsibilities* ($n = 29$) were also presented as a challenge.

The findings also provided insights into the overall number of mentions of challenges female entrepreneurs might had to deal with. 72.92 % of the articles analyzed mentioned at least one challenge faced by female entrepreneurs. However, 27.08 % of the articles within the sample did not mention any type of challenge. Moreover, no article mentioned all six challenges that were included in the analysis (see Table B19 in Appendix B).

The findings revealed that in 2014, 2015 and again in 2022 societal and cultural constraints acted as the main challenge for female entrepreneurs. However, between 2016 and 2021, proportionally, resource constraints were cited the most in the articles. Moreover, the results obtained showed that in 2020, compared to 2019, there was a sharp increase in articles mentioning multiple responsibilities as a challenge to female entrepreneurs, ranking it second place in that year (see Figure A14 in Appendix A).

6. Discussion

6.1. Construction of the Female Entrepreneur in the Media

With the aim of unraveling the intricate construction of the female entrepreneur in the media, this discussion chapter critically evaluates the findings obtained from the analysis of media representations. By uncovering the underlying narratives and entrepreneurial identities, the ensuing section highlights the prevalence of gendered representations in newspaper and magazine articles and explores potential explanations for the observed patterns.

First of all, the findings depict a clear dominance of the feature format in articles about female entrepreneurship. This is mirrored by the literature which propagates the growing significance of feature journalism within the realm of newspapers which leads to elements from hard news journalism, such as entrepreneurship, finding their way into feature journalism. Drivers of this trend include shifting market dynamics and the competition in the media industry marked by the emergence of new media platforms and online discourses (Steensen, 2011; Weischenberg, 2001). Moreover, female authors account for the majority of articles about female entrepreneurship. According to the Global Media Monitoring Project (2020), while there has been a slight increase in the proportion of newspaper stories written by female journalists from 33 % to 37 % between 2010 and 2020, male journalists still surpass them in terms of the number of articles addressing economic subjects. Therefore, the higher representation of female authors in articles about female entrepreneurship may be attributed to the perception that this topic falls under the category of 'soft' news, which is considered less prestigious and is often associated with women (North, 2016). However, the findings of this study also indicate a shift in this trend. Since 2020, the proportion of male journalists writing articles about female entrepreneurship steadily increases. Furthermore, the analysis of the period from 2014 to 2022 reveals that the years 2021 and 2022 exhibit the highest number of articles on female entrepreneurs published, thus, reflecting a wider recognition of their presence in the realm of entrepreneurship and their economic contributions (Martínez-Rodríguez et al., 2022).

By analyzing tone of articles about female entrepreneurship using LIWC-22, it is found that they consistently score higher on positive than on negative tone in the years analyzed. This result reflects other study's findings regarding the positive depiction of female entrepreneurship (Nadin et al., 2020). It is important to note that the LIWC-22 dictionary used in this analysis captures words and word stems associated with positive and negative emotions, but its focus is more on sentiment rather than specific emotions. Newspaper articles often consist of highly formal language, which may result in fewer occurrences of certain words compared to language data derived from, for instance, social media. This discrepancy can lead to divergent results across various categories (Boyd et al., 2022b). Considering that the value of positive as well as negative tone can be anywhere between 0 and 100, the overall mean scores for positive tone ($M = 2.68$)

and negative tone (M = 0.78) within this sample may appear rather low. However, when compared to the mean scores for positive and negative tone in newspaper articles from the Test Kitchen Corpus ($M_{positive\_tone}$ = 2.33; $M_{negative\_tone}$ = 1.38), which serves as a validation for the LIWC-22 program, the scores appear to be similar (Boyd et al., 2022a).

The study reveals that the gender of the author does not have a significant impact on the negative tone of the articles. However, it does exhibit a significant effect on the positive tone. Nonetheless, the conducted statistical tests indicate that the observed differences are not driven by any specific pairwise comparisons, they rather represent a general distinction among male and female authors, as well as those whose gender is not indicated. Possible factors contributing to these findings include the sample size, the chosen alpha level, or the utilization of Tukey's post-hoc test instead of alternative methods (G. P. Brooks & Johanson, 2011; Ruxton & Beauchamp, 2008). It is worth noting that the Tukey method was employed as the preferred approach in light of the unequal group sizes present in the sample (McHugh, 2011).

Consistent with previous literature, articles about female entrepreneurship rely primarily on the *heroic narrative* (Bobrowska & Conrad, 2017; Byrne et al., 2019; Nadin et al., 2020). However, this phenomenon extends beyond gender and applies to the portrayal of entrepreneurship in the media in general. Previous research has shown that entrepreneurs are often depicted according to stereotypes such as the "heroic adventurer" (Hamilton, 2013, p. 91) or the "utopian market heroes" (Luri et al., 2023, p. 111). Scholars like Ahl (2002, 2006) have noted that entrepreneurship has traditionally been associated with masculinity, leading to the expectation for women to imitate and adopt the attitudes and behaviors typically attributed to male entrepreneurs to gain legitimacy within the entrepreneurial realm (Marlow & McAdam, 2012). In addition to the prevailing *heroic narrative* in the media, this study highlights the presence of additional narratives, including the *equality narrative* and the *emancipatory narrative*, within articles. Notably, the economic aspect of female entrepreneurship emerges as a prominent and pertinent theme in these narratives. Recent years have witnessed growing attention from scholars and international institutions towards gender inequalities, particularly financial disparities between men and women (Dilli et al., 2019). Calás et al. (2007) argue that

> 'entrepreneurship' has become a favored mantra for economic development wherever there is poverty, unemployment or underemployment, and other economic maladies that nations do not seem to be able to resolve. That is, 'entrepreneurship' works under Western neoliberal economic recipes that are intended to apply universally, whether in the inner cities of the US or the rural areas of Bangladesh. (p. 98)

Considering the dominance of male journalists in the production of articles concerning economic and political subjects (Global Media Monitoring Project, 2020), it is reason-

able to posit that their preference for employing the equality narrative, which emphasizes financial and economic aspects, aligns with this trend.

The *emancipatory narrative* highlights the significance of female empowerment and presents entrepreneurship as a pathway to achieving a "better work-life balance, and a way to 'have it all'" (Nadin et al., 2020, p. 570). The desire for personal independence serves as a crucial motivator for women to embark on entrepreneurial pursuits. Moreover, the aspiration to effectively manage family obligations alongside professional life, leveraging the increased flexibility as self-employed individuals, further drives women's entrepreneurial engagements (McGowan et al., 2012; Nadin et al., 2020). However, research suggests that the perception of balance or imbalance greatly influences the job satisfaction of female entrepreneurs. When women perceive an imbalance between their domestic and professional responsibilities, their job satisfaction tends to decrease (De Clercq et al., 2021). This study's findings in regard to the persistent application of the *emancipatory narrative* affirm the persistence of traditional gender stereotypes, particularly considering domestic duties being assigned to women. Notably, Nadin et al. (2020) discovered that the notion of sharing domestic responsibilities with men was absent in media representations. Instead, the solution proposed for women facing challenges is to work harder (Nadin et al., 2020), which clearly corresponds to neoliberal feminist practice (Rottenberg, 2018). In addition, McGowan et al. (2012) found that

> rather than fighting for an equal role within the home, many women had embraced both roles, as homemaker and business owner, with all the energy that they could muster, but the experience left some with significant guilt that they were 'short-changing' their family. (p. 68)

Previous research largely focused on "narratives, as sociocultural tools that entrepreneurs leverage to construct or otherwise work on their identities" (Radu-Lefebvre et al., 2021, p. 1570). Nonetheless, similarities and links between the *heroic narrative* and the *individualized entrepreneurial femininity* are evident (Byrne et al., 2019). However, the hegemonic position of the latter cannot be confirmed by this study's results. Therefore, conventional conceptualizations of entrepreneurs as individually operating heroes are challenged. Among all the entrepreneurial femininities examined, the *relational* one is the most frequently employed in the analyzed articles. Attempting to emphasize the complementarity of both genders, this indicates female entrepreneurs' will to "insert a feminine way of doing business into the public world of entrepreneurship" (Lewis, 2014, p. 1857). There is not only a growing stream of research in regard to collaboration in entrepreneurial teams (Blatt, 2009; Cole et al., 2018; Krawczyk-Bryłka et al., 2020), but also an increasing recognition of social networks and their importance addressing the provision of valuable resources to entrepreneurs (Abu-Rumman et al., 2021; Batjargal et al., 2019; Greve & Salaff, 2003). Additionally, studies in-

dicate that relational qualities are perceived as beneficial in leadership (Branson & Marra, 2019; Orser et al., 2011; Uhl-Bien, 2006). Therefore, emphasizing "relational interaction, mutual empathy and mutual empowerment" (Lewis, 2014, p. 1857) contributes to entrepreneurial success. Still, the majority of articles analyzed gives no indication of the subjects' entrepreneurial femininities as "the way women 'do' entrepreneurship" (Lewis, 2014, p. 1852) is not addressed specifically.

In terms of female entrepreneurs' portrayal as *genius* or *innovative,* the study finds rather low levels of the usage of these depictions. No article uses the term *genius* for a specific female entrepreneur or female entrepreneurs in general. Scholars have theorized and categorized intensively on the phenomenon of feminine genius (Kristeva, 2004; Macarthur, 2010; Simonton, 1992). Initially, other outcomings were expected since,

> the typical neoliberal discourse, however, transforms this caricature of the 'genius' into an 'entrepreneur' and 'visionary leader.' The 'exceptional woman' is gathered up in this discourse to perform the work of 'gender mainstreaming'. (...) the discourse of 'gender-mainstreaming' (...) offers the token woman as the 'exceptional' example, proving that women can make it if they are good enough. Yet, regardless of how 'exceptional' the woman is, her success and ability have been shown to never quite measure up against the male 'norm'. (Macarthur, 2010, p. 257)

In popular culture, however, what can be seen is that geniuses are usually white men, particularly within the context of tech entrepreneurship, whose outstanding talents and moral superiority are highlighted and embedded within the narrative (Mendick et al., 2020). Consequently, this portrayal, alongside gender stereotypes and the persistent comparison of women to the male norm, may contribute to the underrepresentation of female entrepreneurs as geniuses. However, research findings indicate that certain articles do portray female entrepreneurs as *innovative*. It is noteworthy that the higher prevalence of female entrepreneurs in industries where innovation is particularly challenging and their engagement in entrepreneurship often stemming from necessity might diminish the degree of innovation observed (Nissan et al., 2012; Terjesen & Lloyd, 2015). Nevertheless, it is essential to recognize that gender stereotypes could also exert an influential effect, for instance, Luksyte et al. (2018) found that men are often stereotypically associated with possessing a higher inclination towards displaying innovative work behavior compared to women. However, Thébaud (2015) argued that

> by introducing an innovative organization, a woman entrepreneur signals a level of agency that is not expected for women in general, but that better fits the masculine stereotype of the 'entrepreneur.' As a result, women are less likely

than their male counterparts to be penalized for being (unexpectedly) innovative, and in doing so, end up partially compensating for the status-based biases they might otherwise experience. (p. 75)

6.2. Representation of Ethical and Non-Ethical Conduct Among Female Entrepreneurs in the Media

This chapter delves into the portrayal of ethical and non-ethical behavior among female entrepreneurs in newspaper and magazine articles. It aims to provide a comprehensive interpretation of the findings, shedding light on the prevalent themes observed in the media representation of female entrepreneurs' ethical conduct. Furthermore, this section explores the implications of the results in the broader context of societal developments, gender dynamics, and the promotion of ethical business practices within the entrepreneurial landscape.

The study findings indicate that a majority of the articles examined do not discuss ethical or non-ethical behavior. However, there is a notable emphasis on the depiction of ethical behavior compared to non-ethical behavior among female entrepreneurs. This includes their efforts to benefit the community, treat employees well and with respect, align business practices with organizational values and beliefs, and demonstrate environmental responsibility. The increasing societal awareness regarding business activities' environmental and social impacts has led to a greater emphasis on sustainable practices, responsible leadership, and ethical decision-making. Legislative bodies and global institutions have recognized this trend, promoting the adoption of frameworks such as Environmental, Social, and Governance (ESG) standards (European Banking Authority, 2021). The relationship between women in management positions and ESG performance has also garnered attention among scholars (Bosone et al., 2022; Peng & Chandarasupsang, 2023; Velte, 2016). By engaging in the aforementioned ethical behaviors, female entrepreneurs appear to be well-equipped to future-proof their businesses. Female entrepreneurs' ethical behaviors found in the sample relate to the diversification as well as empowerment of their workforce, nurturing female talent, providing guidance or funding to aspiring female founders and developing sustainable products and solutions as well as tailoring those to women's needs.

Several articles depict female entrepreneurs' non-ethical behaviors. Initial evidence of such behaviors can be traced back to 2019, as prior to that year, no instances of non-ethical conduct were reported. The articles consistently highlight the presence of lies and deception as prominent non-ethical practices. Moreover, in a few cases they are paired with manipulation of communication and breaches of promise. Many of these articles focus on the case of female entrepreneur Elizabeth Holmes, who faced legal charges by the United States Department of Justice for fraud in 2018 and subsequently received an 11-year and three-month prison sentence in 2022 (United States Department of Justice, 2022). Holmes and her business partner were charged for

crimes in connection with their respective involvement with two multi-million-dollar schemes to promote Theranos, a private health care and life sciences company based in Palo alto, California (...) The indictment alleges that Holmes and Balwani defrauded doctors and patients (1) by making false claims concerning Theranos's ability to provide accurate, fast, reliable, and cheap blood tests and test results, and (2) by omitting information concerning the limits of and problems with Theranos's technologies. (...) The indictment alleges that the defendants used a combination of direct communications, marketing materials, statements to the media, financial statements, models, and other information to defraud potential investors. (United States Department of Justice, 2022, paragraphs 1-5)

The "complex interplay of feminine charm, ego, power, and ethics" (Williams, 2022, pp. 25-26) that comes with this case has played into the extensive media attention around the legal proceedings. Furthermore, Williams (2022) argued that the experiences of Holmes and Theranos have the potential to cast a shadow over emerging female founders for an extended period, creating ethical uncertainties within the start-up landscape. Notably, this study's findings on female entrepreneurs' non-ethical behavior stem from one specific female entrepreneur whose case "provides a chilling example of how the self-confidence underlying the 'fake it until you make it' ethic can lead to self-delusion and fraud" (Di Dio et al., 2022, p. 169). Additionally, other articles document instances of non-ethical behaviors in female-founded businesses, citing detrimental workplace cultures and management styles. It is worth noting that these accounts pertain to a small number of companies with relatively large structures, which may amplify or exacerbate non-ethical behaviors (Fassin, 2005).

Overall, the study's findings indicate that the portrayal of female entrepreneurs' ethical behaviors is more frequent and varied compared to non-ethical behaviors which largely focus on a small number of high-profile female entrepreneurs. However, it is important to exercise caution in drawing broader conclusions about the ethical landscape in business solely based on media representations. Relying only on media portrayals may introduce bias and lead to incomplete assertions, thereby failing to provide an accurate reflection of the realities experienced by female entrepreneurs.

6.3. Depiction of Female Entrepreneurs' Challenges in the Media

The following section delves into the challenges faced by female entrepreneurs, as illuminated by the analysis of articles in magazines and newspapers. By examining the media coverage of female entrepreneurs, valuable insights into the various challenges that are presented are gained. It is important to understand these, in order to contribute to the development of supportive environments that empower and enable female entrepreneurs' success.

Articles were analyzed with regard to six overarching types of challenges and various corresponding challenges female entrepreneurs might encounter, including societal and cultural constraints, networking constraints, multiple responsibilities, resource constraints, personal constraints and educational constraints. The analysis revealed that the majority of articles addressed at least one of these challenges, highlighting the diverse conditions under which female entrepreneurs operate. Findings reveal that the most frequently cited challenge in the articles about female entrepreneurship are resource constraints. Specifically, female entrepreneurs face difficulties in accessing external finance, as indicated by personal accounts and references to the 'funding gap' between male and female entrepreneurs. These findings coincide with previous literature on female entrepreneurs' difficulties regarding access to capital and funding (Lins & Lutz, 2016; Morazzoni & Sy, 2022; Na & Erogul, 2021).

Moreover, female entrepreneurs encounter numerous societal and cultural constraints that pose significant challenges to their entrepreneurial pursuits. The present study reveals that social prejudices complicate their entrepreneurial endeavors, with biases and stereotypes serving as fundamental contributors. As evidenced by the data, these factors contribute to a lack of trust, doubts regarding female entrepreneurs' expertise, and instances of discrimination. These findings align with prior research indicating the persistent dominance of the male norm in the entrepreneurship domain (Ahl, 2006; V. Meyer et al., 2017).

In examining the portrayal of networking constraints among female entrepreneurs, the findings reveal a diverse landscape. This study finds that above all, the lack of female role models is a perceived challenge. Previous literature emphasizes the positive relationship between the presence of role models and entrepreneurial intentions (Austin & Nauta, 2016; BarNir et al., 2011). Additionally, Bechthold and Rosendahl-Huber (2018) have demonstrated the positive influence of working with female entrepreneurs on women's attitudes towards entrepreneurship. Another challenge in this realm is posed by the general lack of network contacts experienced by some female entrepreneurs. Hampton et al. (2009) argue that a diverse network is beneficial for business viability in the long run. However, "until women and men have equal access to opportunities, gender differences in network patterns will endure and will of course thereby continue to undergird unequal access to opportunity" (Hanson & Blake, 2009, p. 146).

Multiple articles depict female entrepreneurs' lack of balance between work and imposed family and household chores. As previous studies show, women still bear the majority of unpaid care work, including childcare and other domestic responsibilities, a situation further exacerbated by the Covid-19 pandemic (Ferrant et al., 2014; Seedat & Rondon, 2021). This issue extends to female entrepreneurs, as evidenced by the findings of this study, which indicate an increasing prevalence of work-life imbalance among female

entrepreneurs during the years under investigation, particularly in 2020 and the following years under study. Notably, male entrepreneurs' businesses not being affected by this underscores the presence of gender inequality (Eddleston & Powell, 2012; Hundley, 2001; Wang, 2015).

Furthermore, personal constraints can act as a challenge for female entrepreneurs. In particular, a lack of self-confidence in some female entrepreneurs is indicated. The analyzed articles include personal accounts that highlight struggles with confidence, as well as previous research supporting the assertion that women tend to exhibit lower confidence levels compared to men. In fact, some studies find lower confidence levels in female entrepreneurs compared to their male counterparts (Kirkwood, 2009; Kuschel & Labra, 2018). Additionally, Cech et al. (2011) argue that in professional environments with strong gender stereotypes, both men and women may develop varying levels of confidence in their respective professional roles. It is worth noting that lower levels of confidence in professional roles among female entrepreneurs might be attributed to their perception that their competencies and identity traits are incongruent with the masculine nature of entrepreneurship (Ahl, 2006; Cech et al., 2011).

Last, educational constraints are perceived as a challenge for female entrepreneurs to some extent. This primarily pertains to a perceived lack of training in management, entrepreneurship, and technical skills rather than general education. Notably, OECD data show that in most of their member states men have better access to training on how to start a business compared to women (OECD, 2013). Overall, the relatively low frequency of naming educational constraints as a challenge mirrors that, compared to men, women leverage advanced education and professional experience as primary pathways to pursue entrepreneurship (Bates, 1995). In addition, entrepreneurship education is found to positively influence entrepreneurial intentions in female students (Prabha Devi et al., 2019; Shahin et al., 2021).

Notably, some of the analyzed articles as well as previous literature indicate that these challenges do not act individually but might sometimes be intertwined and reinforce one another. In brief, Carranza et al. (2018) argue that "social norms are most likely to be the origin for external constraints that affect labor market, financial market, sectoral choice and many other aspects of women's entrepreneurial choices and outcomes" (p. 31). Social norms and gender stereotypes may sometimes be the origin of financial constraints as they influence investment decisions of those involved in the funding process (Bigelow et al., 2014; Jha & Alam, 2022). Moreover, these stereotypes and traditional roles impact female entrepreneurs' ability to develop their network as their male counterparts do. Thus, their network's composition is also less helpful in dismissing perceptions of financial constraints (Kwong et al., 2012).

7. Conclusion

The present empirical study aims to analyze the portrayal of female entrepreneurship in the media and situate the findings within the context of contemporary societal and feminist developments. Through the examination of newspaper and magazine articles published between May 2014 and December 2022, the study identifies dominant entrepreneurial identities, narratives, ethical and non-ethical behaviors, attributions, and challenges depicted in these publications. Consequently, this research contributes not only to the existing body of literature concerning the media representation of female entrepreneurship but also to ongoing discussions on gender disparities within the entrepreneurial domain. Notably, this work expands our understanding of how female entrepreneurs are depicted in the media by extending the scope of investigation across various mediums and countries. Simultaneously, it provides insights into the current media and cultural landscape which is influenced by the pervasive impact of popular feminism. The time span under investigation, thus, differs from previous decades where feminist discourses were not disseminated as widely and ingrained as deeply in mainstream culture.

The findings of the analysis demonstrate an overall tendency for articles to present a positive depiction of female entrepreneurship rather than a negative one. Furthermore, the portrayal of female entrepreneurs is predominantly characterized by the heroic narrative, mirroring entrepreneurial stereotypes, respectively, the portrayal of entrepreneurship in general (Hamilton, 2013). In addition, the equality and emancipatory narratives are also observed in the articles, although to a lesser extent compared to the heroic narrative. Notably, while most articles do not explicitly depict entrepreneurial femininities, the ones that do predominantly emphasize the relational entrepreneurial femininity. This underscores the perception that relational qualities hold value in the domain of leadership (Branson & Marra, 2019; Orser et al., 2011; Uhl-Bien, 2006). In addition, female entrepreneurs' ethical behaviors are more frequently depicted than their non-ethical behaviors. Moreover, the portrayal of female entrepreneurs' challenges is frequent and varied. Notably, resource constraints, particularly limited access to external funding, emerge as the most pervasive challenge encountered by female entrepreneurs. However, a widespread attribution of being innovative or genius relating to female entrepreneurs is not found in this study.

The analysis of female entrepreneurs' media portrayal presented in this study carries important practical implications for multiple stakeholders involved, including media and journalism professionals, media recipients, female entrepreneurs, policymakers, and entrepreneurial support organizations. First, it is crucial to raise awareness among media professionals and journalists regarding their influential role in shaping narratives surrounding female entrepreneurship. This awareness should drive the adoption of more balanced and diverse narrative approaches. By moving beyond the prevailing heroic narrative, a broader spectrum of

entrepreneurial experiences can be highlighted. Guidelines and training for journalists to avoid perpetuating stereotypes and biases in their coverage of female entrepreneurship need to be integrated in editorial processes in order to encourage responsible reporting that reflects the diversity and complexity of female entrepreneurs' experiences. Furthermore, particular attention should be given to encouraging male journalists to delve into the subject of female entrepreneurship and expand their perspectives beyond the lens of equality. Second, it is crucial for media recipients to critically evaluate portrayals of female entrepreneurship, enabling them to discern and acknowledge the multifaceted representations of realities and identities linked to female entrepreneurs. Third, special attention should be given to female entrepreneurs and aspiring female entrepreneurs who consume media content. These individuals can benefit from the insights gained in this study, as it raises awareness for the prevailing narratives perpetuated by the media. Ultimately, these findings have the potential to stimulate critical reflection on these narratives and empower women to challenge and redefine conventional entrepreneurial stereotypes. Fourth, entrepreneurial support organizations might reduce perceived challenges through developing tailored support programs and providing resources as well as assistance, for instance, with regards to accessing funding and networking opportunities as well as mentorship programs and other platforms for knowledge sharing. Fifth, it is imperative to recognize the need for macro-level interventions to address structural barriers. Thus, policymakers should address the perceived challenges by implementing policies that, for instance, enhance equal access to funding for entrepreneurs of all genders to get rid of financial constraints, create inclusive business environments to reduce societal and cultural constraints, and also lift the dual burden of business and domestic responsibilities, for example, by expanding affordable childcare options. These practical implications aim to guide actions and initiatives that can contribute to empowering and promoting the success of female entrepreneurs. By implementing these recommendations, individuals, organizations, and policymakers can actively contribute to advancing gender equality, breaking down barriers, and harnessing the untapped potential of women in entrepreneurship.

This study, like any research endeavor, is accompanied by inherent limitations that warrant consideration when interpreting the findings and forming conclusions. First, there are limitations that refer to the methodology. Quantitative content analysis prioritizes numerical data and statistical patterns, potentially overlooking valuable qualitative insights as well as oversimplifying complex contexts. It is predominantly concerned with identifying patterns and frequencies within the content. However, quantitative content analysis is not designed to establish causal relationships between variables or to explain the underlying mechanisms driving the observed patterns (Riffe et al., 1998). Additional research methods, such as experimental or qualitative approaches, may be needed to establish causalities. Second, additional limitations pertain to the presence of researcher bias. De-

spite attempts to standardize coding procedures, there is still an element of subjectivity involved in the interpretation and coding of content. The researcher's preexisting assumptions and biases have the potential to impact not only the selection of categories, such as narratives and challenges, but also the coding decisions and subsequent data interpretation (Riffe et al., 1998). Third, it is important to acknowledge the limitations pertaining to the sample employed in this study. While the selected database provides a diverse collection of publications, it is crucial to note that the available content may not comprehensively represent the entirety of articles focused on female entrepreneurship. Furthermore, the exclusion of non-English articles as well as the application of additional exclusion criteria, may restrict the generalizability of the findings. Thus, care should be taken in extrapolating the results beyond the confines of this particular sample.

To explore additional similarities and differences in the portrayal of female entrepreneurs in the media, future research could expand the scope of inquiry to include articles written in languages other than English. Moreover, trends and patterns regarding the depicted narratives and entrepreneurial identities might be subject to change in the upcoming years. Hence, monitoring and contextualizing female entrepreneurs' depiction in media coverage may provide interesting insights into this field's development and women's position in society and organizational culture. In addition, conducting a comparative analysis between the depiction of male and female entrepreneurs in the media within a similar timeframe would be advantageous for identifying potential similarities and differences. Future research may further explore the impact of different entrepreneurial identities and narratives in the media on the experiences of female entrepreneurs. This could be accomplished through qualitative research methods, allowing for a more comprehensive exploration. By conducting in-depth interviews or focus groups, researchers can gain a nuanced understanding of how these entrepreneurial identities and narratives impact women's formation of identity and their entrepreneurial trajectories. Furthermore, an intersectional approach, considering factors such as ethnicity and socio-economic backgrounds, could shed light on the unique challenges faced by different groups of female entrepreneurs. Through this lens, valuable insights can be gained, informing targeted interventions aimed at improving opportunities for marginalized demographics with entrepreneurial aspirations.

The present study contributes to the existing literature by providing further insights into the portrayal of female entrepreneurs in the media during a specific time period. They underscore and put a spotlight on the conditions present in the contemporary organizational culture female entrepreneurs operate in. By acknowledging and appreciating the distinctive strengths and viewpoints that women contribute to the field of entrepreneurship, it is possible to cultivate an inclusive environment that not only supports their active involvement but also fosters sustainable economic development.

References

Abouzahr, K., Taplett, F. B., Krentz, M., & Harthorne, J. (2018). *Why women-owned startups are a better bet*. https://www.bcg.com/publications/2018/why-women-owned-startups-are-a-better-bet

Abu-Rumman, A., Al Shraah, A., Al-Madi, F., & Alfalah, T. (2021). Entrepreneurial networks, entrepreneurial orientation, and performance of small and medium enterprises: Are dynamic capabilities the missing link? *Journal of Innovation and Entrepreneurship*, *10*(1), 1–16. https://doi.org/10.1186/s13731-021-00170-8

Achtenhagen, L., & Welter, F. (2011). 'Surfing on the ironing board' - the representation of women's entrepreneurship in German newspapers. *Entrepreneurship & Regional Development*, *23*(9-10), 763–786. https://doi.org/10.1080/08985626.2010.520338

Adichie, C. N. (2013). We should all be feminists | Chimamanda Ngozi Adichie | TEDxEuston [Video]. https://www.youtube.com/watch?v=hg3umXU_qWc

Adichie, C. N. (2015). *We should all be feminists*. Anchor Books, a division of Random House LLC.

Agostinho, D. (2016). Ghosting and Ghostbusting Feminism. *Diffractions - Graduate Journal for the Study of Culture*, *6*, 1–16. https://journals.ucp.pt/index.php/diffractions/article/view/516/459

Ahl, H. (2002). *The Making of the Female Entrepreneur: A Discourse Analysis of Research Texts on Women's Entrepreneurship* [Doctoral dissertation, Internationella Handelshögskolan]. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A3890&dswid=5955

Ahl, H. (2006). Why Research on Women Entrepreneurs Needs New Directions. *Entrepreneurship Theory and Practice*, *30*(5), 595–621. https://doi.org/10.1111/j.1540-6520.2006.00138

Alexandersson, A., & Kalonaityte, V. (2021). Girl bosses, punk poodles, and pink smoothies: Girlhood as Enterprising Femininity. *Gender, Work & Organization*, *28*(1), 416–438. https://doi.org/10.1111/gwao.12582

Allen, B. (2004). Social Constructionism. In S. May & D. K. Mumby (Eds.), *Engaging Organizational Communication Theory & Research: Multiple Perspectives*. SAGE.

Alsos, G. A., Isaksen, E. J., & Ljunggren, E. (2006). New Venture Financing and Subsequent Business Growth in Men–and Women–Led Businesses. A Gendered Perspective on Organizational Creation. *Entrepreneurship Theory and Practice*, *30*(5), 667–686. https://doi.org/10.1111/j.1540-6520.2006.00141.x

Andrews, K. R. (1989). Ethics in Practice. *Harvard Business Review*. https://hbr.org/1989/09/ethics-in-practice

Austin, M. J., & Nauta, M. M. (2016). Entrepreneurial Role-Model Exposure, Self-Efficacy, and Women's Entrepreneurial Intentions. *Journal of Career Development*, *43*(3), 260–272. https://doi.org/10.1177/0894845315597475

Banet-Weiser, S. (2018). *Empowered: Popular feminism and popular misogyny*. Duke University Press.

Banet-Weiser, S., Gill, R., & Rottenberg, C. (2020). Postfeminism, popular feminism and neoliberal feminism? Sarah Banet-Weiser, Rosalind Gill and Catherine Rottenberg in conversation. *Feminist Theory*, *21*(1), 3–24. https://doi.org/10.1177/1464700119842555

Bardasi, E., Sabarwal, S., & Terrell, K. (2011). How do female entrepreneurs perform? Evidence from three developing regions. *Small Business Economics*, *37*(4), 417–441. https://doi.org/10.1007/s11187-011-9374-z

BarNir, A., Watson, W. E., & Hutchins, H. M. (2011). Mediation and Moderated Mediation in the Relationship Among Role Models, Self-Efficacy, Entrepreneurial Career Intention, and Gender. *Journal of Applied Social Psychology*, *41*(2), 270–297. https://doi.org/10.1111/j.1559-1816.2010.00713.x

Bateman, C. R., & Valentine, S. R. (2010). Investigating the Effects of Gender on Consumers' Moral Philosophies and Ethical Intentions. *Journal of Business Ethics*, *95*(3), 393–414. https://doi.org/10.1007/s10551-010-0386-4

Bates, T. (1995). Self-employment entry across industry groups. *Journal of Business Venturing*, *10*(2), 143–156. https://doi.org/10.1016/0883-9026(94)00018-p

Batjargal, B., Webb, J. W., Tsui, A., Arregle, J. L., Hitt, M. A., & Miller, T. (2019). The moderating influence of national culture on female and male entrepreneurs' social network size and new venture growth. *Cross Cultural & Strategic Management*, *26*(4), 490–521. https://doi.org/10.1108/CCSM-04-2018-0057

Bechthold, L. A., & Rosendahl-Huber, L. (2018). Yes, I can! – A Field Experiment on Female Role Model Effects in Entrepreneurship. *AOM Annual Meeting Proceedings*. https://doi.org/10.5465/AMBPP.2018.209

Becker-Herby, E. (2016). *The rise of femvertising: Authentically reaching female consumers* [Master's thesis]. University of Minnesota, Minneapolis. https://conservancy.umn.edu/bitstream/handle/11299/181494/beckerherby_%20final%20capstone_2016.pdf?sequence=1

Beu, D. S., Buckley, M. R., & Harvey, M. G. (2003). Ethical decision-making: A multidimensional construct. *Business Ethics: A European Review*, *12*(1), 88–107. https://doi.org/10.1111/1467-8608.00308

Bigelow, L. S., Lundmark, L., McLean Parks, J., & Wuebker, R. (2014). Skirting The Issues? Experimental Evidence Of Gender Bias In IPO Prospectus Evaluations. *Journal of Management*, *40*(6), 1501–1778. https://doi.org/10.1177/0149206312441624

Bird, B., & Brush, C. (2002). A Gendered Perspective on Organizational Creation: Entrepreneurship theory and practice. *Entrepreneurship Theory and Practice*, *26*(3), 41–65. https://doi.org/10.1177/104225870202600303

Blank, L. L. (2022). #Girlboss. *FKW // Zeitschrift Für Geschlechterforschung Und Visuelle Kultur*, *70*, 105–111. https://www.fkw-journal.de/index.php/fkw/article/download/1600/1600

Blatt, R. (2009). Tough Love: How Communal Schemas and Contracting Practices Build Relational Capital in Entrepreneurial Teams. *Academy of Management Review*, *34*(3), 533–551. https://doi.org/10.5465/amr.2009.40633298

Bobrowska, S., & Conrad, H. (2017). Discourses of Female Entrepreneurship in the Japanese Business Press – 25 Years and Little Progress. *Japanese Studies*, *37*(1), 1–22. https://doi.org/10.1080/10371397.2017.1293474

Boschma, M., & Daalmans, S. (2021). What a Girl Wants, What a Girl Needs: Analyzing Postfeminist Themes in Girls' Magazines. *Media and Communication*, *9*(2), 27–38. https://doi.org/10.17645/mac.v9i2.3757

Bosma, N., Hill, S., Ionescu-Somers, A., Kelley, D., Guerrero, M., & Schott, T. (2021). 2020/21 Global Report. https://www.gemconsortium.org/file/open?fileId=50691

Bosone, C., Bogliardi, S. M., & Giudici, P. (2022). Are ESG Female? The Hidden Benefits of Female Presence on Sustainable Finance. *Review of Economic Analysis*, *14*(2), 253–274. https://openjournals.uwaterloo.ca/index.php/rofea/article/view/5005

Boyd, R. L., Ashokkumar, A., Seraj, S., & Pennebaker, J. W. (2022a). LIWC-22: Descriptive Statistics and Norms. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.liwc.app%2Fstatic%2Fdocuments%2FLIWC-22.Descriptive.Statistics-Test.Kitchen.xlsx&wdOrigin=BROWSELINK

Boyd, R. L., Ashokkumar, A., Seraj, S., & Pennebaker, J. W. (2022b). The Development and Psychometric Properties of LIWC-22. https://www.researchgate.net/profile/ryan-boyd-8/publication/358725479_the_development_and_psychometric_properties_of_liwc-22%20https://doi.org/10.13140/RG.2.2.23890.43205

Branson, C. M., & Marra, M. (2019). Leadership as a Relational Phenomenon: What This means in Practice. *Research in Educational Administration & Leadership*, *4*(1), 81–108. https://doi.org/10.30828/real/2019.1.4

Brooks, D., & Hébert, L. (2006). Gender, Race, and Media Representation. In C. Skelton, L. Smulyan, & B. Francis (Eds.), *The SAGE Handbook of Gender and Communication* (pp. 297–318). SAGE Publications, Inc. https://doi.org/10.4135/9781412976053.n16

Brooks, G. P., & Johanson, G. A. (2011). Sample Size Considerations for Multiple Comparison Procedures in ANOVA. *Journal of Modern Applied Statistical Methods*, *10*(1), 97–109. https://doi.org/10.22237/jmasm/1304222940

Bruni, A., Gherardi, S., & Poggio, B. (2004a). Doing Gender, Doing Entrepreneurship: An Ethnographic Account of Intertwined Practices. *Gender, Work & Organization*, *11*(4), 406–429. https://doi.org/10.1111/j.1468-0432.2004.00240.x

Bruni, A., Gherardi, S., & Poggio, B. (2004b). Entrepreneur-mentality, gender and the study of women entrepreneurs. *Journal of Organizational Change Management*, *17*(3), 256–268. https://doi.org/10.1108/09534810410538315

Brush, C. G., Duffy, S., & Kelley, D. (2012). ICSB-WEB webinar report on women's entrepreneurship. *International Journal of Gender and Entrepreneurship*, *4*(3), 337–339. https://doi.org/10.1108/17566261211264190

Burr, V., & Dick, P. (2017). Social Constructionism. In B. Gough (Ed.), *The Palgrave Handbook of Critical Social Psychology* (pp. 59–80). Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-51018-1_4

Byrne, J., Fattoum, S., & Diaz Garcia, M. C. (2019). Role Models and Women Entrepreneurs: Entrepreneurial Superwoman Has Her Say. *Journal of Small Business Management*, *57*(1), 154–184. https://doi.org/10.1111/jsbm.12426

Calás, M. B., Smircich, L., & Bourne, K. A. (2007). Knowing Lisa? Feminist analyses of 'gender and entrepreneurship'. In D. Bilimoria & S. K. Piderit (Eds.), *Handbook on women in business and management* (pp. 78–105). Edward Elgar.

Cant, M. C. (2012). Small Business Attitudes Towards Ethical Issues: Survival Or Ethically Correct? *International Business & Economics Research Journal*, *11*(12), 1347. https://doi.org/10.19030/iber.v11i12.7414

Carranza, E., Dhakal, C., & Love, I. (2018). *Female Entrepreneurs: How and Why are they Different?* (Jobs Working Paper No. 20). World Bank. https://openknowledge.worldbank.org/entities/publication/bdb0a3d4-6b79-5c5d-96fc-28d2f36125e6

Carter, C., & Steiner, L. (2004). Introduction to Critical Readings: Media and Gender. In C. Carter & L. Steiner (Eds.), *Issues in cultural and media studies. Critical readings: Media and gender* (pp. 1–10). Open University Press.

Carter, S., Shaw, E., Lam, W., & Wilson, F. (2007). Gender, Entrepreneurship, and Bank Lending: The Criteria and Processes Used by Bank Loan Officers in Assessing Applications. A Gendered Perspective on Organizational Creation. *Gender, Work & Organization*, *31*(3), 427–444. https://doi.org/10.1111/j.1540-6520.2007.00181.x

Carter, S. L., & Shaw, E. (2006). *Women's business ownership : recent research and policy developments* (tech. rep.). DTI Small Business Service. https://strathprints.strath.ac.uk/8962

Cavada, M. C., Bobek, V., Skoko, H., & Maček, A. (2018). Cultural Foundations of Female Entrepreneurship in Mexico: Challenges and Opportunities. *Naše Gospodarstvo/Our Economy*, *64*(1), 28–40. https://doi.org/10.2478/ngoe-2018-0004

Cech, E., Rubineau, B., Silbey, S., & Seron, C. (2011). Professional Role Confidence and Gendered Persistence in Engineering. *American Sociological Review*, *76*(5), 641–666. https://doi.org/10.1177/0003122411420815

Cejka, M. A., & Eagly, A. H. (1999). Gender-Stereotypic Images of Occupations Correspond to the Sex Segregation of Employment. *Personality and Social Psychology Bulletin*, *25*(4), 413–423. https://doi.org/10.1177/0146167299025004002

Cohn, M. A., Mehl, M. R., & Pennebaker, J. W. (2004). Linguistic markers of psychological change surrounding September 11, 2001. *Psychological Science*, *15*(10), 687–693. https://doi.org/10.1111/j.0956-7976.2004.00741.x

Cole, M. L., Cox, J. D., & Stavros, J. M. (2018). SOAR as a Mediator of the Relationship Between Emotional Intelligence and Collaboration Among Professionals Working in Teams: Implications for Entrepreneurial Teams. *SAGE Open*, *8*(2), 215824401877910. https://doi.org/10.1177/2158244018779109

Cruz, K., & Brown, W. (2016). Feminism, Law, and Neoliberalism: An Interview and Discussion with Wendy Brown. *Feminist Legal Studies*, *24*(1), 69–89. https://doi.org/10.1007/s10691-016-9314-z

Cuberes, D., & Teignier, M. (2016). Aggregate Effects of Gender Gaps in the Labor Market: A Quantitative Estimate. *Journal of Human Capital*, *10*(1), 1–32. https://doi.org/10.1086/683847

Cuddy, A. J., Fiske, S. T., & Glick, P. (2008). Warmth and Competence as Universal Dimensions of Social Perception: The Stereotype Content Model and the BIAS Map. In M. Zanna (Ed.), *Advances in Experimental Social Psychology* (pp. 61–149). Elsevier. https://doi.org/10.1016/s0065-2601(07)00002-0

Das, T. K. (2005). How Strong are the Ethical Preferences of Senior Business Executives? *Journal of Business Ethics*, *56*(1), 69–80. https://doi.org/10.1007/s10551-004-3238-2

Davis, A. E., & Shaver, K. G. (2012). Understanding Gendered Variations in Business Growth Intentions across the Life Course. *A Gendered Perspective on Organizational Creation*, *36*(3), 495–512. https://doi.org/10.1111/j.1540-6520.2012.00508.x

De Clercq, D., Brieger, S. A., & Welzel, C. (2021). Leveraging the macro-level environment to balance work and life: An analysis of female entrepreneurs' job satisfaction. *Small Business Economics*, *56*(4), 1361–1384. https://doi.org/10.1007/s11187-019-00287-x

Di Dio, S., Filippi, M., & Schillaci, D. (2022). "Fake it 'til you make it": The designer playground for crafting prototypes, orchestrating frauds and pushing the ecological transition. In F. Biondo, G. La Rocca, & V. Trapani (Eds.), *Information disorder: Learning to recognize fake news* (pp. 165–176). Peter Lang.

Dilli, S., Carmichael, S. G., & Rijpma, A. (2019). Introducing the Historical Gender Equality Index. *Feminist Economics*, *25*(1), 31–57. https://doi.org/10.1080/13545701.2018.1442582

Dunstone, K., Brennan, E., Slater, M. D., Dixon, H. G., Durkin, S. J., Pettigrew, S., & Wakefield, M. A. (2017). Alcohol harm reduction advertisements: A content analysis of topic, objective, emotional tone, execution and target audience. *BMC Public Health*, *17*(1), 312. https://doi.org/10.1186/s12889-017-4218-7

Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation*. Lawrence Erlbaum Associates, Inc. https://psycnet.apa.org/record/1987-97607-000

Eagly, A. H. (2013). *Sex Differences in Social Behavior* (1st). Psychology Press. https://doi.org/10.4324/9780203781906

Eagly, A. H., & Wood, W. (2012). Social Role Theory. In P. van Lange, A. Kruglanski, & E. Higgins (Eds.), *Handbook of Theories of Social Psychology: Volume Two* (pp. 458–476). SAGE Publications.

Eddleston, K. A., & Powell, G. N. (2012). Nurturing Entrepreneurs' Work-Family Balance: A Gendered Perspective. *Gender, Work & Organization*, *36*(3), 513–541. https://doi.org/10.1111/j.1540-6520.2012.00506.x

Eikhof, D. R., Summers, J., & Carter, S. (2013). "Women doing their own thing": media representations of female entrepreneurship. *International Journal of Entrepreneurial Behaviour & Research*, *19*(5), 547–564. https://doi.org/10.1108/IJEBR-09-2011-0107

Ettl, K., Welter, F., & Achtenhagen, L. (2016). *"Das 21. Jahrhundert ist weiblich": Unternehmerinnen in der Presse* (tech. rep. No. 249). Institut für Mittelstandsforschung (IfM) Bonn. Bonn. https://www.econstor.eu/handle/10419/147491

European Banking Authority. (2021). *EBA Report on management and supervision of ESG risks for credit institutions and investment firms: EBA/REP/2021/18* (tech. rep.). https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1015656/EBA%20Report%20on%20ESG%20risks%20management%20and%20supervision.pdf

Fassin, Y. (2000). Innovation and Ethics Ethical Considerations in the Innovation Business. *Journal of Business Ethics*, *27*(1/2), 193–203. https://doi.org/10.1023/A:1006427106307

Fassin, Y. (2005). The Reasons Behind Non-Ethical Behaviour in Business and Entrepreneurship. *Journal of Business Ethics*, *60*(3), 265–279. https://doi.org/10.1007/s10551-005-0134-3

Feher, M. (2009). Self-Appreciation; or, The Aspirations of Human Capital. *Public Culture*, *21*(1), 21–41. https://doi.org/10.1215/08992363-2008-019

Ferrant, G., Pesando, L. M., & Nowacka, K. (2014). *Unpaid Care Work: The missing link in the analysis of gender gaps in labour outcomes* (tech. rep.). OECD Development Centre. https://www.fearlessgirl.us/wp-content/uploads/unpaid_care_work.pdf

Gill, R. (2007a). *Gender and the media*. Polity.

Gill, R. (2007b). Postfeminist media culture: Elements of a sensibility. *European Journal of Cultural Studies*, *10*(2), 147–166. https://doi.org/10.1177/1367549407075898

Gill, S. (2010). Is gender inclusivity an answer to ethical issues in business? An Indian stance. *Gender in Management: An International Jour-*

nal, *25*(1), 37–63. https://doi.org/10.1108/175424110110199 22

Global Entrepreneurship Research Association. (2021). *Women's Entrepreneurship 2020/21: Thriving Through Crisis* (tech. rep.). https://www.gemconsortium.org/reports/womens-entrepreneurship

Global Media Monitoring Project. (2020). *Global Media Monitoring Project (GMMP) 2020 Report* (tech. rep.). https://genderopendata.org/dataset/global-media-monitoring-project-gmmp-2020-report

Gódány, Z., & Mura, L. (2021). Success from the perspective of female entrepreneurs. *Entrepreneurship and Sustainability Issues*, *9*(2), 521–534. https://doi.org/10.9770/jesi.2021.9.2(34)

Gottschalk, S., & Niefert, M. (2013). Gender differences in business success of German start-up firms. *International Journal of Entrepreneurship and Small Business*, *18*(1), 15–46. https://doi.org/10.1504/ijesb.2013.050750

Greve, A., & Salaff, J. W. (2003). Social Networks and Entrepreneurship. *A Gendered Perspective on Organizational Creation*, *28*(1), 1–22. https://doi.org/10.1111/1540-8520.00029

Grosser, K., Moon, J., & Nelson, J. (2017). Guest editors' introduction: gender, business ethics, and corporate social responsibility: assessing and refocusing a conversation. *Business Ethics Quarterly*, *27*(4), 541–567. https://doi.org/10.1017/beq.2017.42

Gunther, A. C. (1998). The persuasive press inference: Effects of mass media on perceived public opinion. *Communication Research*, *25*(5), 486–504. https://doi.org/10.1177/009365098025005002

Gupta, V. K., Turban, D. B., Wasti, S. A., & Sikdar, A. (2009). The Role of Gender Stereotypes in Perceptions of Entrepreneurs and Intentions to Become an Entrepreneur. *A Gendered Perspective on Organizational Creation*, *33*(2), 397–417. https://doi.org/10.1111/j.1540-6520.2009.00296.x

Haines, E. L., Deaux, K., & Lofaro, N. (2016). The Times They Are a-Changing ... or Are They Not? A Comparison of Gender Stereotypes, 1983–2014. *Psychology of Women Quarterly*, *40*(3), 353–363. https://doi.org/10.1177/0361684316634081

Hamilton, E. (2013). The discourse of entrepreneurial masculinities (and femininities). *Entrepreneurship & Regional Development*, *25*(1-2), 90–99. https://doi.org/10.1080/08985626.2012.746879

Hampton, A., Cooper, S., & McGowan, P. (2009). Female Entrepreneurial Networks and Networking Activity in Technology-based Ventures. *International Small Business Journal: Researching Entrepreneurship*, *27*(2), 193–214. https://doi.org/10.1177/0266242608100490

Hanson, S., & Blake, M. (2009). Gender and Entrepreneurial Networks. *Regional Studies*, *43*(1), 135–149. https://doi.org/10.1080/00343400802251452

Hase, V. (2021). Sentiment/tone (Automated Content Analysis). *DOCA - Database of Variables for Content Analysis*. https://doi.org/10.34778/1d

Heilman, M. E. (2001). Description and Prescription: How Gender Stereotypes Prevent Women's Ascent Up the Organizational Ladder. *Journal of Social Issues*, *57*(4), 657–674. https://doi.org/10.1111/0022-4537.00234

Heizmann, H., & Liu, H. (2022). "Bloody Wonder Woman!": Identity performances of elite women entrepreneurs on Instagram. *Human Relations*, *75*(3), 411–440. https://doi.org/10.1177/0018726720979034

Hester, J. B., & Gibson, R. (2007). The Relationship Between Tone of TV News Coverage and Public Opinion for a Controversial Issue. *Electronic News*, *1*(2), 89–102. https://doi.org/10.1080/19312430709336910

Hilton, J. L., & von Hippel, W. (1996). Stereotypes. *Annual Review of Psychology*, *47*, 237–271. https://doi.org/10.1146/annurev.psych.47.1.237

Hindle, K., & Klyver, K. (2007). Exploring the relationship between media coverage and participation in entrepreneurship: Initial global evidence and research implications. *International Entrepreneurship and Management Journal*, *3*(2), 217–242. https://doi.org/10.1007/s11365-006-0018-8

Hundley, G. (2001). Why women earn less than men in self-employment. *Journal of Labor Research*, *22*(4), 817–829. https://doi.org/10.1007/s12122-001-1054-3

Ibrahim, N., Angelidis, J., & Tomic, I. M. (2009). Managers' Attitudes Toward Codes of Ethics: Are There Gender Differences? *Journal of Business Ethics*, *90*(Suppl 3), 343–353. https://doi.org/10.1007/s10551-010-0428-y

Instagram. (2023a). #Bossbabe. https://www.instagram.com/explore/tags/bossbabe/

Instagram. (2023b). #Girlboss. https://www.instagram.com/explore/tags/girlboss/

Irene, B. N. (2017). Women entrepreneurship in South Africa: Understanding the role of competencies in business success. *The Southern African Journal of Entrepreneurship and Small Business Management*, *9*(1). https://doi.org/10.4102/sajesbm.v9i1.121

Isaga, N. (2019). Start-up motives and challenges facing female entrepreneurs in Tanzania. *International Journal of Gender and Entrepreneurship*, *11*(2), 102–119. https://doi.org/10.1108/IJGE-02-2018-0010

Jacobs, L., & Meeusen, C. (2021). Coming Out of the Closet, Also on the News? A Longitudinal Content Analysis of Patterns in Visibility, Tone and Framing of LGBTs on Television News (1986-2017). *Journal of Homosexuality*, *68*(13), 2144–2168. https://doi.org/10.1080/00918369.2020.1733352

Jha, P., & Alam, M. M. (2022). Antecedents of women entrepreneurs' performance: An empirical perspective. *Management Decision*, *60*(1), 86–122. https://doi.org/10.1108/MD-07-2020-0849

Kamberidou, I. (2013). Women entrepreneurs: 'we cannot have change unless we have men in the room'. *Journal of Innovation and Entrepreneurship*, *2*, Article 6. https://doi.org/10.1186/2192-5372-2-6

Kepler, E., & Shane, S. (2007). *Are male and female entrepreneurs really that different?* (Tech. rep.). Office of Advocacy, US Small Business Administration. http://www.pw.seipa.edu.pl/s/p/artykuly/90/909/female%20entrepreneurs%20different%20shane%202007.pdf

Kessler, S. H., Sommer, K., Humprecht, E., & Oehmer-Pedrazzi, F. (2023). Manuelle standardisierte Inhaltsanalyse. In F. Oehmer-Pedrazzi, S. H. Kessler, E. Humprecht, K. Sommer, & L. Castro (Eds.), *Standardisierte Inhaltsanalyse in der Kommunikationswissenschaft – Standardized Content Analysis in Communication Research* (pp. 9–21). Springer VS. https://doi.org/10.1007/978-3-658-36179-2_2

Kim, S. H., Carvalho, J. P., & Cooksey, C. E. (2007). Exploring the effects of negative publicity: News coverage and public perceptions of a university. *Public Relations Review*, *33*(2), 233–235. https://doi.org/10.1016/j.pubrev.2007.02.018

Kirkwood, J. (2009). Is a lack of self-confidence hindering women entrepreneurs? *International Journal of Gender and Entrepreneurship*, *1*(2), 118–133. https://doi.org/10.1108/17566260910969670

Kosut, M. (2012). *Encyclopedia of Gender in Media*. SAGE.

Krawczyk-Bryłka, B., Stankiewicz, K., Ziemiański, P., & Tomczak, M. T. (2020). Effective Collaboration of Entrepreneurial Teams - Implications for Entrepreneurial Education. *Education Sciences*, *10*(12), Article 364. https://doi.org/10.3390/educsci10120364

Krijnen, T. (2020). Gender and Media. In K. Ross (Ed.), *The international encyclopedia of gender, media, and communication*. https://doi.org/10.1002/9781119429128.iegmc016

Kristeva, J. (2004). Is There a Feminine Genius? *Critical Inquiry*, *30*(3), 493–504. https://doi.org/10.1086/421159

Kuschel, K., & Labra, J. P. (2018). Developing entrepreneurial identity among start-ups' female founders in high-tech: policy implications from the Chilean case. In P. G. Green & C. G. Brush (Eds.), *A Research Agenda for Women and Entrepreneurship* (pp. 27–44). Edward Elgar Publishing. https://doi.org/10.4337/9781785365379.00007

Kwong, C., Jones-Evans, D., & Thompson, P. (2012). Differences in perceptions of access to finance between potential male and female entrepreneurs. *International Journal of Entrepreneurial Behaviour & Research*, *18*(1), 75–97. https://doi.org/10.1108/13552551211201385

Leskinen, R. (2011). Success in the female entrepreneurial networking process. *Annals of Innovation & Entrepreneurship*, *2*(1), Article 6002. https://doi.org/10.3402/aie.v2i1.6000

Lewis, P. (2006). The Quest for Invisibility: Female Entrepreneurs and the Masculine Norm of Entrepreneurship. *Gender, Work & Organization*, *13*(5), 453–469. https://doi.org/10.1111/j.1468-0432.2006.00317.x

Lewis, P. (2014). Postfeminism, Femininities and Organization Studies: Exploring a New Agenda. *Organization Studies*, *35*(12), 1845–1866. https://doi.org/10.1177/0170840614539315

LexisNexis. (2023). Nexis Uni®: Academic Research Reimagined for Digital Natives. https://www.lexisnexis.com/en-us/professional/academic/nexis-uni.page

Lins, E., & Lutz, E. (2016). Bridging the gender funding gap: do female entrepreneurs have equal access to venture capital? *International Journal of Entrepreneurship and Small Business*, *27*(2/3), 347–365. https://doi.org/10.1504/IJESB.2016.073993

LIWC. (2023). LIWC Analysis. https://www.liwc.app/help/liwc#Tone

Luksyte, A., Unsworth, K. L., & Avery, D. R. (2018). Innovative work behavior and sex-based stereotypes: Examining sex differences in perceptions and evaluations of innovative work behavior. *Journal of Organizational Behavior*, *39*(3), 292–305. https://doi.org/10.1002/job.2219

Luri, I., Kaliyamurthy, A. K., & Farmer, M. (2023). "Sometime in the future"—The technology entrepreneur as utopian market hero. *Marketing Theory*, *23*(1), 99–118. https://doi.org/10.1177/14705931221137729

Luthar, H. K., & Karri, R. (2005). Exposure to Ethics Education and the Perception of Linkage between Organizational Ethical Behavior and Business Outcomes. *Journal of Business Ethics*, *61*(4), 353–368. https://doi.org/10.1007/s10551-005-1548-7

Macarthur, S. (2010). Women, New Music and the Composition of Becomings. *Cultural Studies Review*, *16*(2), 248–270.

Maden, C. (2015). A gendered lens on entrepreneurship: Women entrepreneurship in Turkey. *Gender in Management: An International Journal*, *30*(4), 312–331. https://doi.org/10.1108/GM-11-2013-0131

Malmström, M., Johansson, J., & Wincent, J. (2017). Gender Stereotypes and Venture Support Decisions: How Governmental Venture Capitalists Socially Construct Entrepreneurs' Potential. *A Gendered Perspective on Organizational Creation*, *41*(5), 833–860. https://doi.org/10.1111/etap.12275

Marlow, S., & McAdam, M. (2012). Analyzing the Influence of Gender upon High–Technology Venturing within the Context of Business Incubation. *A Gendered Perspective on Organizational Creation*, *36*(4), 655–676. https://doi.org/10.1111/j.1540-6520.2010.00431.x

Marlow, S., & McAdam, M. (2013). Gender and entrepreneurship. *International Journal of Entrepreneurial Behaviour & Research*, *19*(1), 114–124. https://doi.org/10.1108/13552551311299288

Martínez-Rodríguez, I., Quintana-Rojo, C., Gento, P., & Callejas-Albiñana, F. E. (2022). Public policy recommendations for promoting female entrepreneurship in Europe. *International Entrepreneurship and Management Journal*, *18*(3), 1235–1262. https://doi.org/10.1007/s11365-021-00751-9

Mason, E. S., & Mudrack, P. E. (1996). Gender and ethical orientation: A test of gender and occupational socialization theories. *Journal of Business Ethics*, *15*(6), 599–604. https://doi.org/10.1007/BF00411793

Mastrangelo, F. (2021). *Theorizing #Girlboss Culture: Mediated Neoliberal Feminisms from Influencers to Multi-level Marketing Schemes* [Doctoral dissertation, Virginia Commonwealth University, Richmond]. https://doi.org/10.25772/1T69-2929

McCabe, A. C., Ingram, R., & Dato-on, M. C. (2006). 'The Business of Ethics and Gender'. *Journal of Business Ethics*, *64*(2), 101–116. https://doi.org/10.1007/s10551-005-3327-x

McGowan, P., Redeker, C. L., Cooper, S. Y., & Greenan, K. (2012). Female entrepreneurship and the management of business and domestic roles: Motivations, expectations and realities. *Entrepreneurship & Regional Development*, *24*(1-2), 53–72. https://doi.org/10.1080/08985626.2012.637351

McGrath, M., & Sternlicht, A. (2022). Why Female Entrepreneurs Welcome The End Of The Girlboss Era — Once And For All. *Forbes*. https://www.forbes.com/sites/maggiemcgrath/2022/06/28/why-female-entrepreneurs-welcome-the-end-of-the-girlboss-era-once-and-for-all/?sh=342a16136743

McHugh, M. L. (2011). Multiple comparison analysis testing in ANOVA. *Biochemia Medica*, *21*(3), 203–209. https://hrcak.srce.hr/clanak/108599

Meijer, M. M., & Kleinnijenhuis, J. (2006). News and corporate reputation: Empirical findings from the Netherlands. *Public Relations Review*, *32*(4), 341–348. https://doi.org/10.1016/j.pubrev.2006.08.002

Mendick, H., Berge, M., Ottemo, A., & Silfver, E. (2020). Popular culture geeks, suffering, revenge and mathematics. *BSRLM Proceedings*, *40*(3), Article 9. https://bsrlm.org.uk/wp-content/uploads/2021/02/BSRLM-CP-40-3-09.pdf

Meunier, F., Krylova, Y., & Ramalho, R. (2017). Women's Entrepreneurship: How to Measure the Gap between New Female and Male Entrepreneurs? *World Bank Policy Research Working Paper*, (8242).

Meyer, N., & Landsberg, J. (2015). Motivational Factors Influencing Women's Entrepreneurship: A Case Study of Female Entrepreneurship in South Africa. *International Journal of Economics and Management Engineering*, *9*(11), 3864–3869. https://doi.org/10.5281/zenodo.1110035

Meyer, V., Tegtmeier, S., & Pakura, S. (2017). Revisited: how gender role stereotypes affect the image of entrepreneurs among young adults. *International Journal of Gender and Entrepreneurship*, *9*(4), 319–337. https://doi.org/10.1108/IJGE-07-2017-0031

Milestone, K., & Meyer, A. (2012). *Gender and popular culture* (1st ed.). Polity Press.

Minniti, M. (2009). Gender Issues in Entrepreneurship. *Foundations and Trends® in Entrepreneurship*, *5*(7-8), 497–621. https://doi.org/10.1561/0300000021

Moore, D. P., & Buttner, E. H. (1997). *Women entrepreneurs: Moving Beyond the Glass Ceiling*. SAGE.

Morazzoni, M., & Sy, A. (2022). Female entrepreneurship, financial frictions and capital misallocation in the US. *Journal of Monetary Economics*, *129*, 93–118. https://doi.org/10.1016/j.jmoneco.2022.03.007

Morris, M. H., Miyasaki, N. N., Watters, C. E., & Coombes, S. M. (2006). The Dilemma of Growth: Understanding Venture Size Choices of Women Entrepreneurs. *Journal of Small Business Management*, *44*(2), 221–244. https://doi.org/10.1111/j.1540-627X.2006.00165.x

Na, H., & Erogul, M. S. (2021). A global review of female entrepreneurial finance. *International Journal of Globalisation and Small Business*, *12*(1), 59–82. https://doi.org/10.1504/IJGSB.2021.113880

Nadin, S., Smith, R., & Jones, S. (2020). Heroines of enterprise: Post-recession media representations of women and entrepreneurship in a UK newspaper 2008–2016. *International Small Business Journal: Researching Entrepreneurship*, *38*(6), 557–577. https://doi.org/10.1177/0266242620913209

Nissan, E., Carrasco, I., & Castaño, M. S. (2012). Women Entrepreneurship, Innovation, and Internationalization. In M.-À. Galindo & D. Ribeiro (Eds.), *Women's Entrepreneurship and Economics* (pp. 125–142). Springer. https://doi.org/10.1007/978-1-4614-1293-9_9

Noguera, M., Alvarez, C., Merigó, J. M., & Urbano, D. (2015). Determinants of female entrepreneurship in Spain: An institutional approach. *Computational and Mathematical Organization Theory*, *21*(4), 341–355. https://doi.org/10.1007/s10588-015-9186-9

North, L. (2016). The Gender of "soft" and "hard" news. *Journalism Studies*, *17*(3), 356–373. https://doi.org/10.1080/1461670X.2014.987551

OECD. (2013). *Entrepreneurship: Access to training and money to start a business, by sex*. https://stats.oecd.org/index.aspx?queryid=83119#

Orser, B. J., Elliott, C., & Leck, J. (2011). Feminist attributes and entrepreneurial identity. *Gender in Management: An International Journal*, *26*(8), 561–589. https://doi.org/10.1108/17542411111183884

Orser, B. J., Riding, A. L., & Manley, K. (2006). Women Entrepreneurs and Financial Capital. A Gendered Perspective on Organizational Cre-

ation. *Organization*, *30*(5), 643–665. https://doi.org/10.1111/j.1540-6520.2006.00140.x

Peng, H., & Chandarasupsang, T. (2023). The Effect of Female Directors on ESG Practice: Evidence from China. *International Journal of Financial Studies*, *11*(2), 66. https://doi.org/10.3390/ijfs11020066

Perry, S. C. (2002). A Comparison of Failed and Non-failed Small Business in the United States: Do Men and Women Use Different Planning and Decision Making Strategies? *Journal of Developmental Entrepreneurship*, *7*(4), 415–428. https://www.proquest.com/scholarly-journals/comparison-failed-non-small-businesses-united/docview/208440408/se-2

Prabha Devi, T., Panigrahi, S., Maisnam, C., Al Alyani, W., & Bino, E. (2019). The Female Entrepreneurs' Attitude towards Entrepreneurship: How Entrepreneurial Orientation and Desirability Influence Intention of Entrepreneurial Students? *Delhi Business Review*, *20*(2), 11–24.

Prügl, E. (2015). Neoliberalising Feminism. *New Political Economy*, *20*(4), 614–631. https://doi.org/10.1080/13563467.2014.951614

Radu, M., & Redien-Collot, R. (2008). The social representation of entrepreneurs in the French press: Desirable and feasible models? *International Small Business Journal*, *26*(3), 259–298. https://doi.org/10.1177/0266242608088739

Radu-Lefebvre, M., Lefebvre, V., Crosina, E., & Hytti, U. (2021). Entrepreneurial Identity: A Review and Research Agenda. *A Gendered Perspective on Organizational Creation*, *45*(6), 1550–1590. https://doi.org/10.1177/10422587211013795

Renzulli, L. A., Aldrich, H., & Moody, J. (2000). Family Matters: Gender, Networks, and Entrepreneurial Outcomes. *Social Forces*, *79*(2), 523–546. https://doi.org/10.1093/sf/79.2.523

Riffe, D., Lacy, S., & Fico, F. G. (1998). *Analyzing media messages: using quantitative content analysis in research*. Erlbaum.

Robinson, P. B., & Sexton, E. A. (1994). The effect of education and experience on self-employment success. *Journal of Business Venturing*, *9*(2), 141–156. https://doi.org/10.1016/0883-9026(94)90006-X

Roivainen, I. (2023). "Life sucks, coffee helps": Articulating the authentic entrepreneur on YouTube's girlboss channels. *Nordicom Review*, *44*(1), 1–22. https://doi.org/10.2478/nor-2023-0001

Rosa, P., Carter, S., & Hamilton, D. (1996). Gender as a determinant of small business performance: Insights from a British study. *Small Business Economics*, *8*(6), 463–478. https://doi.org/10.1007/BF00390031

Rosener, J. B. (2011). Ways Women Lead. In P. Werhane & M. Painter-Morland (Eds.), *Issues in Business Ethics* (pp. 19–29, Vol. 27). Springer, Dordrecht. https://doi.org/10.1007/978-90-481-9014-0_3

Rottenberg, C. (2017). Neoliberal Feminism and the Future of Human Capital. *Signs: Journal of Women in Culture and Society*, *42*(2), 329–348. https://doi.org/10.1086/688182

Rottenberg, C. (2018). *The rise of neoliberal feminism*. Oxford University Press.

Roxas, M. L., & Stoneback, J. Y. (2004). The Importance of gender Across Cultures in Ethical Decision-making. *Journal of Business Ethics*, *50*(2), 149–165. https://doi.org/10.1023/B:BUSI.0000022127.51047.ef

Ruxton, G. D., & Beauchamp, G. (2008). Time for some a priori thinking about post hoc testing. *Behavioral Ecology*, *19*(3), 690–693. https://doi.org/10.1093/beheco/arn020

Seedat, S., & Rondon, M. (2021). Women's wellbeing and the burden of unpaid work. *BMJ Clinical Research*, *374*, Article 1972. https://doi.org/10.1136/bmj.n1972

Seron, C., Silbey, S. S., Cech, E., & Rubineau, B. (2016). Persistence Is Cultural. *Work and Occupations*, *43*(2), 178–214. https://doi.org/10.1177/0730888415618728

Sexton, D. L., & Bowman-Upton, N. (1990). Female and male entrepreneurs: Psychological characteristics and their role in gender-related discrimination. *Journal of Business Venturing*, *5*(1), 29–36. https://doi.org/10.1016/0883-9026(90)90024-n

Shahin, M., Ilic, O., Gonsalvez, C., & Whittle, J. (2021). The impact of a STEM-based entrepreneurship program on the entrepreneurial intention of secondary school female students. *International Entrepreneurship and Management Journal*, *17*(4), 1867–1898. https://doi.org/10.1007/s11365-020-00713-7

Shastri, S., Shastri, S., Pareek, A., & Sharma, R. S. (2022). Exploring women entrepreneurs' motivations and challenges from an institutional perspective: Evidences from a patriarchal state in India. *Journal of Enterprising Communities: People and Places in the Global Economy*, *16*(4), 653–674. https://doi.org/10.1108/JEC-09-2020-0163

Simonton, D. K. (1992). Gender and genius in Japan: Feminine eminence in masculine culture. *Sex Roles*, *27*(3-4), 101–119. https://doi.org/10.1007/BF00290012

Smith, P. L., & Oakley, I. E. F. (1997). Gender-Related Differences in Ethical and Social Values of Business Students: Implications for Management. *Journal of Business Ethics*, *16*(1), 37–45. https://doi.org/10.1023/A:1017995530951

Smith, R. (2021). Fashioning an elite entrepreneurial identity via the endorsement of gendered, designer dress codes and artefacts of success. *The International Journal of Entrepreneurship and Innovation*, *22*(4), 251–265. https://doi.org/10.1177/14657503211027092

Snyder, R. C. (2008). What Is Third-Wave Feminism? A New Directions Essay. *Signs: Journal of Women in Culture and Society*, *34*(1), 175–196. https://doi.org/10.1086/588436

Startbase. (2021). *Female Founders Report 2021: Frauen in der deutschen Start-up Szene: Antiquierte Rollenbilder oder neuer Schwung?* https://www.startbase.de/downloads/female-founder-report/2021/female-founder-report.min.pdf

Statista. (2023). *Distribution of Instagram users worldwide as of January 2023, by age group*. https://www.statista.com/statistics/325587/instagram-global-age-group/

Statista Research Department. (2020). *Number of female-led startups that became unicorns worldwide between 2013 and 2019*. https://www.statista.com/statistics/1221250/number-female-led-startups-to-unicorns/

Stedham, Y., Yamamura, J. H., & Beekun, R. I. (2007). Gender differences in business ethics: Justice and relativist perspectives. *Business Ethics: A European Review*, *16*(2), 163–174. https://doi.org/10.1111/j.1467-8608.2007.00486.x

Steensen, S. (2011). The Featurization of Journalism. *Nordicom Review*, *32*(2), 49–61. https://doi.org/10.1515/nor-2017-0112

Swail, J., & Marlow, S. (2018). 'Embrace the masculine; attenuate the feminine' - gender, identity work and entrepreneurial legitimation in the nascent context. *Entrepreneurship & Regional Development*, *30*(1-2), 256–282. https://doi.org/10.1080/08985626.2017.1406539

Szücs, E. (2015). Space for Girls: Feminism, Political Agency, and Girl Culture on the Internet. *Women's Studies*, *44*(5), 657–680. https://doi.org/10.1080/00497878.2015.1038163

Tajfel, H. (1963). Stereotypes. *Race*, *5*(2), 3–14. https://doi.org/10.1177/030639686300500201

Terjesen, S. A., & Lloyd, A. (2015). The 2015 Female Entrepreneurship Index. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2625254

Thébaud, S. (2015). Status Beliefs and the Spirit of Capitalism: Accounting for Gender Biases in Entrepreneurship and Innovation. *Social Forces*, *94*(1), 61–86. https://doi.org/10.1093/sf/sov042

Thébaud, S., & Charles, M. (2018). Segregation, Stereotypes, and STEM. *Social Sciences*, *7*(7), Article 111. https://doi.org/10.3390/socsci7070111

Ughetto, E., Rossi, M., Audretsch, D., & Lehmann, E. E. (2020). Female entrepreneurship in the digital era. *Small Business Economics*, *55*(2), 305–312. https://doi.org/10.1007/s11187-019-00298-8

Uhl-Bien, M. (2006). Relational Leadership Theory: Exploring the social processes of leadership and organizing. *The Leadership Quarterly*, *17*(6), 654–676. https://doi.org/10.1016/j.leaqua.2006.10.007

United Nations. (2014). *Emma Watson at the HeForShe Campaign 2014 - Official UN Video [YouTube]*. https://www.youtube.com/watch?v=gkjW9PZBRfk

United Nations. (2015). *Resolution adopted by the General Assembly on 25 September 2015*. https://www.un.org/en/development/des

a/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

United States Department of Justice. (2022). *U.S. v. Elizabeth Holmes, et al.* https://www.justice.gov/usao-ndca/us-v-elizabeth-holmes-et-al

Valentine, S. R., & Rittenburg, T. L. (2007). The Ethical Decision Making of Men and Women Executives in International Business Situations. *Journal of Business Ethics*, *71*(2), 125–134. https://doi.org/10.1007/s10551-006-9129-y

Velte, P. (2016). Women on management board and ESG performance. *Journal of Global Responsibility*, *7*(1), 98–109. https://doi.org/10.1108/JGR-01-2016-0001

Wang, Q. (2015). *Child Care, Work-Family Policy and Female Entrepreneurship*. https://doi.org/10.2139/ssrn.2669282

Weischenberg, S. (2001). *Nachrichten-Journalismus: Anleitungen und Qualitäts-Standards für die Medienpraxis* (1. Aufl.). Westdt. Verl.

Welter, F. (2004). The environment for female entrepreneurship in Germany. *Journal of Small Business and Enterprise Development*, *11*(2), 212–221. https://doi.org/10.1108/14626000410537155

Williams, M. (2022). Elizabeth Holmes and Theranos: A play on more than just ethical failures. *Business Information Review*, *39*(1), 23–31. https://doi.org/10.1177/02663821221088899

Wilson, K. (2015). Towards a Radical Re-appropriation: Gender, Development and Neoliberal Feminism. *Development and Change*, *46*(4), 803–832. https://doi.org/10.1111/dech.12176

Wood, W., & Eagly, A. H. (2012). Biosocial Construction of Sex Differences and Similarities in Behavior. In J. Olson & M. Zanna (Eds.), *Advances in Experimental Social Psychology* (pp. 55–123). Elsevier. https://doi.org/10.1016/b978-0-12-394281-4.00002-7

World Economic Forum. (2013). *The Global Gender Gap Report 2013*. http://www3.weforum.org/docs/WEF_GenderGap_Report_2013.pdf

Xie, X., & Lv, J. (2018). Female technology entrepreneurs: Resource shortages and reputation challenges - a view of institutional support. *International Entrepreneurship and Management Journal*, *14*(2), 379–403. https://doi.org/10.1007/s11365-017-0450-y

Xu, X., Li, Y., & Chang, M. (2016). Female CFOs and loan contracting: Financial conservatism or gender discrimination? - An empirical test based on collateral clauses. *China Journal of Accounting Research*, *9*(2), 153–173. https://doi.org/10.1016/j.cjar.2015.10.001

Copreneurial Couples in Startups: A Comprehensive Analysis of Copreneurial Couples in Startups Compared to Classical Businesses

Eliza Alena Marie Weitzel

Technical University of Munich

Abstract

Due to a lack of attention in research to draw a connection between couple businesses and their existence as a form of startup teams, this paper aims to provide deeper insights into the structure and behavior of copreneurial couples in startups. This lack needs to be addressed due to the increase of these phenomena and possible outcomes for the startup world, as copreneurial couples in startups tend to be viewed as red flags without proof of this being valid. For this purpose, a qualitative, theory-building research approach was chosen, in which copreneurial couples of startups and classical businesses were interviewed. As a result, a comprehensive model of the development dynamics of copreneurial couples and a hands-on framework were created. The main finding is limited differences between copreneurial couples in startups and classical businesses regarding motivations, processes, challenges, and opportunities when combining work and private life. The primary differentiation lies in the amount of workload, the variation in the procurement of external financial resources, and the environment they are navigating in. The work confirms parts of the previous literature but also provides new insights into communication, work-life balance, decision-making processes, and external influences. Finally, the framework can be used by copreneurial couples to structure, prioritize, and navigate the challenge of wholly combining their work and private domain.

Keywords: copreneurial couples; copreneurship; couple business; startups; team dynamics

1. Introduction

Copreneurial couples in startups are getting increasingly frequent media attention (Dixon, 2021; Escher, 2020; Leven, 2022; Murphy, 2022) and have been called 'the secret weapon to startup success' (Escher, 2020, p. 1). However, in the present literature, copreneurial couple startups have received very little attention (Kuschel & Lepeley, 2016). Despite growing interest from the media and increasing interest from young people, including couples, about entrepreneurship and startups, there is a lack of research covering this small but growing niche.

Moreover, copreneurial couples, romantic partners jointly owning or managing a business, are frequent in family businesses and are a rising segment (De Bruin & Lewis, 2004; El Shoubaki et al., 2022; Fletcher, 2010; Lee et al., 2023; Marshack, 1993; Muske & Fitzgerald, 2006; O'Connor et al., 2006; Ruef et al., 2003). Ruef et al. (2003) found that

around 50 % of their sampled founding teams were married couples or cohabiting partners.

Limited academic research was done about this essential and unique form of family business (Dyer et al., 2013; El Shoubaki et al., 2022; Fitzgerald & Muske, 2002; Marshack, 1994; Ponthieu & Caudill, 1993; Rodrigues & Franco, 2021; Tolentino et al., 2022; Tompson & Tompson, 2003). In the case of copreneurial ventures, additional research needs to be done to determine how spousal and family involvement in founding an enterprise affects both the firm and the family (Blenkinsopp & Owens, 2010; Danes & Jang, 2013). El Shoubaki et al. (2022) highlight the potential of researching strategic boundary setting and its outcome and the dynamics of how couples refine their strategies over time.

Additionally, there is a limited number of empirical inquiries into entrepreneurial endeavors within couples (Fletcher, 2010). According to Fitzgerald and Muske (2002), multiple possible explanations exist for this, for example, the

cultural myth that family and business are separated. This explanation is also reflected by Aldrich and Cliff (2003). Furthermore, it is difficult to collect data due to the non-transparent structures of copreneurial couple businesses (Fitzgerald & Muske, 2002; Jaffe, 1990; Marshack, 1994).

The lack of research on copreneurial couples in startups raises the questions of what motivates couples to start a startup, what this process looks like, and how these couples combine their private and professional domains. Furthermore, examining what challenges and opportunities arise and how this differs from copreneurial couples in classical businesses.

To fill this research gap, this thesis aims to understand how copreneurial couples combine their relationship with a shared business, especially in the fast-changing world of startups. Furthermore, the aim is to shed light on changing societal norms and evolving gender roles in entrepreneurship and uncover dynamics in power, decision-making, and leadership within copreneurial relationships. The research focuses on key aspects such as communication, work-life balance, decision-making processes, and external influences. The thesis offers practical recommendations for copreneurial success by delving into these dimensions, contributing to academic understanding and real-world applications.

The paper aims to get a comprehensive overview of relevant topics in the dynamics of copreneurial couples. For this purpose, a qualitative approach was chosen, guided by the inductive method by Gioia et al. (2013). The research design involved semi-structured interviews analyzed iteratively until saturation. Grounded theory, devoid of preconceived notions, enabled the identification of patterns and relationships organically, aligning with the study's exploratory nature. Initially conceived for the startup ecosystem, the thesis adapted to include both classical and startup businesses, aiming for a comparative examination. This process resulted in data structures for each aggregated dimension, following Gioia et al. (2013), from which a model was created, and a framework derived.

The study developed a model highlighting the development dynamics of copreneurial couple businesses, enabling the understanding this process's core phases easily. An extended framework was designed to outline the different focus areas, challenges, and opportunities by granting guiding questions for practical usage of the tool for couples eager to start a shared venture. Additionally, this framework can be used by other founding teams, potential shareholders, and supporters since it creates understanding and transparency. Furthermore, the findings draw attention to general conditions and requirements, motivations, approaches, and strategies for combining professional and personal spheres. By providing the insights mentioned, the study bridges the research gap by combining the fields of entrepreneurship, family, and psychology.

Following the introduction of the theoretical psychological foundation and the research done about copreneurial couples, the paper provides the methodology applied to derive the results of the study. Then the results are presented along

the aggregated dimensions of the data structure. Finally, the results are contextualized within existing theories, emphasizing contributions, and the paper concludes by addressing limitations and proposing avenues for future research.

2. Theoretical context

As shown in the introduction, the main topics to focus on are, on the one hand, couples and their strategies, mindset, and practices to effectively work together in business. On the other hand, we need to understand the psychological backbone of relationships in general. Therefore, this chapter should give an overview of the most essential terms to set the theoretical basis for the following study.

2.1. Theoretical frameworks

As copreneurial couples are a unique form of a small group, it is essential to understand the psychological basics determining the relationship between two people. Marshack (1993) states that despite being promising, the literature building on this still needs a link between the social exchange theory, emphasized by the dual-career literature, and the family systems theory drawn on the family business literature. This missing link is partly due to the myth that family and work are strictly separate spheres (Kanter, 1989; Rapoport & Rapoport, 1965). Nevertheless, certain scholars in the field of family business emphasize the importance of adopting an exchange perspective within the context of family firms and underscore how relationships within these firms can serve as mechanisms for creating value (Daspit et al., 2016). According to Blenkinsopp and Owens (2010), there has been a recognized need to connect the fields of entrepreneurship and family firms, as they can mutually benefit from each other. This collaboration can enhance the comprehension of the family's role in entrepreneurship and the impact of entrepreneurship on family firms.

To create a potential link, the following chapters will provide the basic concepts of psychological frameworks that have been used in previous literature and will be used in the later analysis.

2.1.1. Social exchange theory

Social exchange theory is one of the most significant and influential theoretical perspectives in understanding individuals' behavior (Ahmad et al., 2022; Cook & Rice, 2006; Cropanzano & Mitchell, 2005). The theory was already illuminated by various research areas, including anthropology (Firth, 2013; Sahlins, 1972), social psychology (Gouldner, 1960; Homans, 1958; Thibaut & Kelley, 1959), and sociology (Blau, 1964). Due to the complexity of social exchange theory, the development of the research and views was analyzed and evaluated over the last decades by different disciplines (Ahmad et al., 2022).

Homans (1958) shaped the idea of a cost-versus-benefit analysis by economic principles done by individuals to evaluate social interaction. As a concept used for small groups,

the social exchange theory says individuals evaluate their relationship or interaction with other individuals based on a cost-versus-benefit decision. According to Homans, social behavior is an exchange of goods (Homans, 1958). In this context, costs can be viewed as material goods, time or mental involvement, benefits can vary from monetary profit to emotional well-being or other positive outcomes. To foster collaboration between two individuals, shared values must be in place. This can be seen as an agreement of each other's behavior reinforcing (Homans, 1958). The probability of two individuals' interaction will rise if there is an increase in satiation or aversive stimulation of any one kind of behavior compared to an alternative interaction (Homans, 1958).

Festinger et al. (1950) also found that when a group is close-knit, and members exchange important feelings or activities with each other, they tend to interact more frequently. According to Homans (1958), the interaction in a group can be in equilibrium but does not have to. Even though this decision is not made actively based on this concept, the theory predicts that the relationship or group membership is profitable if the rewards outweigh the costs. Therefore, an individual will stay in the relationship or group.

Unlike Homans (1958, 1961), who focuses on the psychology of instrumental behavior, Blau (1964) places more emphasis on technical, economic analysis and the emergence of social structures in small groups through exchange (Emerson, 1976). Blau (1964) distinguishes between social and economic exchanges, and emphasizes a practical, helpful outlook on what people expect from their interactions, and avoids delving too deeply into psychology to focus on the evolving aspects of social exchange (Emerson, 1976, p. 335). On the other hand, Thibaut and Kelley (1959) studied relationships in small groups, using game theory's reward-cost matrices to analyze interdependence and how power affects outcomes. They also explored how outcomes influence attraction to relationships.

However, the fundamental research leaks clear definitions and has been a source of conceptual misunderstanding with limitations and controversies (Cropanzano & Mitchell, 2005; Cropanzano et al., 2017; Emerson, 1976). Even though the theory lacks the necessary depth, the underlying idea is still regarded by research (Cropanzano et al., 2017). Social exchange theory hosts various approaches and is more a frame than a concept that can describe multiple social phenomena (Ahmad et al., 2022; Emerson, 1976).

To position the relevance of the social exchange theory for this thesis, it's essential to look at the research done in this field. While social exchange theory can be used in various areas, the link between entrepreneurial teams and social exchange theory is limited. Since we are looking at people in a marriage or marriage-like relationship who run a business together, we can draw on research from Nakonezny and Denton (2008). Looking at all parts of a marriage from beginning to end, the concept of social exchange theory determines if the marriage is viewed as beneficial by the two parties, as it is seen to weigh costs and benefits (Nakonezny & Denton, 2008). Looking at the dissolution of a marriage and the rea-

son for divorce can be broken down to the costs of staying together outweigh the benefits of so (Levinger, 1976). The opposite applies to entering a marriage; therefore, this can be viewed as a concept laying the base for the motivation of a copreneurial couple, not only to be in a relationship but also to do business together. Based on social exchange theory, this could be because the alternative the couple sees is less rewarding and connected to lower profit.

In essence, social exchange theory, pioneered by Homans (1958, 1961) and extended by scholars like Blau (1964) or Thibaut and Kelley (1959), is a key framework for understanding human behavior through a cost-versus-benefit analysis. Despite criticisms, it remains influential, offering a versatile explanation for diverse social phenomena. In the context of this thesis on copreneurial couples, it proves relevant as seen in Nakonezny and Denton's (2008) research, where it informs the assessment of costs and benefits in both personal and business aspects of these partnerships.

The implication here is that applying social exchange theory in researching copreneurial couples in startups and ventures could enrich our understanding of these partnerships. This theoretical framework provides insights into the reciprocity and mutual benefits inherent in copreneurial relationships, allowing us to explore the motivations and dynamics at play. By examining the balance of resources, rewards, and costs, the theory illuminates partners' perceptions of contributions and benefits in both personal and business domains, offering insights into satisfaction and commitment. Social exchange theory also sheds light on trust-building mechanisms, role negotiations, and the impact of external factors on copreneurial relationships, providing a comprehensive framework for exploring the complexities within these unique partnerships.

2.1.2. Family systems theory

The family systems theory is a framework that views the family as a complex and interconnected system where connected individuals affect each other's behavior and development, whereby family dynamics influence individual functioning (Johnson & Ray, 2016). This theory has been widely applied across various fields by different researchers, including psychology and family therapy (Bowen, 1966, 1993, 2004; Brown, 1999; Gurman & Kniskern, 2014; Haley, 1991; Minuchin, 2018; Minuchin & Fishman, 1981; Whitaker & Bumberry, 1988), social work (McGoldrick, 2016; McGoldrick et al., 2020; Satir, 1987, 1988; Satir et al., 1994), and marriage counseling (Gottman & Krokoff, 1989; Gottman & Silver, 1995; Gottman et al., 1998).

Key concepts of family systems theory include interconnectedness, differentiation, triangles, family roles, multigenerational patterns, and the circularity of influence (Johnson & Ray, 2016; Rothbaum et al., 2002).

In the field of couples and relationships, researchers such as Kanter (1989) or Rapoport and Rapoport (1965) have explained the independence between work and family and the myth about being separated domains. According to Kanter (1989), this myth asserts that in modern industrial societies,

work and family life are seen as separate realms with distinct functions. Events in one realm, such as work-related decisions, are considered external variables in the family life, influencing context but not fundamentally shaping its operation. Furthermore Rapoport and Rapoport (1965) argue that when people undergo significant changes in roles, they handle them based on personal, cultural, and social factors. When these changes happen simultaneously at work and family, it emphasizes how they depend on each other, giving people more flexibility to choose how they integrate the two aspects of their lives.

With the rise of women in the workforce and, therefore, a rise of dual-career couples, specific social changes have occurred. These changes have also affected dual-career couples at the individual, interpersonal, and family levels, resulting in a higher value for equality and mutual fulfillment and a less traditional gender-related distribution of tasks (Rapoport & Rapoport, 1965).

Edwards and Rothbard (2000) organize mechanisms linking work and family into six general categories: spillover, resource drain, congruence, work-family conflict, compensation, and segmentation. These underlying concepts and strategies can create problems in dual-career couples. Utilizing family systems theory could help solve these problems since numerous influential studies have proposed incorporating family systems theory into the problem-solving processes of family-owned businesses (Rodriguez et al., 1999).

Based on these facts, family systems theory could contribute to researching copreneurial couples in ventures and startups, by offering a lens to explore interconnected roles, communication dynamics, and boundary management, providing nuanced insights into copreneurial relationships. The theory could illuminate how copreneurial couples navigate the dynamic boundaries between their personal and business lives, especially in startups. Additionally, it could shed light on the influence of startup initiation on existing family subsystems. The theory could investigate feedback loops regarding the impact of business-related stress or success on the family system. Furthermore, it could highlight the evolution of roles within copreneurial couples, particularly in the face of startup growth or challenges. Lastly, family systems theory could be instrumental in examining how external alliances, like triangulation with advisors or mentors, affect decision-making processes. In summary, integrating family systems theory into this thesis offers a concise framework for understanding the complexities of copreneurial couples' intertwined personal and professional lives.

2.2. Current state of research about copreneurial couples in startups

This thesis's second crucial theoretical field is the current state of research about copreneurial couples in startups and the embedding of this specific research field into family business research.

2.2.1. Definition of copreneurial couples in startups

When defining copreneurial couples, it is essential to distinguish between copreneurial couples, dual-career couples, and co-entrepreneurs. Co-entrepreneurs are partners, not necessarily romantic, running a business together (El Shoubaki et al., 2022). Dual-career couples are couples where both partners are active as entrepreneurs or pursuing a career, but not in the same venture (Marshack, 1994). Copreneurial couples, also called copreneurs (Barnett & Barnett, 1988) or business-owning couples (Danes & Morgan, 2004), partners who manage so-called couple-run companies (Machek et al., 2015) or couple businesses (El Shoubaki et al., 2022).

These couples share personal and work relationships and can be considered the smallest family business unit (El Shoubaki et al., 2022; Fitzgerald & Muske, 2002; Tolentino et al., 2022).

Copreneurial couples have been investigated across various disciplines, resulting in a fragmented literature base (El Shoubaki et al., 2022). The existing literature gives multiple characteristics to define copreneurship. As shown in Table 1, Fitzgerald and Muske (2002), gave an overview of different criteria used in previous literature to define copreneurship. This list includes ownership, commitment, responsibility, shared risk, shared management, full-time commitment, intertwined worlds, equalitarian, running a business together, shared entrepreneurial venture, defined areas, partnerships, and working a minimum of fifteen hours per week in the venture. As noted by Fitzgerald and Muske (2002), some of these characteristics are similar and are based on the business side rather than the relationship aspect.

El Shoubaki et al. (2022) analyzed over 71 articles on couple businesses in their literature review and defined them as ventures jointly owned and/or run by a romantic couple. Couples, whether cohabiting or married, of mixed or single gender, can co-own or actively manage a business, with the distinguishing factor being their shared sense of psychological ownership (El Shoubaki et al., 2022). The factor of shared ownership sets couple businesses apart from businesses where one partner solely owns and runs the business while the other assists as a family member (J. Block et al., 2014; J. H. Block et al., 2015).

Therefore, for this thesis, the term *copreneurial couple* is defined, based on the consolidated definition of El Shoubaki et al. (2022) and the commonly used characteristics mentioned earlier, as two individuals in a romantic relationship committed to contributing individual resources into an entrepreneurial venture while sharing a sense of ownership.

Since this thesis focuses on copreneurial couples in startups, a definition of startups is essential. Per Salamzadeh and Kawamorita Kesim (2017), startups are ventures established to experiment with business models crafted around innovative ideas, usually proposed by a group of co-founders or team members. Ries (2011) characterizes startups as human institutions created to develop innovative products or services in the face of significant uncertainty. While

Table 1: Criteria used to define copreneurship

Author(s)	Ownership	Commitment	Responsibility	Share Risk	Shared Management	Full Time	Intertwined Worlds	Egalitarian	Run a business together	Share Entrepreneurial Venture	Defined Areas	Partnerships	15 Hrs/Wks
Barnett and Barnett (1988)	x	x	x				x	x					
Bryson et al. (1976)									x				
Cox et al. (1984)					x	x							
Epstein (1971)												x	
Jaffe (1990)		x	x	x			x		x		x		
Marshack (1993)	x	x	x							x			
Marshack (1994)	x	x	x			x				x			
Nelton (1986)										x			
Ponthieu and Caudill (1993)		x	x	x									
Wicker and Burley (1991)	x		x										x

Note. Table by Fitzgerald and Muske (2002, p. 4), slightly adapted for better readability.

Kopera et al. (2018) characterize startups as dynamic entities shaped by their form and merit, emerging from operation within a highly volatile and unpredictable environment. Nevertheless, each author interprets the concept differently (Salamzadeh & Kawamorita Kesim, 2017), and there is no singular definition in the literature regarding what defines a startup (Paternoster et al., 2014). Reisdorfer-Leite et al. (2020) stated that the definitions are broad, indicating a gap in scientific literature, and used product lifecycle management to draw the line between a startup and a consolidated enterprise.

As a conclusion for this thesis, *copreneurial couples in startups* or *copreneurial startup couples* are copreneurial couples who work on creating a product or service focusing on innovation and growth, while operating in dynamic and uncertain environments. Although there can be the opportunity to get more untraditional external funding from angel investors or venture capitalists, this is not characteristic of defining startups. However, getting money from these sources is an indication for a venture to be classified as a startup. This comprehensive definition will be used to identify suitable interview partners for data collection as explained in Chapter 3.2.

2.2.2. Motivation of couples to run a business together

The literature lists various motivations for couples to start a business together. This includes controlling their situation and combining work and private life (Thompson, 1990), seeking greater intimacy with their partner (Cox et al., 1984; Thompson, 1990), realizing a shared vision (Marshack, 1993), or fulfilling shared dreams and goals (Fitzgerald & Muske, 2002; Fletcher, 2010). And since they have blended work and family boundaries, they are anticipated to have stronger marriages and businesses (Fitzgerald & Muske, 2002). According to Marshack (1993), family and business

relationships are strengthened by this blending. Fitzgerald and Muske (2002) state that copreneurial couples aspire to run a business alongside someone they are familiar with and can trust, which should improve the business's profitability and ensure its success.

Financial aspects such as increased wealth further motivate couples to start a business together (O'Connor et al., 2006). According to Dahl et al. (2015), both partners, especially women, gained more income from a business with their partner than from outside opportunities in the labor market. Therefore, Dahl et al. (2015) see copreneurial businesses as maintaining a minor scale due to this. Jaouen and Lasch (2015) found that micro-firm owners tend to be more professional when their goal is to grow the business, therefore El Shoubaki et al. (2022) identified the link between motivation and growth intentions as a potential future object of investigation.

2.2.3. Negative aspects and challenges

As stated by Fletcher (2010), couples entering copreneurship aim to tackle two significant life challenges in parallel: managing a marriage and owning a business. To the best of my knowledge, minimal research has been conducted about copreneurial couples in startups, hence, the upcoming chapter will center on literature closely related to the subject, especially findings from copreneurs in general and dual-career couples.

Copreneurial couples face the challenge of balancing roles and work-life dynamics while struggling with transitioning from a personal endeavor to a professional business (Fletcher, 2010). This journey involves navigating leadership ambiguities for employees, reconciling lifestyle preferences with growth considerations, preserving boundaries within each other's work domains, effectively managing emotions

in the workplace, and ensuring the second partner establishes ownership of the business idea or builds credibility (Fletcher, 2010). In addition, further research has shown that work-family spill-over effects, for example, due to conflicts about decision-making, are a challenge for copreneurial couples (Lee et al., 2023). And, while the blending of work-home boundaries can benefit these couples, this can also be challenging (El Shoubaki et al., 2022). For dual-career couples, research shows that the fusion of work and family introduces a potential for increased tension (Fitzgerald & Muske, 2002). This results from mismanagement of boundaries (Marshack, 1994), conflicts (Dyer, 1992; Foley & Powell, 1997), unfair distributions of responsibilities (Goffee & Scase, 2015), as well as time and financial pressures (Jaffe, 1990). For Fitzgerald and Muske (2002), this tension concerns whether copreneurship benefits couples. Furthermore, researchers highlight the challenges of establishing equality in their relationship (Bebbington, 1973; Bryson et al., 1976; Elman & Gilbert, 1984; Epstein, 1971; Marshack, 1994). Possible reasons for this are that women still take over most domestic duties (Biernat & Wortman, 1991; Elman & Gilbert, 1984) and are more likely to prioritize reducing conflicts related to gender roles over advancing their careers (Elman & Gilbert, 1984; Hamilton, 2006; Heckman et al., 1977; Poloma & Garland, 1972).

Jennings and Brush (2013) propose that early empirical investigations indicate less favorable outcomes for a specific category of mixed-sex teams, particularly those composed of spouses or partners with a marital-like relationship. Further research suggests that teams consisting of spouses are less inclined to initiate high-potential ventures (Davidsson et al., 2009) and have a higher likelihood of demonstrating sub-par business performance when copreneurs distribute tasks equally within the family domain (Sharifian et al., 2012). Fitzgerald and Muske (2002) argue that the close relationships within a couple may pose more challenges than intimacy can assist in overcoming.

Following the identification of occurring challenges within copreneurial couples' multiple researchers have noted possible solutions. These include that couples should not split the equity exactly equally due to the representing danger for the company (Reichmuth & Ewald, 2022) and should keep a clear distinction between their professional and personal domains (Tompson & Tompson, 2003). Furthermore, it is essential for copreneurs to have well-defined roles within the business (Tompson & Tompson, 2003).

2.2.4. Positive dynamics and wins

Even though several authors report on negative aspects, the literature also shows the positive side of copreneurial couples and the resulting advantages and opportunities. As mentioned about the negative aspects, there is a lack of research on the positive facets of copreneurial couples in startups.

One of the only studies in this niche intersection, done by Kuschel and Lepeley (2016), collected information from a sample of five women copreneurs who had started high-technology businesses and who were working with their hus-

bands at that time while belonging to the same entrepreneurship acceleration program, Start-Up Chile. Kuschel and Lepeley (2016) suggest that copreneurial teams in new high-technology ventures have similar and complementary levels of education and skills development, becoming highly aware of the mutual skills and strengths of their partner after three years of working together, which allows them to define their respective roles. Additionally, they found that both partners divide work and family and have developed a level of mutual trust and commitment, which is essential to move forward (Kuschel & Lepeley, 2016). The interviewed women showed workaholic tendencies with a high rational underpinning, which adds up to the factors strengthening the collaboration, and in many instances this business liaison can remain intact despite a breakdown in the partners' sentimental relationship. Finally, their findings show that these couple's growth orientation takes multiple structures (Kuschel & Lepeley, 2016). However, another study discovered that copreneurs typically have complementary skills contributing to success (O'Connor et al., 2006).

Since there have been no other specific studies on the positive aspects of copreneurial couples in startups, the following part of the chapter will focus on literature that is close, particularly findings from copreneurial couples in general as well as from dual-career couples.

Fletcher (2010) found that copreneurial couples see benefits in having a joint commitment to the business, as life choices, shared responsibility and interests, sharing tasks and roles, have flexibility and autonomy. Tompson and Tompson (2003), who examined articles in the popular press, noted that the trust between copreneurial couples can serve to enhance the business relationship. Furthermore, they found that these couples have better communication skills than unmarried business partners and display resilience and pride that is not readily apparent in conventional partners or management teams (Tompson & Tompson, 2003). Finally, they assume that if a couple exhibits strong communication skills, mutual respect, trust, helpfulness, persistence, patience, and selflessness, these relationship qualities could potentially be leveraged to enhance the marital bond and the business (Tompson & Tompson, 2003). Besides this, other researchers acknowledged positive aspects of copreneurial couples, such as having strong family values and the boundaries between love and work are navigated easier while growing the bond between the partners (Barnett & Barnett, 1988; Marshack, 1993; Nelton, 1986). Even though the previous chapter described tensions due to unevenly distributed roles, especially in the area of domestic duties, other sources show that copreneurial couples value equality (Barnett & Barnett, 1988; Jaffe, 1990; Nelton, 1986). However, the significance of equal rights must be restaged because some sources are over 20 years old, and the role of women has also changed. Tolentino et al. (2022) highlight the role of cognitive empathy in copreneurial couples due to the possible influence on outcomes in well-being and performance. This can be particularly interesting when considering startups.

2.2.5. Gender dynamics

Interest in the effects of gender roles and inequality has been growing for many years. This also applies to the research area of entrepreneurship and family businesses. As previous chapters have shown, copreneurs tend to take on more traditional gender roles, it is essential to relate this topic to copreneurial and dual-career couples to answer the research question.

It was found that copreneurial couples tend to foster stereotypical roles and task distribution due to the culture of family businesses in general (El Shoubaki et al., 2022; Fitzgerald & Muske, 2002; Marshack, 1993; Tompson & Tompson, 2003). The study of Fitzgerald and Muske (2002) gives insights into women's invisibility as co-founders in family businesses. They found that even if the woman had decision-making power, took over responsibilities, and worked in the family business, they are not listed as an official co-founder but as the household manager (Fitzgerald & Muske, 2002). Marshack (1993) stated that "In many cases, women who work in family businesses are wives, mothers, and daughters first, and employees, managers, and executives second." (p. 356).

The research noted the influence of this topic on the way copreneurial couples act. According to El Shoubaki et al. (2022) tensions may shift between domains, and the allocation of roles and power within the couple frequently adheres to traditional gender norms in society. Yang and Aldrich (2014) found that spouse teams exhibit a notably more significant gender effect, with gender inequality levels about 71 percent higher than those observed in non-spousal teams. Furthermore, research showed that the male tends to act as the primary decision-maker, with the female supporting behind the scenes (McAdam & Marlow, 2012; Yang & Aldrich, 2014). And while dual-career couples distribute tasks and responsibilities in a more equal manner, copreneurs tend to maintain traditional gender roles in both their business and marital relationships (Tompson & Tompson, 2003).

3. Data and methodology

This chapter, divided into four sections, establishes the foundation for presenting and discussing the findings, offering a transparent and thorough account of the research design and methodology. The first section explains the choice of qualitative research for copreneurship, highlighting its benefits. The following section outlines participant selection. It then discusses data collection methods. Finally, the used data analysis techniques are explained.

3.1. Research design

In previous chapters, we have examined the existing literature on copreneurial couples, exploring the unique dynamics, challenges, and opportunities associated with jointly managing businesses while maintaining personal relationships. We have seen that copreneurship is a multifaceted phenomenon shaped by communication, work-life balance, and

decision-making. Existing frameworks and studies, such as those by Marshack (1993), Fitzgerald and Muske (2002), and Danes and Jang (2013), have provided valuable insights into the various dimensions of copreneurship. However, it has become evident that there still is a significant research gap, particularly regarding the complexities and nuances of the copreneurial experience. Since the existing literature cannot sufficiently answer the paper's research question, a qualitative research approach was chosen for investigating insufficiently understood phenomena, as recommended by Corbin and Strauss (2008). Qualitative interviews often provide a deeper understanding, especially of social phenomena such as the of individuals' experiences and perceptions (Neergaard & Leitch, 2015). Qualitative Interviews, therefore, can provide rich, in-depth insights into the lived experiences of copreneurial couples.

The following process was pursued: First, a general understanding of the theory about copreneurial couples and the underlying theoretical frameworks was established, and a research question was formulated. Then, interview partners were selected based on specific criteria. Afterwards, data was collected through interviews and analyzed following Gioia et al. (2013). This process is iterated until no new insights emerge. Finally, a model was created from the insights and compared the two business types and their underlying structures and dimensions.

Building upon the inductive research strategy, Corbin and Strauss (2008) defined the grounded theory approach, which is part of the methodology by Gioia et al. (2013). Therefore, this served as a crucial framework for the research to understand the main themes. Grounded theory allowed for the analysis of data without any preconceived notions, thereby providing an opportunity to identify patterns and relationships from scratch. This aligned with the study's exploratory nature and enabled a deeper understanding of how copreneurial couples combine business and their private life (Corbin & Strauss, 2008; Gioia et al., 2013). The Gioia mythology was used because it enhanced the richness of the analysis by providing a systematic way to uncover and interpret the nuanced themes and narratives in the interview transcripts, clarify the respective path from the interview data, and how the model and framework were created (Gioia et al., 2013).

The choice of using a qualitative method was based on most of the literature on copreneurial couples and the psychosocial concepts behind individuals' behavior using primarily qualitative methods. For this thesis, a qualitative method seemed most appropriate to find patterns between the couples' approaches and identify best practices. To do this, the core of these investigations involves conducting semi-structured interviews with people who have experienced the phenomenon of interest to gather retrospective accounts (Gioia et al., 2013).

Initially, the study delves into the intricacies of researching entrepreneurial couples, explicitly focusing on startup ventures. Conceived as a qualitative study to gain insights into the dynamics of entrepreneurial couples within the

startup ecosystem, the research journey faced substantial obstacles in the recruitment process for interview partners. In addition, after completing several interviews, it emerged that the interviewed business was more of a classical business than a startup in the definition used in this thesis. Consequently, there was a strategic shift in the thesis focus on a comparative analysis, incorporating both classical and startup businesses. Expanding the scope to encompass classical businesses alongside startups, the research aims to draw insightful parallels and distinctions in the experiences of entrepreneurial couples across diverse business environments. Therefore, the comparative analysis involves in-depth interviews with entrepreneurial couples from both classical and startup businesses. The study seeks to identify patterns, differences, and commonalities in the experiences, challenges, and success factors these couple's encounter. This adaptation addresses the practical constraints faced during the sampling process and enriches the study by providing a broader perspective on the dynamics of entrepreneurial couples within varying business landscapes.

3.2. Interviewee selection

As the thesis focuses on copreneurial couples as defined in Chapter 2.2.1., selecting only individuals suiting this categorization was necessary. A theoretical sampling approach following Miles and Huberman (1994), was undertaken to determine a suitable set of cases consisting of multiple steps building onto each other. The first step was to determine the search criteria. The second step was to use various public and restricted online sources to create a longlist. The third and last step was to contact the people from the longlist and recheck for the selected criteria. A minimum number of seven couples was defined to be able to determine conclusions and trends within the time frame of this master's thesis.

For the correct identification, two main questions had to be answered, which resulted in the search criteria. First, if the business is a copreneurial couple business. Following Tompson and Tompson (2003), who said that a researcher must know the ownership structure and the labor contributions of the husband-and-wife couple to identify it as a copreneurial business it had to be established whether this was the case. Therefore, keywords like 'copreneurial couple', 'couple business', 'co-entrepreneurs', and 'couple-owned business' were used. Second, if the business is a startup or a classical business. To answer this question, some keywords were 'startup' and 'new venture'. It is essential to mention that no active exclusion of couples was done based on religion, culture, or geographical region. Even if Tompson and Tompson (2003) stated, it is likely to be cultural, religious, and legal influences determine how and whether husbands and wives interact as copreneurs across countries, this seemed to narrow the pool of protentional interview partners too much. Furthermore, according to the reviewed literature, these influences seem to be not decisive in answering the research question of the thesis.

Three primary sources were used to search for and contact suitable candidates. The first source was online news-paper articles and blogs[1]. Multiple articles and blog posts named couples who started a startup or business together and the according business, which allowed a more in-depth look at the business characteristics via their websites and social media presence. The second source was two social media networks, Facebook[2] and LinkedIn. A Facebook group with over 2.200 members was found, and a post was created allowing to contact some possible candidates. However, most companies could be defined as classical businesses, not startups. LinkedIn was used to search for posts and articles about copreneurial couples and people connected to these posts. After creating a post about the research, the author of this thesis got recommendations from her network for suitable interview partners. For requests made outside of her network, she wrote a short message in addition to the contact request on LinkedIn explaining her intention (see Appendix A). The third source was podcasts from or with business couples[3]. After creating a long list, the identified people were contacted. For people the author could not find or reach via LinkedIn, she used a technique of guessing email addresses based on the company's domain and the names.

In total, 73 people were contacted through LinkedIn (42) and e-mail (31) and with getting 32 responses. This represents a response rate of 43,8 %. Additionally, the author participated in an online seminar for raising money as a startup founder and wrote a short message to approximately 300 participants via the group chat, which created four responses. Due to these couples' high workload, only fifteen founders representing eight companies could be interviewed. This corresponds to a success rate of 20,5 %.

3.3. Data collection

The data was collected through semi-structured interviews with one person at a time. The interviews were conceived to last for 30 to 45 minutes but could be longer according to the willingness of each person to dive deep and share information. The couples were interviewed separately to understand better the differences in viewpoints, goals, and strategies, as well as the communication approach of each individual. Furthermore, this allows an improved comprehension regarding essential factors that are specific to, for example, gender roles, and previous researchers have suggested the collection of data regarding the perspective of the individual partners, as a potential source of more profound insights (Blenkinsopp & Owens, 2010; Lee et al., 2023).

The interviews followed an interview guideline (see Appendix C), created following best practices for non-directive interviews. The complied best practices, which have been based on the author's personal experience and standard literature, can be found in Appendix B. After the first interview,

---

[1] Blog posts used: Ackerman (2022), Escher (2020), "Five startups co-founded and run by couples" (n.d.), Gegamova (2023), Hazony (2017), Leven (2022), Murphy (2022), and "On Valentine's Day, we ask 3 couple co-founders what it's like working with their partners" (n.d.)

[2] Facebook Groups | Successful couples in business - Couplepreneurs (n.d.)

[3] Podcasts used: Bacon (n.d.), Jones and Jones (n.d.), Pagano-Parente and Parente (n.d.), and Vogt (n.d.)

the phrasing of some questions was lightly adapted to ensure a better understanding of the questions for the following interviews. In most cases, the interviewee is a co-founder and holds a significant share in the company.

To ensure the privacy of the couples, the interviewees and the company's names were anonymized. This was done because the participants viewed the topics discussed as very private, e.g., family planning, communication struggles, and life goals. To clarify which interviewee belongs to which couple, matching names with the same initial letters of the given couple were found for the interviewees. Thus, Anna and Alexander are Couple A and co-founded Company A, while Brigitte and Benjamin are Couple B and co-founded Company B.

Table 2 shows an overview of the interview partners' details, particularly the given name, the role, their equity share, their age range and the length of the interview.

Fifteen interviews were conducted. Only the male partner could be interviewed for one couple (Couple H) due to the partner's busy schedule. The interviews were conducted and recorded in English or German according to the participant's preference. In Appendix D, the transcribed interviews can be found. If necessary, the interviews were translated into English for the results chapter. As mentioned in the chapters before, these eight businesses (A-H) represent four startup businesses (A-D) and four classical businesses (E-H), which provides a balanced proportion for comparative analysis.

3.4. Data analysis

As explained in chapter 3.1. no existing literature provided the depth needed to answer the research question. Therefore, the Gioia et al. (2013) methodology, utilizing aspects of grounded theory, was employed. This method was chosen due to the missing insides about copreneurial couples and their detailed strategies.

The approach aims to reveal the process of transforming raw interview data into terms and concepts in a transparent manner. Therefore, the study followed an inductive multi-step approach for the data analysis.

First, 1st-order concepts were created to consolidate the data and build categories while using the language of the data itself, which is a process comparable to open coding by Strauss and Corbin (1998). Mostly, these concepts are a couple of words or short sentences and tend to explode, meaning creating easily 50 to 100 concepts out of ten interviews (Gioia et al., 2013). For remaining the underlying meaning of the statements, the transcripts were analyzed in their original language, and critical elements and quotes were translated into English before they were added to the text of this thesis. MAXQDA 2022 (VERBI Software, 2021) was used, to aid the coding and firm the data analysis. This coding list, which was the initial coding list, can be taken from Appendix E.

After the 1st-order analysis, the 2nd-order analysis was done to elaborate on the similarities and differences among the created categories. According to Gioia et al. (2013),

this process is similar to axial coding by Strauss and Corbin (1998). For this, the 1st-order concepts were grouped based on more abstractly showing clusters regarding phrasing. The second step was conducted separately for interviews from startup couples and classical business couples to provide deeper insights into the underlying patterns and facilitate a comparison between the two types of companies. This step resulted in 192 concepts and 24 themes for startup businesses and 276 concepts and 29 themes for classical businesses. As a result of this step, no huge differences emerged as to why both previously separated coding systems were combined into one, resulting in 24 themes.

Following Gioia et al. (2013), four aggregated dimensions were created by grouping the 2nd-order themes as a third step. The final coding list can be taken from Appendix E. Following this, data structures were created showing the content for each aggregated dimension, and critical statements for each dimension were added.

As the final step, a model of the development dynamics of copreneurial couple businesses, which simplified the complex process, was derived. Finally, a step-by-step framework was created to draw practical implications for couples aiming to start a shared business. The findings from the analysis are presented in the next chapter.

4. Results

In this chapter, insights from the interviews with the copreneurial couples will be provided. As a result of the inductive research approach, the result chapter is based on the different phases of a couple businesses which were identified through the creation of aggregated dimensions. The data structure will be segmented into corresponding parts with the same aggregated dimension for clarity. This allows to dive deep into each dimension to understand processes, decisions, perspectives, and underlying wishes, goals, and values, finally creating a model. Each aggregated dimension shows an overview of the data structure based on the data structure example by Gioia et al. (2013), which can be found in Appendix F. Additionally, a selection of meaningful quotations from the interviews has been added to each chapter to ensure a transparent understanding of the analysis. The complete selection of relevant quotations can be found in Appendix H.

The findings, presented in a narrative form, that inherently suggests the procedural aspect of the development dynamics in copreneurial businesses, will be followed by a more comprehensive explanation of the developed three-phase model in the subsequent chapter.

4.1. General conditions

In this chapter, I examine the general conditions of the couples to lay the ground for the analysis of the start and running of a couple's business. It highlights the hard facts about the businesses, each individual's educational background, and the relationship history (see Figure 1).

The seven companies, four startup businesses and four classical businesses range in terms of industries, which can

Table 2: Overview of interview partners

#	Couple	Company type	Given name	Role	Equity share	Age range	Interview length [min]
P01	A	Startup	Anna	Co-Founder & CTO	50,0 %	30-40	50
P02	A	Startup	Alexander	Co-Founder & CEO	50,0 %	30-40	37
P03	B	Startup	Brigitte	Co-Founder & CPO	33,0 %	30-40	44
P04	B	Startup	Benjamin	Co-Founder & CEO	33,5 %	30-40	46
P05	C	Startup	Carolin	Co-Founder & CEO	50,0 %	20-30	39
P06	C	Startup	Christopher	Co-Founder	50,0 %	30-40	53
P07	D	Startup	Debora	Co-Founder & Co-CEO	50,0 %	30-40	37
P08	D	Startup	Dennis	Co-Founder & Co-CEO	50,0 %	30-40	46
P09	E	Classical	Emily	Co-Founder	0,0 %*	40-50	48
P10	E	Classical	Emanuel	Co-Founder & CEO	30,8 %*	40-50	31
P11	F	Classical	Fiona	Co-Founder & CEO	50,0 %	30-40	24
P12	F	Classical	Frederick	Co-Founder & CTO	50,0 %	30-40	25
P13	G	Classical	Gabriela	Co-Founder & CEO	60,0 %	30-40	44
P14	G	Classical	George	Co-Founder	40,0 %	30-40	39
P15	H	Classical	Henry	Co-Founder & Managing Director	50,0 %	40-50	42

Note. Details of interviewees and their companies taken from the interview or the company's website

*Information is taken from the company register, list of shareholders - entry in the register file on 18.04.2023, retrieved on 16.01.2024.
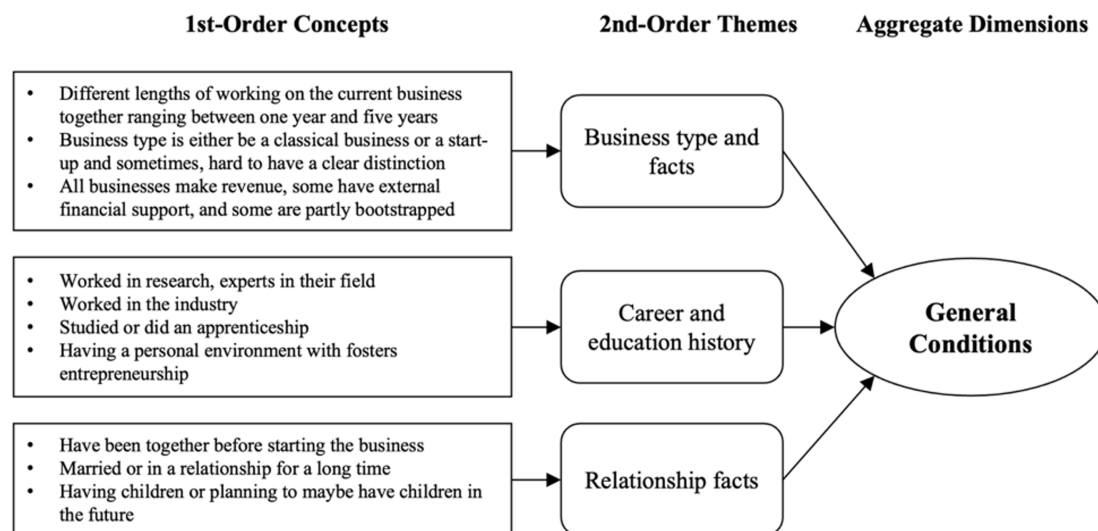
Figure 1: Data structure – General conditions (Own illustration based on Gioia et al. (2013))

be taken from Table 3. This overview is for better classification, interpretation, and evaluation of the participant's statements. However, this also shows the fundamental differences between the companies regarding their business models and, therefore, their classification as startups or traditional businesses. The startups (Companies A-D) are ordering primarily in the fields of digital platforms or online solutions with a high potential of scaling, while the classical businesses (Companies E-H) are operating in a more manual setting with low or only slow potential for growth.

Looking at the participants (see Table 4), it shows that seven out of the eight (87,5 %) couples are married. The time in a relationship is between 7 and 27 years. The couples have been working together is between one and five years. While five out of the seven (71,4 %) have been working together

before on personal projects or in their work environment.

Looking at the background and personal education only Couple F has a nearly identical background, while Couple B stated they have a similar background. The other couples have either diverse backgrounds or different focus points in their professional area. Regarding children, only one couple has no concrete plans; two couples are planning to have children in the near future, one couple is expecting, and four couples already have children.

4.2. Pre-formation phase

The Pre-formation phase can be described as the time between the wish to start a business together or the idea for a business and the time until the start of the collaborative work. From the data collected, this phase can be divided

Table 3: Overview of companies

Couple / Company	Company Type	Given Name	Industry	Business in Short
A	SB	Anna & Alexander	Sustainable Materials	Development for sustainable materials made from mycelium, especially for the construction, furniture, and sports market.
B	SB	Brigitte & Benjamin	Sustainability Software	Online platform for biochar trade and carbon credits.
C	SB	Carolin & Christopher	Personal Care Products	Online shop for clean cosmetics, especially derma rollers and own suitable, specially developed cosmetics and skincare.
D	SB	Debora & Dennis	Mental Health Software	Online training platform for the topics of mindfulness and innovation for companies and private individuals, plus consulting and in-person training.
E	CB	Emily & Emanuel	Social Venture Capital	Sustainable and social investment management to democratize startup investments.
F	CB	Fiona & Frederick	CraftBusiness	Opticians with innovative approaches, use of new technologies and a high level of customer focus.
G	CB	Gabriela & George	Marketing	Marketing agency for marketing strategy and marketing implementation, including campaign management, print and online.
H	CB	Henry	Consulting	Consulting services in the areas of finance, interim management, and social media marketing.

Note. Details of interviewees and their companies taken from the interview, SB = Startup Business, CB = Classical Business

into basic requirements for the couple, the idea development for the business or product, and the underlying motivation to go into a shared venture with their partner (see Figure 2).

4.2.1. Basic requirements

It is not easy to find expressive quotes about the topic of basic requirements because this also includes shared values and commitment to the other person. These values and commitment will be more accessible to see when looking at the working style of the couples, but this seems to be an essential baseline for copreneurial couples. We can clearly see from the interviews that the couple needs to be aligned, not only emotionally but also in terms of taking risks and being aware of the possible challenges they face when combining work and private entirely by starting a business together, as described by Anna. Values that are viewed as important are fully comprehensive trust in each other and a feeling of being able to rely on the partner, transparency, respect, honesty, fairness, reasonability, and admiration. Admiration is a value that Brigitte and Benjamin mentioned in detail and said, that it is essential to know how you feel with your partner because this results in personal confidence. Also, more than half of the couples interviewed said that it is necessary to have a shared working history to know if working together can work out for both; this has either been ideas they worked on before, research or work projects they did together. Mainly Anna and Frederick talked about this. Gabriela also mentioned that they took enough time for a logical evaluation since working and being together simultaneously can create friction.

Finding 1a: Copreneurial couples have a similar value base influencing the private and work domain.

Finding 1b: Copreneurial couples have a similar or complementary willingness to take risks.

4.2.2. Idea development

To understand the dynamics of a couple of businesses, it is essential to know where the idea is coming from. We either have the case that the idea initially came from one partner, who either had the idea based on a research or work project and got excited about it and due to the relationship and talking about ideas openly, the other partner started to get interested in the same topic, which resulted in both being willing to start something together. For the cases of Couples A and E, the idea started with the research work of one person. For Couples B, F, and G, the idea came from either shared or individual work done before and emerged over time.

On the other side, we have the case of personal interest and a passion for the topic which is the case for Couples C and H. Only Carolin and Christopher (Couple C) were actively searching for an idea that is suitable for starting a startup together; here, the business idea came from Carolin out of a personal hobby. For Couple F, who share most of their career path by working in the same company, the business idea was generated during their previous job, and both equally saw an opportunity to start a business on their own, also because it is quite often the case in their industry as opticians.

The main difference between the idea of the startup and classical businesses is that for the startup business, the idea comes from a more profound lack of similar products or solutions. Classical business ideas originate more from the openness to do business together as a couple in a field they already experienced before.

Finding 1c: Startup couple business rather origin from the idea, e.g. coming from research, itself instead of the wish to start a business.

Table 4: Overview of interview partners details

#	Couple	Company Type	Given Name	Background	Responsibilities	Years working together	Years business together	Years as a couple	Years married	Children (Age)
P01	A	SB	Anna	Chemical Engineering	Technology; Administration	7	4	13	8	Planed for the future
P02	A	SB	Alexander	Structural engineering and Architecture	Business, Stakeholder Management					
P03	B	SB	Brigitte	Electrical Engineering, Business	Product and Software Development, Financial Planning	3	3	11	4	Pregnant with first one
P04	B	SB	Benjamin	Mechanical Engineering	Business, Stakeholder Management					
P05	C	SB	Carolin	Trade Administration, Business Psychology	Product Development, Marketing, HR	6	5	7	1	In planning
P06	C	SB	Christopher	Industrial Engineering	Business, Financial Planning, Supplier Management					
P07	D	SB	Debora	Management and Learning, Business Innovation	Product, Content, Marketing, Concepts	5	5	7	4	1 Child (2)
P08	D	SB	Dennis	Accounting and Finance, Entrepreneurship	Finance, Legal, Operations, Sales, HR					
P09	E	CB	Emily	Pedagogy Psychology	HR, Culture, Sales, Startup-side	7	5	27	ca. 20	1 Child (17)
P10	E	CB	Emanuel	Electrical Engineering	Vision, Business and Analytics, Investor-side					
P11	F	CB	Fiona	Master Optician	Business, Management Technology; Craftsmanship	14	5	15	6	2 Children (7&3)
P12	F	CB	Frederick	Master Optician						
P13	G	CB	Gabriela	Graphic Design	Graphic Design Clients, Sales, Management	1,5	1	11	-	-
P14	G	CB	George	Marketing	Strategic Marketing Clients, Sales, Management					
P15	H	CB	Henry	Business and Finance	Consulting, Interim Management	5	5	Ca. 7	Ca. 4	1 Child (ca. 3)

Note. Details of interviewees and their companies taken from the interview, SB = Startup Business, CB = Classical Business

4.2.3. Motivation

Exploring the motivations that drive individuals and couples within the business context unveils a complex and diverse landscape of aspirations. Nine overarching motivations emerge, highlighting the core factors steering their decisions and actions.

For many, the motivation lies in pursuing a delicate balance between professional endeavors and family life, as Coupe C or F mentioned. The yearning for change becomes a powerful force, propelling individuals to seek new opportunities aligned with their values and goals. This was the case for Anna and George, who were interested in stepping out of their comfort zone and trying something new. The presence of a life partner as the ideal co-worker adds a compelling dimension. For example, Brigitte mentioned that she could not have a better co-founder than her husband. For most of the couples, fueling the entrepreneurial spirit is a strong desire to initiate and build something independently, rooted in a passion for innovation and contribution to the business landscape, which was important for Debora. Some are motivated by the collaborative aspect of constructing something as a team, serving the dual purpose of benefiting both family and professional pursuits. This motivation underscores a sense of unity and shared achievement. Especially Caroline and Christopher both talk about creating the business long-term with their future children in mind. A key driver is a willingness to step into the unknown and embrace new risks, motivated by the allure of working on novel and challenging endeavors, acting as a catalyst for personal growth and development, as mentioned by Anna. Building financial independence is a common motivation, prompting individuals to strategically plan and invest in their business ventures for long-term economic security. The desire for increased flexibility and self-determination propels individuals toward entrepreneurial pursuits, reflecting a preference for shaping their work environment and schedules in alignment with personal needs and preferences. A well-known example of this is travel which was also a motivational factor for Couple G.

Many are motivated by the pursuit of a meaningful impact or the opportunity to work on something they are deeply passionate about. This intrinsic motivation speaks to a profound sense of purpose and fulfillment derived from the work itself. This can be seen especially in startup businesses where the idea originates from the desire to have an impact.

Finding 1d: The motivation of the startup couples is more driven by having an impact and pursuing a passion, while the classical businesses want to be more flexible and self-dependent compared to their previous job.

4.3. Formation phase

The formation phase is the phase in which the business itself is built up, not only from the service or product point of view but mainly from a fixed commitment, e.g., quitting the job and starting work on the business in a more extensive way. Additionally, this is the phase where couples create legal structures due to the registration of the business. These are the first months of actively seeing the created idea or concept brought to life. This phase (see Figure 3) is characterized by the time commitment the couples agree on, the power distribution, the equity split as well as legal agreements, and the challenges the couples face at the beginning of working together.

4.3.1. Time commitment

When looking at the time commitment the couple put into their business, it was interesting to see that this was not a big point of discussion for the classical business couples. All classical businesses went to work on their own business 100 % right from the start. In contrast, the time commitment was an essential decision for startup couples. They were and are concerned about the success of their business and therefore spit their time either working on the side while building up their business or one person staying employed full-time somewhere else while the other partner is working full-time on their shared business. According to the couples, this is also only possible due to their motivation and mindset about starting a business as a couple. The idea of doing it as and for the team or family also reflects their willingness to share earnings equally, meaning one person earned the money for both to live from it in case the business does not make any money to pay out as a salary.

Additionally, for Couple D, Dennis mentioned that one reason for both to go full-time right from the get-go was the feedback and impression they got from the investor world, even though they don't have investors invested or plan on having investors in the future. This seems to be based on the high risk of failure for startups in general. There is the actual willingness to pay can be unclear and the technology or processes are not defined and working right from the start and need to be developed first. For classical businesses, the business model and possible revenue streams are usually set and proven to work if executed properly. This also results in a higher chance of getting loans from banks as classical business; startups mostly need to find investors to get external funding.

Finding 2a: Startup couples emphasize the importance of shared motivation and a team-oriented mindset, reflecting their willingness to split time between outside employment and building their business, with equal sharing of earnings to support their livelihood.

Finding 2b: Their perception of investor expectations influences startup couples' decision to go full-time.

Finding 2c: Classical business couples typically commit 100% of their time to their business from the outset.

4.3.2. Equity and shares

As mentioned in Chapter 2.2.1. being a copreneurial couple was not defined as both partners having the same number of shares, or even having shares at all. Instead, it is defined by the power distribution. The interviews show that most couples split equally even when the startup was one person's
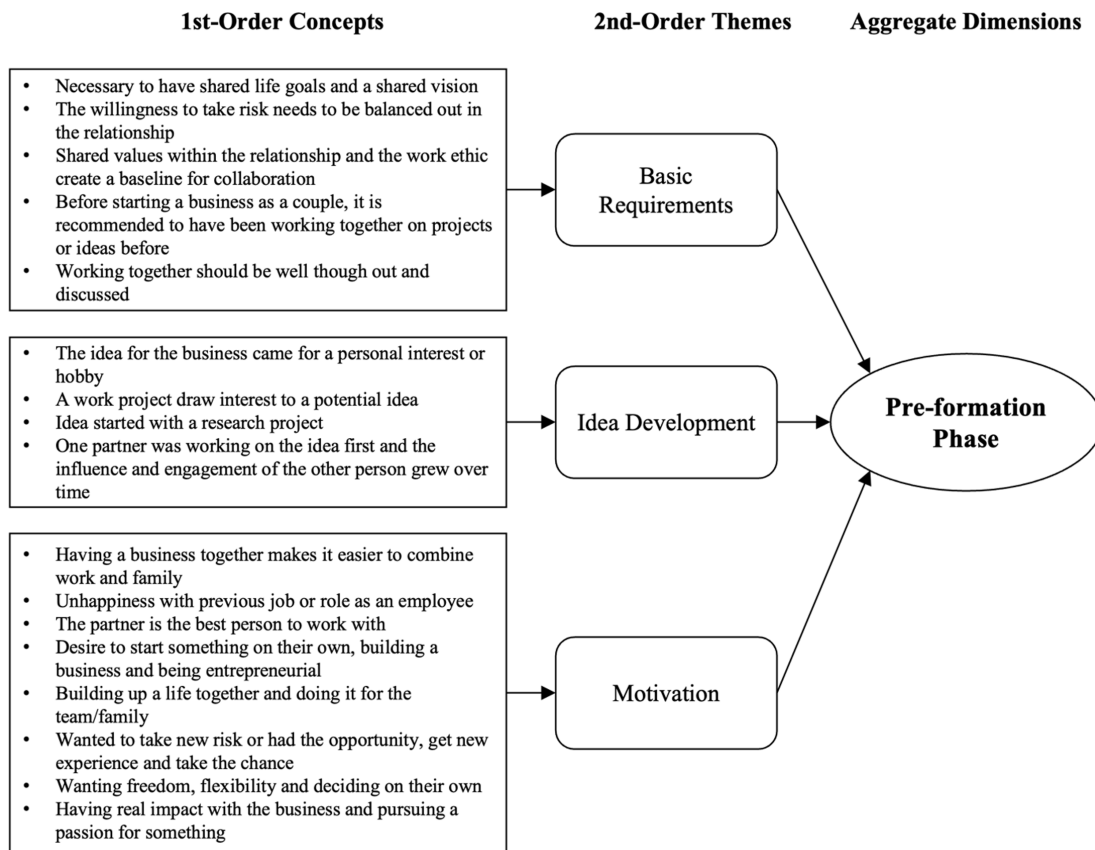
1st-Order Concepts   **2nd-Order Themes**   **Aggregate Dimensions**

Figure 2: Data structure – Pre-formation phase (Own illustration based on Gioia et al. (2013))

idea. The same applies to businesses with additional shareholders, like Couples A and B. This is because the couples believed that starting a business while being in a relationship contributes to the couple as a team. Therefore, they had the mentality of winning and losing together in life and work. Couple B, where Brigitte holds 33 %, and Benjamin holds 33,5 %, argued that it was not possible to do equal shares because they have a third co-founder, and due to their dominating holding as a couple, it seemed fair that one of them would be the person to have less shares that the others.

Only Couple E is notably different. Emily has no shares, and Emanuel holds around 30% of the company. Even though Emanuel stated that they are invested in the business as a family, they did not give any additional information about the equality held by each person. I found the details by looking at the company register, which is open to anyone. They did not give any reasons for this in the interviews, but from taking the research done into account (see Chapter 2.2.) and the facts that they are both in the age range between 40 and 50 and have more traditional gender roles, it seems to represent the insights from previous research. This research found that women in a couple or family businesses tend not to have equity shares but have a significant amount of power in terms of decision making. Another explanation for this could be due to tax or social insurance reasons.

Finding 2d: Copreneurial Couples tend to split the equity equally.

Finding 2e: Copreneurial startup couples tend to split the equity equally due to the high risk of failure and the mindset of 'doing it for the team'.

Finding 2f: When copreneurial couples do not split the equity equally, a partner brings properties into the shred business that cannot be compensated, for example, existing customers or a network.

4.3.3. Power distribution

Power distribution is closely connected to equity and shares. However, it has become increasingly evident that the number of shares one person holds, which could reflect their power in the business, distinguishes significantly from the real and life power distribution.

As mentioned in chapter 4.3.2. this is particularly the case for Couple E, where Emanuel is the majority shareholder, and Emily has no equity but power of attorney. They based their decision on the fact that one person must decide for the company's sake in cases of discrepancy. Emily also states that from her perspective, her husband would never decide against her will, which seems counterintuitive from how they are organized legally. For all couples who also split the equity nearly equally (Couple A, B, C, D, F, H) even if one person is the managing partner from a legal aspect, which is the case for Couple C and F, and has therefore legally more power, both partners state that the lived power distribution, meaning how they decide finally, is always a collaborative decision.

Table 5: Selected interview statements about Basic Requirements

Interview	Statement
Anna (P02)	But then industry, we said, if we want to work for another company, why don't we work for ourselves? We know it's more difficult, it's more challenging. We know the chances of failure is quite high. (P01, Pos. 92)
	I think it's really, really important to just not emotionally jump into the decision of basically working together to have a background of how working together looks like. [...] There should be a history of working together. (P01, Pos. 138)
Alexander (P02)	For the first startup, I mean we have been working since 2017 and then 2019 I would say we found the startup but then we were already starting on the larger project on mycelium and of course, till now. (P02, Pos. 20)
	I think in general I think for me what is value is always I value respect and I value in return. [...] So, I think for me trust and respect for very much part of the private life as well as the more that we do in the job in the business. (P02, Pos. 116)
Brigitte (P03)	I'm via super, super cautious about the risk that it has. So, we are always trying, so we're always making really clear cuts. [...] So, we are people that are very risk-averse and have been obviously really mindful about the risks. (P03, Pos. 56)
	I would always see how you feel with your partner. Because with Benjamin, he is super admiring towards everything I do, even though I don't think it's special. Like, he always, and by kind of feeling being admired by someone, I get more confidence in what I do. And at the same time, I admire him a lot. (P03, Pos. 120)
Benjamin (P04)	[...] I guess, the feels a bit the responsibility to help as much as possible, even though she's working more than I am on the side, let's say. So, from that point of view, I have a lot of admiration, (P04, Pos. 44)
	Yeah. So, to me it is very clear, it was very clear from the get-go that my private relationship is more important that my business. So even when things can easily be like, a bit of a roller coaster when you do a startup. And, the relationship is the thing that sort of keeps me, I think, quite stable. (P04, Pos. 48)
Carolin (P05)	I have the feeling that we've never had such super serious differences of opinion on the basis of values or anything like that, that we would somehow completely fall out or something. (P05, Pos. 80)
	And the way we complement each other in our willingness to take risks. (P05, Pos. 120)
Christopher (P06)	This basic trust is different because you really, simply because it's a basic understanding, that you're there for each other. So, it's just on a different level somehow. And it's clear that you can also and then it becomes too much and so on. But it's just a very special bond and it also strengthens you. (P06, Pos. 80)
Debora (P07)	I think we're both very good at telling each other what we appreciate about each other. At least I hope so. I try to tell Dennis very often, hey, you're doing really well and look, that's great and that's good and wow, or, in the community call, that would be just talking about what we notice about each other. (P07, Pos. 88)
Emily (P09)	You always must have respect for each other. You always must think, even when you're angry. And we get angry with each other, too, from time to time of course. And that's still my Emanuel. So, I'm still his Emily. [...] And so, as I said, I think respect and reflection are super important. And always lots of love, that's also very important. (P09, Pos. 104)
Fiona (P11)	Yes, exactly. And since the starting point, since 2010, we've started working together. And since then, our professional careers and our private careers have been intertwined. So, we went to master craftsman school together, we've always lived together, we've always had the same employer. (P11, Pos. 40)
	But in terms of challenges, well, you always must find a way to stay on the same page. I think that can put quite a strain on a relationship if you hadn't worked together for so long and so much beforehand. (P11, Pos. 124)
Frederick (P12)	We know how to work together. We can keep professional and private matters well separated. And that prompted us to say, people, we'll do it together and we don't have to get together with strangers. (P11, Pos. 12)
	You have to think about it carefully and you shouldn't just do it now if you've been together for half a year half a year together or a year and say, oh man, I've got a cool idea, I'm going to do this together with my husband. I think that can quickly backfire, both professionally and privately. And that would be a shame for both options. (P11, Pos. 144)
Gabriela (P13)	Oh, [we know the other] for ages. Since we were children. And yes, we've been in a relationship for 11 years now and that means we've experienced a lot together. We know each other very well and know how the other person works. And yes, it was a long process until we really decided to work together, because there really are a lot of areas that come together, like that. (P13, Pos. 16)

Debora and Dennis, on the other side, have decided on also having the legal power distribution set equality by being co-CEOs and, therefore, co-managing partners. Gabriela and George, on the other side, set the power to be dominated by Gabriela since she had her own company before and included her network and customers in the newly founded company of both.

When comparing the startups and the classic businesses, there do not seem to be any significant differences in tendencies in one or another direction when it comes to power distribution, regardless of whether it is lived or legal.

Finding 2g: In copreneurial couples, there is a high chance that the legal and the lived power distribution differ.

Finding 2h: Copreneurial couples tend to make decisions about power distribution based on the best outcome, based on tax, insurance, or legal reasons, for the team.

4.3.4. Start of working together

When starting to work together, some of the couples realized that working together in the same company created friction, even though they had worked together before. Furthermore, there were social prejudices not only from the outside, which was the case for Couple C but also, for example, for Brigitte. This could be reasoned by previous research (see chapter 2.2.), that society views work and private domain as a strictly separated area. For Debora, it was a challenge

Table 6: Selected interview statements about Idea Development

Interview	Statement
Anna (P01)	And then he asked me to join his group so that they can start this research. [...] I tried to help them like on a friendship basis, like to get give them knowledge and to prepare protocols for them or to train their students on a part-time basis or something. But he was really insisting on me joining them and after one year I finally accepted because. I was kind of in my comfort zone, but then I started to really get interested in the topic. [...] And we started the research, and the more we started to work on the material, the more we find out that we have to also work on commercializing it. [...] (P01, Pos. 8)
	I would say it started as a coincidence because of how he was working with his professor, for PhD professor, and how he started to kind of know me. And then we had like a friendship as well with his family and everything. And I think the beginning was a coincidence. (P01, Pos. 96)
Brigitte (P03)	[...] and then the biochar came across it through his work, and he just found it so interesting and started watching like YouTube videos about producing it himself in the garden, and then we kept talking about more and more, and then we realized it's actually ticking many of the boxes of what we actually would like to do and we discussed "Okay, what could be a business, what could a business case be in this area?" [...] and I kind of supported a bit. But then I got kind of more and more into the idea, and I got super passionate, and I just worked a lot on it. (P03, Pos. 8)
Benjamin (P04)	So actually, the idea originated from... So, I can tell it from my perspective, which is that I came across biochar in a previous company as I was working as a normal employee and started considering what is biochar looking at it and found it fascinating. And then I followed the industry for a while. Being in a relationship with Brigitte and married to Brigitte she saw that I was seeking a keen interest in that. [...] And so, she could see that I was spending some time on this, and we discussed it for a while. And at some point, I thought, okay, there is really something to do in that space. I was keen to start a company. And so, I just talked a lot to Brigitte about this because I wanted to have her opinion. And I think she was also, she found it also really interesting somehow, she's been interested in doing entrepreneurship. Also, I don't think at that point in time, that was exactly what she was looking for, entrepreneurship, but she was definitely, I mean, she's keen to look at new businesses and consider that. And so, I think she considered the idea and thought "Wow, okay, it's interesting.". (P04, Pos. 12)
Carolin (P05)	We always wanted to start our own business, build something of our own, now is actually the perfect time, because I don't have a gap in my CV. [...] and I always wanted to do something in the field of cosmetics and I also trained really hard in that area, even after my cosmetics training, and then we somehow came up with the topic because I've always done micro needling at home. (P05, Pos. 8)
Christopher (P06)	And back then Carolin was already looking at micro needling and derma rollers and yes, yes, she realized, okay, I want a derma roller like that and she couldn't really order this particular product in and she couldn't really order this particular product in Germany and yes and yes then ordered it from abroad and then saw, okay, this is an entry-level product, so why isn't it available here, yes, and then we realized that the product was not a protected product. (P06, Pos. 20)
Debora (P07)	I had, well, I finished my doctorate, then managed a research project and realized quite quickly that I wanted to go into self-employment, but what I never really wanted to do was just be a trainer and travel around the country all the time. [...] He started practicing mindfulness himself back then and so it just kind of came together. It wasn't planned, I would say it was an organic process. (P07, Pos. 8)
Dennis (P08)	I took a little time out here. and to be fair, I was already a bit hooked by Google's own mindfulness program. Because they did it really well. But I still saw room for improvement. Um, a bit more flexibility. And so, I got talking to Debora. She was like that, she did her yoga teacher training in 2016, wrote her PhD as part of an innovation project and basically brought the two sides together. And then at some point, one thing led to another, and we said, let's write a business plan, let's write a partnership agreement. (P08, Pos. 28)
Emily (P09)	And then Emanuel founded a startup himself around 2000 and I was still studying at the time, but of course I was always aware of it. I kept thinking, 'Man, there's a lot wrong.' [...] And that was the point where I thought at the time, that's strange, that could be done better. (P09, Pos. 4)
Fiona (P11)	Well, we were always missing a certain building block everywhere. Well, and the thing was, with our last employer, we built everything ourselves. In other words, at some point I sat there and said, "Frederick, we're selling all the ideas we've had over the last few years, we're selling them right now and they're making great sales and it's going down really well with customers and how cool would it be if it was our own", so to speak. (P11, Pos. 44)
Gabriela (P13)	And I've been doing this for a while now, so I've been self-employed with a sole proprietorship since 2020 and then really only offered graphic design services. And yes, I then realized that the demand for marketing services and this whole strategic part was becoming more and more in demand from my customers. And that's why George joined me, because he really has a lot of experience in this area (P13, Pos. 8)
George (P14)	Yes, exactly, we founded it as partners. Originally, it grew out of a sole proprietorship that my business partner Gabriela had already set up and managed. I then joined and was initially employed in the sole proprietorship. We did that for six months in this setup. (P14, Pos. 8)

to divide the tasks and responsibilities and not be involved in everything, which they learned with the rising workload. Couple G experienced difficulties because Gabriela was self-employed before George joined her work, which led Gabriela to have to change processes and working style according to George. They mainly had a trial phase with the result of continuing working together but creating a new entity that is owned by both.

Very likely, all copreneurial couples experience similar challenges due to the new circumstances a shred business has, but as described by Alexander, learning is part of this, and continuing is a decision to make.

Finding 2i: When starting to work together as a couple, there will be challenges and new dynamics within the relationship that need to be overcome in the future if a couple wants to continue working together.

Table 7: Selected interview statements about Motivation

Interview	Statement
Anna (P01)	I was kind of in my comfort zone, but then I started to really get interested in the topic. So, I said okay I should maybe get out of my comfort zone and start this topic because that I would see the real impact more compared to the water industry which is also super important for me and it's still one of my interests. (P01, Pos. 8)
	Yeah, of course, we also wanted to have more financial security because we, I mean, we have always been in academia and it's not really the place to be for the rest of our life. (P01, Pos. 88)
Alexander (P02)	So, I think first is that we were all, we wanted to be always self-employed and basically not to work for others. [...] The second reason was that we had interest in that project. It was a very, very interesting project. And we realized that the moment that we leave the company or leave the research group, the project, nobody is going to continue that. (P02, Pos. 72)
Brigitte (P03)	So, I would say Benjamin and I, we've always been quite entrepreneurial in the sense that we always had some ideas [...] (P03, Pos. 8)
	Well, I think the, I mean, in general, because I think I have this no better person than my husband, so I could not imagine the better co-founder than my husband. (P03, Pos. 100)
Carolin (P05)	Financial freedom is an important point for us. That's why we do the whole thing. [...] But somehow, it's also a bit about self-realization. So, it's about doing something, that you enjoy and that you work on and tasks that suit you and somehow simply building something sustainable, where perhaps our children will also benefit from it [...]. (P05, Pos. 64)
Christopher (P06)	I actually always knew that I actually wanted to realize myself by becoming self-employed, i.e. founding a company [...]. (P06, Pos. 8)
	I want this company to still exist in 10 years or 15 years. [...] You have such an intensity that this path must also be the goal. So, what you do has to be in harmony with your life in the end. (P06, Pos. 88)
Debora (P07)	I had, well, I completed my doctorate, then headed a research project, and realized quite quickly that I wanted to move in the direction of self-employment [...]. (P07, Pos. 8)
	We are very free in the way we organize our lives, including where we live and how we live. We are very flexible; we are very self-determined. [...] I think you just don't have that kind of freedom in a traditional employment relationship. (P07, Pos. 80)
Dennis (P08)	That somehow, it's not just about building a company, but about realizing your own goals, your own dreams, your own ... dreams, of ... Everything that goes with it, including the topic of self-fulfillment. (P08, Pos. 152)
Emanuel (P10)	I was an engineer at the time and Emily worked in the social sector and while I was invited to give talks around the world to explain artificial intelligence to people, Emily worked in the youth protection center, for example and was the first point of contact for underage prostitutes. And for this important task, she just like her colleagues, she often received less per month than I did for an hour's lecture. And that created a certain tension at our kitchen table. And we always asked ourselves, why does money have two different faces? (P10, Pos. 12)
Fiona (P11)	And that was our motivation behind it and, of course, we also wanted to go back home. That was always our big goal, because I always find it exciting when children have grandparents and so on [...] and that was our big goal, that we could simply bundle everything together. (P11, Pos. 44)
Frederick (P12)	And at some point, realized that it really suited us, or rather that we had developed so much over the years. And then the idea came up at some point. Yes, we can think about starting our own business. (P12, Pos. 8)
	If everything had stayed with [name previous employer 2] as originally discussed, we would probably have stayed. But then everything developed differently in terms of the direction Kind wanted to take. And so, we said, no, that's not why we came to you, you promised something else, you're now delivering something else. We don't want to go along with that, because then we could have stayed with [name previous employer 1] earlier, because in the end it was the same. (P12, Pos. 84)
Gabriela (P13)	[...] the demand was really growing, and we wanted to do something together. (P13, Pos. 8)
George (P14)	Yes, there were two reasons for that. On the one hand, I thought that, well, that wasn't really a reason, but I always thought what Gabriela was doing was cool. I found it exciting. This self-employment is certainly something that has always appealed to me. [...] I want something different again, I've seen the company [that I was working for before], it was always the same, I always had the same tasks, I wanted something new again. So, I was looking around anyway to see what other options are there. [...] and then there was also the reason that we wanted to travel, go abroad and work from there. That's clearly easiest when you're self-employed and can organize it yourself. If you are employed it's much more difficult to get permission. (P14, Pos. 56)
Henry (P15)	This is very clear that in the end, we can only do this if we live for this idea also. [...] It was not that we said it is business only. It was always kind of well, being able to spend time more together and being able to build up something together but making this also your life and also fitting your family in and around it. (P15, Pos. 52)

4.3.5. Legal agreements

In the realm of legal considerations beyond the initial equity split during company registration, notable divergences emerged among the couples regarding the extent of safeguards they established. Couples D and G, for instance, proactively addressed various scenarios, such as potential separation or failure to reach a shared agreement, underscoring a meticulous approach to safeguarding their business interests. Gabriela highlighted the importance of supporting such arrangements, recognizing the dynamic nature of relationships, and emphasizing that no partnership is immune to change. This sentiment aligns with Brigitte's perspective, who advocated for a marriage contract, particularly considering legal regulations in France, and incorporated provisions related to compensation in the event of having children and the associated care responsibilities. Frederick further elaborated on considerations related to the unfortunate circumstance of one partner's death, emphasizing the
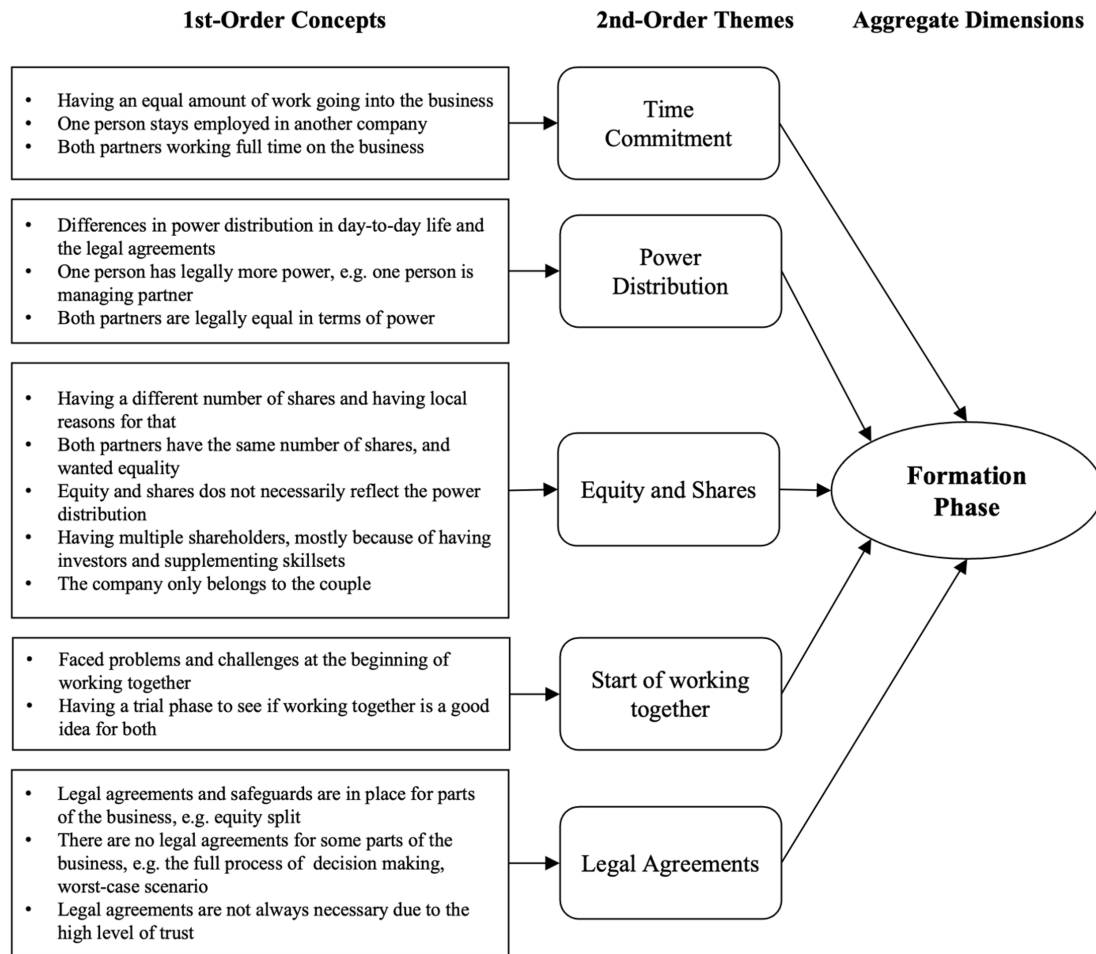
1st-Order Concepts   **2nd-Order Themes**   **Aggregate Dimensions**

Figure 3: Data structure – Formation phase (Own illustration based on Gioia et al. (2013))

desire to establish a solid foundation for their children.

Conversely, other couples admitted to a less detailed approach to legal rules and agreements, attributing it to the high level of trust they share in their relationship. They posited that their interpersonal bonds and mutual understanding were as the primary safeguards for their business collaboration. Henry explicitly articulated the nuanced nature of rules within couples engaged in business together, recognizing that the dynamics necessitate a unique set of considerations and understanding beyond conventional relationship and business norms.

Finding 2j: Copreneurial couples employ varied approaches to legal safeguards, ranging from meticulous planning to reliance on interpersonal trust.

Finding 2k: Recognizing unique dynamics within business couples underscores the need for a specialized approach.

4.4. Working phase

The start of the working phase marks the beginning of creating structures and finding a 'normal' way of working. This chapter concentrates on the processes, roles, and strategies the couples have created to combine working together and being in a relationship. This highlights the roles and reasonability within the business as well as the relationship,

the financial aspect, and the influence of work on the family. All these also contributes also to the line-up of disadvantages and advantages as well as the principles of working together as a couple and working together with others. An overview of this can be taken from the data structure shown in Figure 4.

4.4.1. Roles and responsibilities within the business

Copreneurial couples often navigate the intricate balance of work responsibilities by adopting a strategic and collaborative approach to splitting tasks. This division of labor is typically guided by considerations of free time, individual strengths and weaknesses, and the unique personality traits and skills each partner brings to the table. One key factor influencing the distribution of work is the availability of free time for each partner.

Copreneurial couples recognize that work commitments must align with personal schedules and responsibilities outside of the business, mainly if one partner stays employed full-time in another company, like in the case of Couples B and C. This ensures that no partner feels overwhelmed or burdened, promoting a more harmonious work-life integration. Assessing strengths and weaknesses plays a pivotal role in task allocation. Recognizing each partner's unique skills

Table 8: Selected interview statements about time commitment

Interview	Statement
Anna (P01)	But we said, okay, at least one of us should dedicate to this. So now we are thinking that maybe for the startup in Germany, I would be the one to focus like almost 80, 90% most of it. And Alexander would stabilize in another position because he found a professorship position in another city, but it's not fixed yet. But he said maybe he can work for that university because it's like a permanent contract. So, we can also secure life kind of, and I focus on the startup. So, in case the startup did not go well or fail, then we can still live, you know, and then I would still have time basically to maybe start another thing or also to apply for the proper social positions or something like that. (P01, Pos. 92)
Brigitte (P03)	And for me, it was also for me, it was clearer that I want to get a salary and then need more security from my family background. So, the additional idea was that he does the startup more and I do the job, and then I just support, and he puts this job in and does it full time. [...] like quitting his job completely and being the only one who does it full time because we are bootstrapped currently. So, if you are the only one who's doing it full-time and then you cannot reach co-founders because they all have jobs on the side, it's also a bit frustrating. (P03, Pos. 8)
	So, I work 80% usually so I have one day a week that I have for the startup and then I would say one weekend and then usually I mean we also sometimes spend like holidays to work on the startup and something a bit on the evenings. (P03, Pos. 52)
Benjamin (P04)	Also in my case, I tend to commit more time to the startup than the others because we also were not 100% working points short today. Neither of us are doing that. From the three of us, I tend to commit more time to the company. (P04, Pos. 8)
	So, personally I worked, I would say about less than 50% for another company that I do on a contractual basis, so I'm a contractual consulting for them. And I'm extremely flexible, so that's really nice, I guess. (P04, Pos. 44)
Carolin (P05)	So, because I'm doing it full-time, I naturally have a bigger workload, because I also have the larger areas of responsibility, I would say. (P06, Pos. 76)
Christopher (P06)	You have to say, she probably put more capacity into the subject at the beginning, but we split up so that I kept my job, so to speak, and she then quit her job, so to speak. And then we just said to ourselves, okay, I have a bit of financial means, so I put 20-30,000 euros into it. And that's my contribution so that we can get started. (P06, Pos. 28)
Dennis (P08)	No, we both said we'd go in 100 % now. To be fair, that was always what we took away from the investment world. That is what investors would like to see, if it came to that, if you weren't doing something else at the same time. (P08, Pos. 164)
Frederick (P12)	The original plan was why I was employed, simply that I actually wanted to work in sales at the beginning of the business. I wanted to work in the field for another company. And, of course, as a self-employed person, that would always have been would have been a bit difficult, so to speak. That's why I was supposed to be only employed at our business, which also had pension insurance and health insurance reasons and things like that. But that all fell through because the company was going so well that I said I couldn't take myself out now and work 20 hours a week in the field, Fiona can't do it alone. (P12, Pos. 28)

and areas of expertise allows for a more efficient and productive division of labor. By assigning tasks based on competency, copreneurial couples optimize the low, capitalizing on the inherent strengths of each partner while mitigating potential challenges associated with weaknesses. Personality traits and skills are also influential factors in determining roles within copreneurial partnerships. As Carolin mentioned, partners may naturally gravitate toward tasks that align with their personality traits and skills, fostering a sense of fulfillment and engagement in their respective roles. This approach leverages the diversity of talents within the partnership, leading to a more well-rounded and capable team.

The most significant differences between startup and classical business couples are the workload and the associated challenges of time management.

Finding 3a: Copreneurial couples not only split work according to their skills, strengths, weaknesses, and personality traits but also according to the collaboratively created time schedule.

4.4.2. Roles and responsibilities within the relationship

Business couples navigate a dynamic interplay of roles and responsibilities both within their professional partnership and in their shared life at home. The intricate balance involves handling household activities, splitting work responsibilities, managing the organization with children, and seeking support for tasks that require attention. In the realm of household activities, business couples collaborate to ensure the smooth functioning of their shared space. They strategically divide tasks based on preferences, skills, and availability, fostering a harmonious distribution of responsibilities. This collaborative approach not only eases the burden of day-to-day chores but also strengthens their sense of teamwork and mutual support.

The organization with children introduces an additional layer of complexity. Debora and Dennis are very good example for this since they have a toddler, and the attention shift is a clear challenge for both. Business couples work together to establish effective systems for managing childcare responsibilities. Couple F organized it the way that each of them is taking maternity leaf for a couple of months and taking care of everything related to their private life, being childcare, house budling or organizing family activities. This organizational prowess allows them to navigate the demands of parenting while maintaining their professional pursuits. Clear communication and shared decision-making become paramount in successfully juggling these dual roles. Care work, encompassing responsibilities related to the well-being of family members or elderly relatives, further underscores the collaborative efforts of business couples. Especially Emily talks about the importance of caring for their parents their way of coordinate and share caregiving duties, ensuring the health and happiness of their loved ones. This collaborative care approach reflects a commitment to supporting each

Table 9: Selected interview statements about equity and shares

Interview	Statement
Anna (P01)	[. . .] it's me, my husband, and we have also an angel investor. So, we also have some minor shareholders. So, together with my husband, we host 60% of the company. And 10% is owned by some minority shareholders. And 30% by an angel investor. P01, Pos. 44)
Brigitte (P03)	I have co-founded our startup, together with my husband and the third co-founder. (P03, Pos. 4)
	Yes, [we are equal in terms of equity.] (P03, Pos. 10-12)
	[. . .] in the beginning, there was a phase to have 100% [of nothing]. [. . .] So, we did it equally, but we also had a vesting period. So, we also said, OK, we will review it every year and see what's fair, because if somebody completely leaves because of personal reasons or they go on the job, it's also not fair. (P03, Pos. 16)
Benjamin (P04)	So, we have split it in a nickel manner, but we have, so we have two aspects. The first aspect is we couldn't do exactly equal like to look at the very details, [. . .] because of the number of shares. We basically had to issue 200 shares and you got to keep equally 200 shares in three people. To do, someone has to have one share less than the others. And we decided that Brigitte would have one share less than the others because being the co-funding couple, we already have as a couple two thirds, I guess, on like equivalent two thirds. And Brigitte and I personally, and I spoke about it to Brigitte, and she agreed with that. (P04, Pos. 20)
Christopher (P06)	In other words, right from the start we did everything together. Even if, in terms of time, I'd say she invested more. But we said right from the start that we were both equal. That's just the fairest thing to do. So, it doesn't matter whether you're in a relationship or not. So even if we were to split up, we would each have 50 %. (P06, Pos. 28)
Dennis (P08)	I actually wouldn't have had a problem giving more of a share to Debora, simply because she also has the most experience in this area, but we said we're equally entitled, we're a partnership and that's why we need a 50/50 split. (P08, Pos. 48)
Emanuel (P10)	So, our family has a significant part of the capital about 30 % and other part that belongs in investors and investors who are invested in our business. That's the current split. And yes, we organize it in the same way as a typical typical GmbH is. The more someone invests, the more shares they get. (P10, Pos. 16)
Frederick (P12)	[The equity split is] 50, 50 - Fiona is a managing partner and I am an employed partner, so to speak. (P12, Pos. 24)
Gabriela (P13)	[We have this split] because I've been self-employed for a long time and because it's always been a bit of a dream of mine, that I wanted to set up my own company and then I did, yes, and because I already had a lot of customers, existing customers to the company, that's how it came about. Yes, exactly. And if I may say so, I don't know, but I also think it's cool to be a woman, especially now, to be a bit out in front and set a good example. And that's also a goal of mine, that I can somehow do that (P13, Pos. 36)
Henry (P15)	[The split is] equal, 50/50. (P15, Pos. 16)

other in business and the broader aspects of life. Business couples recognize the importance of seeking support for tasks that need attention at home and understand the value of external assistance, Couple C mentioned this and said they our source as much household activities as possible. Whether through hiring help for household chores, enlisting childcare support, or relying on extended family, seeking external support enables business couples to maintain a healthy balance between their professional and personal responsibilities.

Finding 3b: Copreneurial couples tend to split tasks and responsibilities at home equally, either simultaneously or by fixed periods.

Finding 3c: Whether through hiring help or relying on extended family, external support enables copreneurial couples to balance professional and personal responsibilities.

4.4.3. Finances

The financial dynamics of copreneurial couples involve strategic decisions regarding income and external funding to sustain their joint ventures. Key components include paying themselves a salary, bootstrapping, and exploring external sources such as banks or investors. One significant aspect is the decision to pay themselves a salary. Copreneurial couples, as business partners, deliberate on a fair and structured compensation system while also considering family income as a related unit.

Couple C, for example, discussed the salary Caroline should pay herself according to the business situation while Christopher put money from this outside job into the business. They also had a flexible constellation for debt since they see themselves as unit. On the other hand, Couple G pays for both only a minimum to minimize risk, and they want to pay bonuses according to each partner's contribution at the end of the year. For Couple E, Emanuel mentioned that due to their difference in responsibilities within the business, he gets more salary than Emily, which may seem to be fair from an external perspective. Still, for him, it's not what he likes for his wife. In addition to self-compensation, copreneurial couples often consider external funding to support their business endeavors. This external financial influx can come from traditional sources such as banks or from investors who believe in the potential of their joint venture. Securing loans from banks or attracting investment from external parties becomes a strategic move to fuel business growth, expand operations, or navigate periods of financial challenges. Navigating the complexities of financial decisions requires copreneurial couples to align on their financial goals, risk tolerance, and growth strategies.

As mentioned in chapter 4.3.1., for startups fundraising is more important since they are not able to get access to traditional finance options from banks like classical businesses.

Table 10: Selected interview statements about power distribution

Interview	Statement
Anna (P01)	Yes. So, Alexander is the CEO of the company. So, and I am the CTO, the technical. But it's like, I would, I would say this is like a title because mainly, maybe the technical side is handled by him, and the management side is handled by me. But because he is the one who is talking the most to people, then especially, you know, this is so unfortunate. But because this company is based in Asia and we are working with a lot of developing companies like Indonesia, Cambodia, they would not take a woman seriously. (P01, Pos. 56)
Brigitte (P03)	OK. So, I realized that I don't like to be the CEO. I don't know, I don't like to make all the decisions. And I really like kind of developing the product, but that's also something that I decided independently from the startup. (P03, Pos. 64)
Carolin (P05)	We founded the company with a model protocol simply because it was cheap and uncomplicated. Then we also had the situation once or twice at the notary's office, where we were somehow told, if Christopher was sure about it, because I'm practically the controlling managing partner of the company, and he couldn't even dismiss me because we didn't have some kind of particular clause in it and somehow we always thought about it, should we secure it somehow, should we do something and somehow it was always clear to us that we'd do it together and if things went wrong, we'd do it together, and if it goes wrong, we'll finish it together. (P03, Pos. 20)
	When someone new approaches us, they always think that I'm the only one who has something to say here and so on paper, that's how it is, but we don't do it like that. (P05, Pos. 32)
Debora (P07)	We share the management of the company. We also call ourselves co-managing partners. That was also a conscious decision, where we said we were moving into a new world of work and wanted to be equally responsible for it. (P07, Pos. 24)
Emily (P09)	So, in the end, Emanuel is the managing partner, and in the end, if it came down to the wire, then he would have the last word anyway because he's the managing director, and I'm not; we deliberately did it that way. I have power of attorney in our companies, but that's just bad, if we were both in there now and something were to happen, then it's not such a good idea for us privately to do it this way. [...] But it has never actually happened that Emanuel has made a decision against my will. So, he wouldn't do that. And that's really where we go hand in hand. (P09, Pos. 28)
Emanuel (P10)	So, one thing is important, of course. In the end, only one person can wear the hat in the company. That's what hierarchies are there for in a company, and in this case it's because I'm the managing partner. In managing the company, i.e. making strategic decisions and consulting, Emily plays a very important role. (P10, Pos. 32)
Fiona (P11)	On the one hand, this was for social security reasons, which we would have liked to have one of us in any case remains subject to social security contributions. (P11, Pos. 52)
Frederick (P12)	Then we said yes, someone must be the managing director, in this case it was Fiona and since we don't have enough women in our industry, that fits quite well, of course. (CP12, Pos. 28)
George (P14)	So, from the outside, we have 50/50 as well, both as managing directors and equal partners (P14, Pos. 36)
Henry (P15)	I mean, it is kind of a personal, like a GbR company, also just a combination of two individual persons. Of course, we are both managing partners, but we did not really bother with who has now which artificially title there on the business card. On the business card we are co-founders and managing directors. (P15, Pos. 24)

Finding 3e: Copreneurial couples include their personal and family aspects into navigating financial decisions for the business.

4.4.4. Influence of working together on family planning

The decision to work together as a couple in a shared business undoubtedly profoundly influences various facets of family life and the overall relationship dynamic. This collaborative venture has far-reaching effects, impacting the relationship itself, influencing family planning, and shaping how the family is generally managed. The boundaries between personal and professional life become fluid, with business discussions often seeping into personal moments. Challenges in the business realm may introduce complexities that spill over into the relationship as described by Frederick or Brigitte. But the negative impact is viewed as rather small.

The decision to work together can also have notable effects on family planning. For six couples the demands of a shared business venture have or may influence the timing and approach to expanding the family. Anna and Alexander said they are unsure if their wish to have children will be compatible with their venture. Most couples consider the implications of business responsibilities on parenting and vice versa. Balancing the desire for professional success with the aspirations of building a family requires thoughtful planning

and mutual understanding. Handling the family, in general, takes on a unique dynamic when both partners are involved in a shared business, as described by Debora and Dennis. But even with the high workload some couples, like Couple C, said having a business together will always be a lot of things to do and there will not be a time where children will fit in easily.

Finding 3f: Challenges in the business realm may spill over into the relationship, though the negative impact is generally considered minor.

Finding 3g: The decision to work together as a couple can affect family planning, considering on timing and approach to expanding the family.

4.4.5. Disadvantages and challenges

Copreneurial couples face distinct challenges that can pressure their professional and personal lives. As mentioned by Anna, Alexander, and Brigitte, a high level of workload is a significant challenge. The interconnected nature of personal and professional aspects can affect the relationship itself. Disagreements in business matters may spill over into personal life, and vice versa. The mental load is a prevalent challenge for copreneurial couples. Managing the myriad details of both household and business responsibilities can lead

Table 11: Selected interview statements about the start of working together

Interview	Statement
Anna (P01)	I mean, at the beginning it was so difficult to work together both on the startup and on the company because it was kind of affecting your personal life. like working together during the day was also affecting our personal life. So, we were always talking about work, but we kind of managed to get over that problem. (P01, Pos. 52)
	Yes, for example, because we were working together and we both were kind of the top level of our positions, meaning that we have to manage so many students. We had to attend so many meetings. And it was a bit difficult at the beginning to plan who does what. So, it was not so easy. (P01, Pos. 106)
Alexander (P02)	So, a lot of things are almost integrated into your private life too. [And we did not know that in the beginning.] So, this thing's happened and then you learn. So, it's like a journey. So, you learn every day something new and you learn that's the life. If you want it, then you have to continue on it. If you don't want it, then you give up. So far, we have not given up. (P02, Pos. 52-56)
Brigitte (P03)	I was a bit afraid. I mean, my parents, they work together. So I was, it's not that I'm a big fan of like husband of, it was not a perfect image for me that husband and wife work for the same company. I think it has many advantages, but it also puts all the eggs in one basket. (P03, Pos. 56)
Carolin (P05)	I don't think many people took it seriously at first. (P05, Pos. 92)
Debora (P07)	That's so basic, but in general, as I said, we both did everything at the beginning. [...] And then the team grew and grew and at some point, we realized that it's been about 3/4 of a year, we can't both do everything all the time. When we made a big effort, for example in the jour fixes, with our employees, that we were both always there, but it's such a workload now. We can't manage that. We can't do it all. That's why we have pulled each other out of the other person's topics (P07, Pos. 36)
Gabriela (P13)	For me, it was definitely a new experience when George joined. It was associated with a lot of trust because I had my own approaches on how the company was structured and how I operated before him. Suddenly, a new person was added, which also meant that we created new processes and changed approaches. It was a significant challenge for me because I had been generally successful in how I had been doing things up to that point. However, now it has settled well, and we can solve things together effectively. But at the beginning of the year, it was certainly the biggest learning curve and posed greater challenges. (P13, Pos. 168)
George (P14)	We did [the trial phase] for six months in this setup. We gained our experience and during this time we have realized that it works, the customers are happy, we are happy, it fits. So, we decided to change the sole proprietorship into a limited company. (P14, Pos. 8)
	I quit my job and was hired by Gabriela and then I was employed by her. I was employed by her, and we only did the whole thing on an hourly basis. Simply so that she had the security that she wouldn't just have to pay me if I didn't have any work, in the worst-case scenario. [...] And in this six month, we have realized that this setting is not ideal, simply because with a sole proprietorship, the name of the person must always be in the company name. [...] And that may be something small, but it always bothered me a bit, (P14, Pos. 52)

to mental fatigue. The burden of decision-making, problem-solving, and planning may become a shared mental load. As Emanual stated, the option to talk about work all the time can be a significant advantage, but without taking breaks, it can lead to burnout. The lack of separation, physically and psychologically, between work and private domains is a persistent challenge. According to Carolin and Henry, this can happen quite quickly if they only work from home. The boundary between professional and personal life can blur, making it difficult for copreneurial couples to disconnect from work-related stressors during their personal time, especially in the case of Couple A and F, where they lack breaks and vacations. Concentrated risk is inherent in copreneurial ventures. The shared investment in a business creates a concentrated risk, as both personal and professional aspects are intertwined. Economic downturns or business setbacks can have cascading effects on the couple's financial stability and relationship as outlined by Christopher. The fear of missing out on life is a psychological challenge for copreneurial couples. This was expressed by Brigitte as well as Emily. The immersive nature of joint business ventures may lead to a sense of missing out on personal experiences or opportunities outside the professional realm, contributing to feelings of unease or regret.

Finding 3h: Copreneurial couples face financial pressure, as the success of their joint venture impacts both personal and professional well-being.

Finding 3i: Intertwining of personal and professional aspects can strain relationships as disagreements in business matters spill over into personal life.

Finding 3j: The lack of separation between work and personal life poses a challenge for copreneurial couples, making it challenging to disconnect and increasing stress.

Finding 3k: Joint business ventures bring concentrated risk, where setbacks impact both financial stability and the relationship of copreneurial couples.

4.4.6. Advantages and opportunities

Copreneurial couples often experience a myriad of advantages that not only enhance their professional pursuits but strengthen their relationship on a personal level. Joining forces in business serves as a powerful catalyst for deepening the connection between copreneurial couples as stated by Carolin who said their business united them more than their marriage. Collaborating on shared goals and navigating the challenges of entrepreneurship fosters a sense of unity and shared purpose, creating a solid foundation for their relationship. One notable advantage is the ability to work on multiple ideas and projects simultaneously as Couple G describe. Copreneurial couples can diversify their entrepreneurial endeavors through their shared interests and complementary skills. Complementing each other is a key strength of co-

Table 12: Selected interview statements about legal agreements

Interview	Statement
Anna (P01)	No, we don't have [any legal agreements]. To be honest, for the German side, we may have a UG, like an individual UG, to solve this type of problems because you never know what is happening in your life. (P01, Pos. 76)
Brigitte (P03)	We have everything set up. I mean, we also have a marriage contract because we got married in France. And in France they have a bit special, they have a special stim where you split, so you have in France either. Like the normal way, how it's handled is that everything is split within the couple. [...]So that in our case, it's clearly split. So, if I were to be at home with the children or like he was told when children together, does their career, it still would be compensated, it's a difficult compensated, but in general, it's a clear separation of goods. (P03, Pos. 28)
Benjamin (P04)	So, we have a co-founder agreement for the business, so that defines the rules and how we deal with shares, etc. And I think together, I think we would probably have not done one. I'm not sure. I've never really thought about it if we would have done one if it was only Brigitte and myself. I'm not even sure if that would be necessary legally because we also have a, I guess, you know, contract as a married couple. But we probably would have had to somehow define that in any case. (P04, Pos. 24)
Debora (P07)	We have made legal arrangements for what happens in the event of separation. This has all been legally clarified and recorded. If we ever disagree on decisions, as I said, we always find a way, but if things escalate, if we get a divorce, then we have dealt with the legal issues. We have a relatively good notary, who always provides us with excellent legal advice. He supported us with the formation of the limited company, he supported us with many other private issues, which you have to do when you get married and also on this topic. (P07, Pos. 36)
Dennis (P08)	And if we actually do split up and find a way to do it, it's usually always about money, assets and so on, how we're going to handle the rules. I took a very big leap of faith in the relationship itself, but also in the foundation of the company. (P08, Pos. 64)
Frederick (P12)	Yes, it's enshrined in the shareholder agreement that if someone leaves, so even if I'm not a managing partner, I still have the full right to act. We are authorized to represent each other in the event of a separation or not only if there is a separation, also for example, death or similar. You also have to bear that in mind, of course, then we also have two children, so we've thought about everything to make sure that the children are well looked after later on. (P12, Pos. 40)
Gabriela (P13)	Yes, we have a good friend who works in the fiduciary sector. And he gave us a lot of support. And that was very important to me personally, because yes, every relationship can break down somehow. [...] For this very reason, it was very important to me that we also clarify this legally somehow and that we also get support, because especially in a process when things are just harmonizing very well between each other, then you usually or very often think less about it [...] (P13, Pos. 28)
Henry (P15)	I don't think, if you think too rigid, but this is, or like you were asking for like legal structures and legal agreements and so on. For me, this is nonsense. This is probably important if you have investors on board, it is probably important if you are dealing with other parties. Within a couple, the rules are different. If the rules are determined by a legal paper, I think it's not really the right thing. (P15, Pos. 116)

preneurial couples, which is also caused by balancing out emotions, as stated by Christopher. Copreneurial couples, intimately familiar with each other's personalities, can provide emotional support and understanding during both professional triumphs and challenges. This emotional synergy contributes to a harmonious and resilient working relationship. The depth of knowledge about each other's strengths, weaknesses, and working styles is a unique advantage for copreneurial couples. This intimate understanding allows for more effective collaboration, decision-making, and problem-solving, contributing to the overall success of their joint ventures. A trustful working relationship is the cornerstone of copreneurial success. The pre-existing trust, built up over years, between partners, built on the foundation of their personal relationship, translates seamlessly into their professional collaborations. This trust fosters open communication and a sense of mutual reliance. Working together on one goal is the ultimate unifying factor for copreneurial couples. The opportunity to spend more time together is another significant benefit for copreneurial couples. Emanuel mentioned that, unlike couples who maintain separate professional lives, they share a common workspace, enabling them to be present in each other's daily routines. This also applies to spending time with your family and children as stated by Dennis and Henry.

Finding 3l: Joining forces in business deepens the connection between copreneurial couples, fostering unity through shared goals and entrepreneurial challenges.

Finding 3m: Copreneurial couples enjoy more quality time together, enriching both the personal and professional dimensions of their relationship.

Finding 3n: Intimate familiarity allows copreneurial partners to provide valuable emotional support during both successes and challenges in their professional journey.

Finding 3o: Profound knowledge of each other's strengths and working styles contributes to effective collaboration and decision-making in their business context.

Finding 3p: The trust from their personal relationship seamlessly extends into a trustful working relationship, fostering open communication and mutual reliance.

4.4.7. Principles of working together

Copreneurial couples navigate the intricacies of working together by adhering to fundamental principles contributing to their joint venture's success and maintaining a healthy personal relationship. Continuous learning and improvement stand out as essential principles for copreneurial couples; according to Debora, this can also be done through training. They recognise the evolving nature of their business and commit to ongoing personal and professional development. Adjusting to dynamic situations and engaging in self-reflection become integral components of their journey, ensuring adaptability and growth over time. Creating separation between work and private life is a crucial principle. Copreneurial couples understand the multifaceted reasons be-
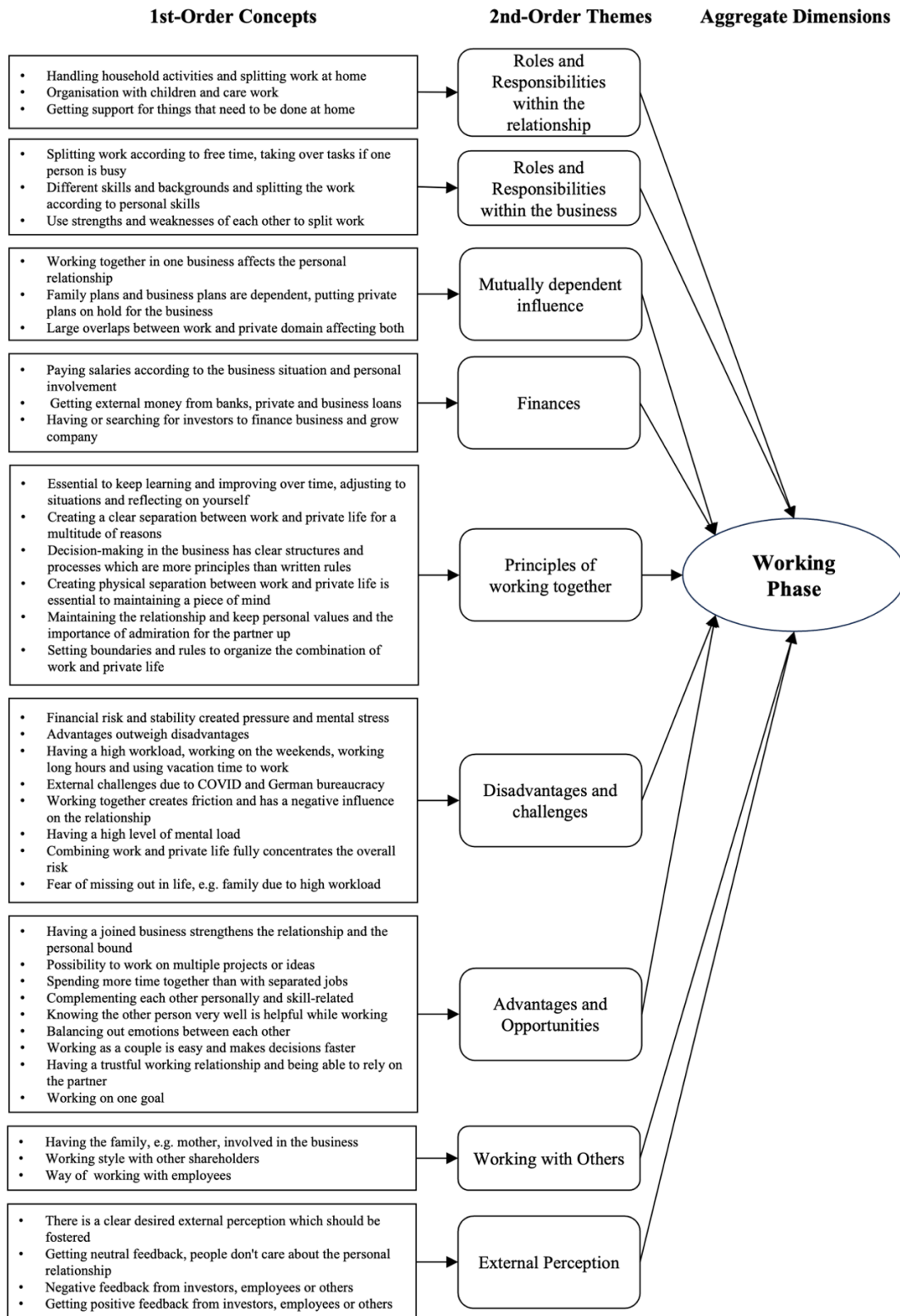
1st-Order Concepts   **2nd-Order Themes**   **Aggregate Dimensions**

- Handling household activities and splitting work at home
- Organisation with children and care work
- Getting support for things that need to be done at home

→ Roles and Responsibilities within the relationship

- Splitting work according to free time, taking over tasks if one person is busy
- Different skills and backgrounds and splitting the work according to personal skills
- Use strengths and weaknesses of each other to split work

→ Roles and Responsibilities within the business

- Working together in one business affects the personal relationship
- Family plans and business plans are dependent, putting private plans on hold for the business
- Large overlaps between work and private domain affecting both

→ Mutually dependent influence

- Paying salaries according to the business situation and personal involvement
- Getting external money from banks, private and business loans
- Having or searching for investors to finance business and grow company

→ Finances

- Essential to keep learning and improving over time, adjusting to situations and reflecting on yourself
- Creating a clear separation between work and private life for a multitude of reasons
- Decision-making in the business has clear structures and processes which are more principles than written rules
- Creating physical separation between work and private life is essential to maintaining a piece of mind
- Maintaining the relationship and keep personal values and the importance of admiration for the partner up
- Setting boundaries and rules to organize the combination of work and private life

→ Principles of working together

- Financial risk and stability created pressure and mental stress
- Advantages outweigh disadvantages
- Having a high workload, working on the weekends, working long hours and using vacation time to work
- External challenges due to COVID and German bureaucracy
- Working together creates friction and has a negative influence on the relationship
- Having a high level of mental load
- Combining work and private life fully concentrates the overall risk
- Fear of missing out in life, e.g. family due to high workload

→ Disadvantages and challenges

- Having a joined business strengthens the relationship and the personal bound
- Possibility to work on multiple projects or ideas
- Spending more time together than with separated jobs
- Complementing each other personally and skill-related
- Knowing the other person very well is helpful while working
- Balancing out emotions between each other
- Working as a couple is easy and makes decisions faster
- Having a trustful working relationship and being able to rely on the partner
- Working on one goal

→ Advantages and Opportunities

- Having the family, e.g. mother, involved in the business
- Working style with other shareholders
- Way of working with employees

→ Working with Others

- There is a clear desired external perception which should be fostered
- Getting neutral feedback, people don't care about the personal relationship
- Negative feedback from investors, employees or others
- Getting positive feedback from investors, employees or others

→ External Perception

Working Phase

Figure 4: Data structure – Working phase (Own illustration based on Gioia et al. (2013))

hind this separation, from preserving mental well-being to fostering a sense of peace. Establishing physical boundaries helps maintain a balance, allowing them to switch between professional and personal roles more easily. From the participant's view, this can be fixed free time or family slots, practicing mindfulness, not talking about work during meals or clear communication of the role someone is taking in a specific moment. For example, Brigitte, as well as Emanuel,

Table 13: Selected interview statements about roles and responsibilities with the business

Interview	Statement
Anna (P01)	So, because we know each of us has strengths and weaknesses. [...] And I'm very good at management and doing some hands-on work, like doing some solving the problems, but I cannot be definitely as good as him in like in one day he can submit two proposals, but for me, it would take a month. (P01, Pos. 52)
Alexander (P02)	In the work life, I would say, and meetings, most of the time meetings with companies we do together, but now we came to a point that because there are so many meetings and time is always so precious. (P02, Pos. 108)
Brigitte (P03)	So, I like to do like product development. And I also navigated more and more towards product development and software development. [...] And then he takes on more of the sales requests because I'm limited to my kind of working hours with my day-to-day job and he's more flexible. (P03, Pos. 64)
	[...] and we can also support each other. So, if, I mean, for example this morning, Benjamin was running late. So, he just called me "Can you take over this meeting?" So, it's really, really easy and we can shuffle around between each other. (P03, Pos. 100)
Benjamin (P04)	So, there's the background aspect, but there are the skills aspect. I mean, I hear a lot about Brigitte's work and she hear a lot about mine. She's probably not trained to do what I do generally, and I'm definitely not trained to do what she does, but from a skilled point of view, we are related to do well. (P04, Pos. 68)
Carolin (P05)	Well, I would say he is more of an analytical, numbers person. That doesn't suit me at all. I'm more of an emotional person, I come from a human resources background. I'm pretty good with texts. My strengths are a bit more in marketing and storytelling. Everything that has to do with people, creativity, and product development. (P05, Pos. 28)
Christopher (P06)	And we use these strengths in our startup. That's why we are clearly divided as a couple. So, we try to, well, we have different focuses. And mine is clearly on these economic topics such as sourcing, product procurement, etc. (P06, Pos. 8)
	Then, of course, we also have different characteristics. She is very structured and is this person who is also strong in the operation at the end. So, she speaks in a very disciplined way and also brings things with her and then be the heart of product development. (P06, Pos. 12)
Debora (P07)	So, we founded the company as a GmbH in 2019 and then said relatively quickly how we would distribute the areas of responsibility. I'm more responsible for product, content, marketing, concepts and actually also a bit of the innovation processes. [...] So, we have developed relatively well apart, well, not apart, but split up, and later the topic of tech and platform management were added later and that is also the case, where Dennis actually responsibility for it, where we really have a strong overlap, the topic of sales and account management, that's actually what account management, that's actually something where we always come together, just like with the topic of trainers and network management. (P07, Pos. 16)
Dennis (P08)	[...] we split up in such a way, that she is more responsible for the creative side, i.e. marketing, content, vision and so on, and I'm more responsible for operations, sales and HR. (P08, Pos. 8)
Emily (P09)	We did everything for a long time, especially in the early days. Something falls and the one closer to it bends down, that's how it was. That's what we did. Emanuel had the vision right from the start. Emanuel is very visionary. And I'm more of a visionary when it comes to business development. I'm visionary in terms of how I want to work with my team. In other words, I'm typically pedagogical and psychological. [...] And then the team grew and grew and at some point, we realized that it's been about three quarters of a year now, we can't both do everything all the time. (P09, Pos. 36)
Emanuel (P10)	It has to do with the strengths of both of us; Emily is much stronger than me in the social and emotional areas. And I'm stronger in the analytical area. And that's how we've divided up our tasks. (P10, Pos. 28)
Fiona (P11)	[...] we know where our strengths and weaknesses lie and everything that really concerns the craftsmanship, Frederick is simply the one who always has the expertise or wears the hat. And when it comes to business management, that's always me. (P11, Pos. 60)
Frederick (P12)	Fiona was the business management part with all the figures and all the applications and subsidies etc. And I'm actually more of the manual, technical part, which means I've mostly taken care of all the IT and things like that. and things like that, what kind of things do we need, what would be interesting and the creative stuff, we did that together. (P12, Pos. 20)
Gabriela (P13)	And it was very important to us, as George comes from the marketing sector and I come from the design sector, that we almost even look after individual customers separately. I now carry out small jobs myself in the design area and George does the same in the strategy/-marketing area. (P13, Pos. 68)
George (P14)	I would say that 80 % of the work is clearly defined. And then there's 20 % where we perhaps marketing campaigns for ourselves, we already know who is doing what. And yes, we then have to always have to see who what can do, but I say 80 % is how we define who does what. (P14, Pos. 32)
Henry (P15)	So, we changed that, we ended that business, and what we are practically now doing is within the roof of the same company; I'm doing consulting and interim management activities, and my wife has built up a social media marketing agency. (P15, Pos. 8)

uses phrases like 'I am now calling you as your life partner'. Another way of separating is using different words or more professional language at work as explained by Frederick or Emily. Decision-making within the business is guided by clear structures and processes grounded in principles rather than rigid written rules. For example, Couples C, D, F and G have clear areas and the person responsible for a topic also has the dominating decision power.

But in general, most of the couples stated that they decide, and if they have discrepancies, they tend to put the decision aside and revaluate when both have had the chance to think about it again. Furthermore, maintaining the relationship's vitality is a core principle for copreneurial couples. They priorities personal values and actively cultivate admiration for each other as explained by Anna, Brigitte, and Debora. Nurturing the emotional connection ensures that the professional collaboration enhances, rather than jeopardizes, their personal bond.

Table 14: *Selected interview statements about roles and responsibilities with the relationship*

Interview	Statement
Alexander (P02)	I think most of the time we share everything but because I love cooking, so I'm always doing on the cooking side and Anna is very much into the cleaning and organization so she is taking care of that. (P02, Pos. 96)
Brigitte (P03)	So yeah, so I think, I mean, for Benjamin and me, it's clear that we want to split it quite equally. So, I mean, I would say, because everybody has like some household things that they prefer to do. But we always split stuff. And so, for us it's clear that we will both be equally responsible for taking care of the child. And of course, I'm a bit afraid what it will do with our free time because currently we are both juggling a job and the startup. [...] So, I would also say a bit attitude towards having a child is also not like, okay, you as a woman you don't do anything for a year and you stay at home with your child, it's not like, okay, you organize childcare and then you have very flexible working hours whenever the child sleeps, so that's about the plan. (P03, Pos. 48)
	That's also why I think it will be actually fine when we have a child because then whoever currently takes care of the child can just say okay, I will just shuffle you will jump into this meeting I cannot take it currently and we balance each other out and I think that's quite nice that we have this flexibility. (P03, Pos. 100)
Carolin (P05)	Yes, we try to outsource and automate as much of the housework as possible. So, we have a cleaning lady, who comes, we take shirts to the dry cleaners, we have things delivered. So, it's really, we try to make the whole thing as efficiently as possible. When children come along, Christopher will probably just take a break from [employer] simply take some time off, because he can do that, salary-wise too. And then, so that we can continue with the company, we'll probably also involve our moms and get them involved so that they can support us and so that it can continue here. (P05, Pos. 72)
Debora (P07)	Very challenging. So, I don't think you can sugar-coat it. It was very challenging. Our daughter has just turned two and the last two years have been really tough. So, for me personally, they've been the hardest in my life, because when you have a company together, you need to work at the same time and in parallel, which you don't really have any more with a child. It's more likely that either one or the other will be responsible for, yes, the care work and that always means that the moment the child is in bed, you're really broken. [...] So, it all comes together and that requires a lot of strength in many areas, a lot of perseverance on our part and actually constant consultation and organizations as partners, as parents and as business partners. (P07, Pos. 44)
Dennis (P08)	Even that, when everyone does everything, is always relatively difficult. Everyone somehow does business, everyone does childcare, everyone does housework. That's always a bit of a challenge for an equal partnership, but also equal entrepreneurship, if everyone can do everything, everyone will do everything. (P08, Pos. 100)
Emily (P09)	And yes, how we manage life at home is very chaotic indeed, because we both love being here [at work] and because the roles are very here, I think it's very complicated, because when we had our son, I said I'm at home now, so I wanted that too, I wanted to be with him, and I also did some consulting or coaching on the side. I'm with him because we only have one child and I want to enjoy it too. (P09, Pos. 20)
Fiona (P11)	We actually split it pretty much 50/50, with Frederick being the one who does more care work [right now]. Well, we had another baby at the end of 2021. I was basically at home for the first year, until this year on first March and Frederick did the business side of things. I did more of the background, the financial and business side [and now is his turn]. (P11, Pos. 72)
George (P14)	We do it pretty much the same way as before, when we weren't working together. We've also split it up a bit. I mainly do the laundry. (P14, Pos. 24)
Henry (P15)	Well, we do have, let's say for cleaning and so on, we do have support, we have a cleaning lady that comes to us, which is something that we both don't really enjoy much doing, the cleaning of the house. Taking care of the little one has, I believe, changed over time also a little bit, like when he was very small, of course, and breastfeeding and everything, it was mainly my wife, while I was, whatever, I don't know, taking him more for longer walks. (P15, Pos. 4)

Finding 3q: Maintaining the relationship is a core principle, emphasizing personal values and nurturing admiration for each other.

Finding 3r: Setting boundaries and rules organizes work and private life integration, ensuring a structured yet flexible approach.

Finding 3s: Copreneurial couples use different language styles and communication characteristics to create boundaries.

4.4.8. Working with others

Copreneurial couples, who jointly navigate the realms of business and personal life, often extend their collaborative approach beyond their partnership to include other key stakeholders. This encompasses involving family members, collaborating with other shareholders, and establishing a unique working style with employees. Working with other shareholders is a nuanced aspect of copreneurial collaborations. This is especially important since the feedback they receive, like Couple A, E and G, form investors or customers is negatively biased towered couple businesses. Whether involving external investors or partners, copreneurial couples navigate shared decision-making and aligning interests. Establishing a cohesive working style with other stakeholders involves transparent communication, shared goals, and a commitment to the collective success of the business. The way copreneurial couples work with employees reflects their collaborative ethos. Open communication, mutual respect, and a recognition of individual strengths contribute to a positive working environment, that aligns with their shared values. But this does not come intuitively but is rather learned and developed over time like the statement of Caroline shows, where their first employee told them she feels like a child of divorce, and they knew they had to make changes.

Finding 3t: Copreneurial couples need to be very thoughtful in their dealings with employees and the way they manage them.

Finding 3u: Copreneurial couples should create clear guidelines how to communicate with external parties.

Table 15: Selected interview statements about finances

Interview	Statement
Alexander (P02)	And we have already raised half a million. Now we are raising another one million. (P02, Pos. 4)
Brigitte (P03)	And then when we talk to investors, we are currently not actively looking for investors. But also, with, say, Benjamin and I share talking to investors depending on how this happens. (P03, Pos. 64)
Benjamin (P04)	The idea is also that over time, we do, you know, as the company evolves and we get more successful potentially investments, we've not really tried to have investments so far. (P04, Pos. 20)
	And in that case, most of that means looking for investment to be able to get a salary if we're not able to live from the income that that the startup generates on its own. (P04, Pos. 56)
Carolin (P05)	Different. Well, in the beginning, I didn't pay myself anything, then at some point we started paying 800, 900 euros when the first interns came and we said, maybe I should earn as much as the interns. Then we went up in the meantime, even to around 5, then it was 3 again. suspended again and are paying off loans, because of course we always give a lot of loans to the company ourselves. So, we do that a bit flexible. (P05, Pos. 104)
	And then we kept putting money in privately and made loan agreements, so to speak, where the company paid it back. And we still do that, so we make regular repayments. And then when things get tight again, we push a larger sum in and out again. And as it happens. So, for us, for example, it's never the issue is that we need money now. And how do we draw up the contracts so that we're both safe and who pays how much? who has cash in the account, who puts money in. So, it's uncomplicated. (P05, Pos. 108)
Dennis (P08)	We took out a small loan at the beginning because the interest rates were relatively favorable, but otherwise we don't have any external money. (P08, Pos. 68)
	No, we didn't [got investors onboard], because we always had the feeling that the topic of mindfulness and venture capital didn't go so well together. Because everything is always very numbers-driven, very pushy, very hard, has to somehow generate your sales and your yield at some point. And that somehow wasn't the case, even now with all the impact investment funds that now exist, but I still don't have the feeling that it fits. (P08, Pos. 72)
Emanuel (P10)	If you work in a capital company, which is not yours alone, then you are also subject to certain constraints, namely the constraints of the other company, and I personally find it stressful in the family, in the family situation outside of work, that we, Emily and I, are paid unequally, for example. Of course, that has to do with the area of responsibility we take on. And that also makes it rationally and possibly also fair for someone looking at it from the outside. But what someone from the outside perceives as fair is possibly different to what I consider fair for my favourite person in life. And that is something, i.e. appreciation and recognition, including financial recognition. That's actually an issue that's really not easy. (P10, Pos. 88)
Frederick (P12)	Exactly, exactly. That's for the whole store fitting, for the equipment, it's all relatively expensive because it's medical equipment. In our case the house bank and the Thüringer Aufbaubank, which financed us, and the Thüringer Aufbaubank only gives us the money if the house bank agrees to finance it, of course. Plus, a bit of funding from the state of Thuringia. Exactly. (P12, Pos. 92)
Gabriela (P13)	We are currently paying ourselves very little salary. Yes, that's important to us because we're not really reliant on it at the moment. We pay ourselves the same amount, the same salary, the same amount. But that will probably be at the end of the year, when we'll discuss about with bonuses. If we simply see that it was a good year. We still had so much profit, then we divide it up according to how it suits us and perhaps also based on who did what, exactly who generated what turnover. (P13, Pos. 48)

4.5. Model and framework

Having carefully navigated the findings presented in a processual manner guided by the data structure, now moving onto the next stage of this research: the development of a model. Using the Gioia et al. (2013) methodology, the data structure is the foundation for the development dynamics of the copreneurial couple businesses' model. Since this thesis aims to provide insights into how couples combine work and private life, the model only represents the development dynamic of copreneurial couple businesses and can be used for theoretical explanations. From the model simplifying this development process, I created a framework with guidelines to provide an organized evaluation, creation, and handling of decisions, structures, and strategies.

Delving into the inspiration behind the model and the framework, it becomes clear that the theoretical frameworks presented in Chapter 2.1. played a significant role. In particular, the combination of individual perspective fostered in the field of social exchange and the view of couples as a unit as in the family systems theory. In addition, the conceptual framework by El Shoubaki et al. (2022) provided inspiration since their work summarizes many aspects of copreneurial couples.

Finally, for the framework, the business model canvas by Osterwalder and Pigneur (2010) was taken as inspiration to pair important domains with guiding questions for easy handling. Furthermore, the business model canvas is often used in the field of entrepreneurship education and training of startup teams. Therefore, copreneurial couples in startups are probably familiar with this type of framework.

The model reflects the overall aggregated dimensions and is structured into three main phases, as shown in Figure 5: the Pre-formation, the Formation, and the Working Phase. The model should be read from left to right following the arrow's direction, and the symmetrical reflection illustrates the interaction between two individuals sharing a path into the future.

In the Pre-Formation Phase, we start with two individuals in a relationship. They share values, goals, and dreams and have individual work domains. Here, the separation between work and private life is achieved by only getting each other's opinion on work-related topics, while the relationship is the primary connection. At this point, one or both partners come across or develop an idea to work on. Based on their motivation, education, and experience, they prefer either classical

Table 16: Selected interview statements about influence of working together on the family

Interview	Statement
Anna (P01)	And another thing which is also very important in a couple of relationships is like, for example, having kids, so now we still don't have kids together. And we said that like last three years, four years was also very difficult because we have a lot of things to do. And if we want to have kids, then although I was on, I could be on a maternity leave or something like that, but it means that the work has to still be done. Then who does it? Alexander has to be the one to do it. And it was not fair. And it was a lot of work. So that's also something that I would say I compensated because biological clock for women is also more kind of important or more critical, I would say than men. Then we say, okay, we will probably once we are a little bit more stable, then we can start the family planning. This is also something which is important. (P01, Pos. 06)
	No, no, it might mean that probably we would not be able to have kids, but then we have achieved something else. It's not a very easy decision to make, but that's what we have agreed on. (P01, Pos. 110)
Alexander (P02)	Yes, we are always talk about [having children] but both Anna and I maybe realize that I mean, we are getting of course old but at the same time there are too many commitments we have at the moment. And as you know, as foreigners, having no support from family abroad is always difficult, especially, it means that one of us has to be there, I don't know, not working anymore, at least for a year or something, or basically be working much, much less. And that means that both financially and both technically in terms of time management. At the moment, it's not realizable, unless we reach the level that we have other employees the company that can take care of the work that we do. And that means that we need to wait a little bit. (P02, Pos. 92)
Brigitte (P03)	I don't think it had much influence. So, I wouldn't say it's the hardest things we've ever done. [...] So, it's not the fact that we are doing the startup together. It's just the fact that we are working a lot and that sometimes we are like, yeah, I'm personally wondering whether we're enjoying our life enough on whether we are, whether we managed to shut off during the weekends and not feel guilty about not doing something. (P03, Pos. 88)
Benjamin (P04)	But it's a question whether the time scale that we have with the kid will work out. And we took the decision to have a kid, you know, actively knowing the risks associated with that and from a work point of view. (P04, Pos. 56)
Carolin (P05)	So, we always assumed that we would raise the company to such a solid level that we would easily decide, okay, now is the time, let's give it a try. It has now turned out that somehow, it's always, somehow there's always a lot to do and it's always somehow always stressful and it's not really getting any better. And now we've simply reached the point where we've said okay, we're married now and I've sort of stopped taking my pill and now come what may, when it happens, it happens and then we have to deal with the situation somehow anyway, because we've said whether it's now or in a year or two a year or in two years, the perfect time will come in the end and we have to come to terms with the company somehow anyway. anyway. That's why we'll just deal with it now and see what happens and then we'll see how we manage. (P05, Pos. 68)
Christopher (P06)	Especially in Q4 last year, when it all came so hard, quite honestly, I wouldn't have thought a single line, children, so that's impossible, yes. In other words, you're also putting yourself under psychological strain if you can't cope with it and if you can't organize yourself, and then it's difficult, but we've come to terms, we know that in the next two years we have to stabilize the whole thing to such an extent that we can simply pull ourselves out of it more strongly so that we can also have a normal life, that we can simply pull ourselves out of it more so that we can have a normal life. But it works. (P06, Pos. 88)
Debora (P07)	Yes, it's always been clear to us that when we get married - we got married in 2020 - we want to have children at some point. I'm not super young anymore, so it was also clear to me that I would want a child at some point and not wait forever. And yes, I think we imagined it would be easier when it finally happened. Which is also because we, yes, that issues like childcare and so on, that we also imagined it would be easier, because it's simply interesting time in Germany, too. Exactly, but I still wouldn't do it any differently. I think it's always the way it should be. (P07, Pos. 48)
Dennis (P08)	It has to be said that Debora is a bit older than me. And we knew right from the start that there would be a bit more of a push from her than from me. And to be fair, there's never really a good time, because that's how you approach it now. I could well have imagined waiting another year or two until it was and then we'd be in calmer waters, but I also understood that you have to get going somehow. And then it was more like, well, let's just see. (P08, Pos. 112)
	Whether there's room for a second or third child in there somehow, especially against the also a bit against the time background, yes, or also from the age background, we have to see somehow, is not really the case at the moment, because we are really very busy with [our daughter]. But the last word has not yet been spoken yet. (P08, Pos. 20)
Emily (P09)	But when parents get old and need you and you're just so tied down, it feels like you're being torn apart. So, I often feel like that. That suck. It's really stupid. And with our son, he's coming, he's 17, he has his girlfriend. But sometimes I think, well, what will it be like in ten years' time, when he's no longer with us, but he'll probably have gone to university somehow and moved away somewhere, we'll say, well shit, the last few years from the age of, I don't know, 13 or 12, until he was 18, we should or should have had more time for him. [...] Family, friends, sometimes I actually feel guilty about that, yes, but it's a shame that you don't have more time. (P09, Pos. 56)
Fiona (P11)	Um, [it does] not really [influence our relationship]. Because I think if that had influenced us, we wouldn't have lasted 14 years together, to be honest. We had a good roadmap right from the start. We said, okay, work is work, private is private and it's also quite funny when we still go to see former colleagues. They are also always super amazed that if you hadn't known in the store that we were a couple, you wouldn't have even realized it. (P11, Pos. 80)
Frederick (P12)	But [discussions at work] had a very small effect on the evening afterwards at home. Because you still talk about it at home. (P12, Pos. 140)
Gabriela (P13)	We are currently focusing quite a lot on [name of business] and our business plans. Not because we don't find private plans also important, but more because it's a bit of a baby at the moment. And yes, family and plans for the future are not really so present at the moment or not yet so important. We can talk about that again in a few years. But for us but it's also important to us that we have a bit of security with this company at the moment, that we want to build up financial security before we plan any further steps. (P13, Pos. 96)
George (P14)	Yes, exactly, it's not something we have in concrete terms yet, because here, too, we clearly say, hey, first we have to build up our company, that's our child at the moment, so to speak. Also, of course, financially we have to reach a different level, we have to we have to be in a better position, also with the apartment, we simply have to have more security. (P14, Pos. 104)

Table 17: Selected interview statements about disadvantages and challenges

Interview	Statement
Anna (P01)	And also, we were not easily able to arrange holidays together because we both cannot be away together because then it's a bit difficult to arrange the project to manage the students and all those things. So, this was kind of affecting our personal life. (P01, Pos. 106)
Alexander (P02)	But in terms of personal life, I think it also makes you a little bit under pressure because a lot of things then comes to Saturday or Sunday with discussions [...]. You will not have that freedom that two-person working into different companies. So, a lot of things are almost integrated into your private life too. (P02, Pos. 52)
	Yes, yes of course but they think the private life I will I mean, I can totally say, and I agree that now it is very hard because we run it so many things at once. (P02, Pos. 68)
Brigitte (P03)	So, we work a lot. We also work during the holidays and once we also work during our honeymoon because we wanted to send a presentation to someone (P03, Pos. 84)
	I would say the biggest challenge is to just the workload. So, it's not the fact that we are doing the startup together. It's just the fact that we are working a lot and that sometimes we are like, yeah, I'm personally wondering whether we're enjoying our life enough [...]. (P03, Pos. 88)
Carolin (P05)	We even had the company in the apartment for a relatively long time. In the beginning, we had a small apartment where we had an 11 square meter office, and the first two employees were already in there. They then came to our home and then we moved into a larger apartment where it was at least on two different floors, but we actually had floors, but we actually always had the company in the apartment and the employees in the apartment for a very long time. (P05, Pos. 56)
	Yes, that you never really switch off. So, we actually always take it with us, no matter where we are, whether it's leisure time, a vacation or it is, it's somehow always there. So, it's as if the company is always running along behind us, so to speak. You can tell that, so we haven't really been able to let go completely since we founded the company. (P05, Pos. 84)
Christopher (P06)	You can't say, now I have free time, because both are burdened, both have stomach aches and both can't calm down right away, so both are just under tension and that's also a vice, yes, but it also strengthens the relationship, so that's now been a disadvantage where the negative effect is simply that you don't have that distance, that you're just, yes, just this, yes, that there's no one there to catch you, so we catch ourselves, but that you just both feel this pain. (P06, Pos. 80)
Debora (P07)	Financial uncertainty. So, the biggest challenge for me personally. Setting limits. When to stop working. And when to take a break. It's simply much more difficult when you work together. And can always talk about work. Yes, and to endure the ups and downs together. And staying strong, that's, yes, I think that's a big challenge. (P07, Pos. 84)
Dennis (P08)	So, by far, probably that [combing work] with an additional small human being. The two of us as such. As I said, we've worked well together, we can split up, go on vacation together, everything like that, easy-peasy. But then whether to give up most of your attention to a child who demands a lot of you and then how do we structure it? (P08, Pos. 128)
	We have to make sure that our cash flow comes in all the time and that we serve our customers. And it's not like we can take half a year off relatively easily and then somehow nothing happens, and nothing comes in. (P08, Pos. 132)
Emily (P09)	[...] then I started, Emanuel how was that appointment? And that's standard on the car journey. And every time we said, no, we don't really want to talk about it right now, we actually want to talk about something else. But we always end up there. That's also the case at the weekend, so it's difficult. And actually, it's really difficult. I find it very difficult to draw the line. (P09, Pos. 44)
	But I still gave up the simple things, like just having time to go to the movies once a week or I don't know. I think I'm going to really struggle with that when it's 10 years down the line. (P09, Pos. 56)
Emanuel (P10)	Of course, there are also cons and they are, for example, that you always take the company with you, that it's like a ghost always sitting between us sitting on the TV couch or driving along in the car, it's just much harder to switch off. (P10, Pos. 6)
	Because we also realize that this hustle and bustle that many people have at the beginning of their business startup is obviously not healthy in the long term and also leads to inadequate recovery, which in turn permanently reduces performance. And we notice this not only with our employees, but frankly ourselves as well. (P10, Pos. 64)
Fiona (P11)	Of course, you're already tied down and we haven't had a day's vacation in the last four years. Unless we've used a bridging day or something. (P11, Pos. 108)
Frederick (P12)	We have said that we try to keep private, and business matters separate, but it's in the evening when you say the children are in bed. We'd actually like to watch a series on Netflix together, but there's still something that needs to be still having to be prepared, the email still has to be written, the programming still has to be done. (P12, Pos. 104)
Gabriela (P13)	We actually try not to mix it too much. It's difficult, of course, because everything is so close and, above all now that we don't have a permanent office, the office is also at home and yes, we miss it a lot. (P13, Pos. 100)
Henry (P15)	Yeah, that was probably difficult because as we were working also virtually all the time, we were working from home, from living room, dining room, from everywhere. If we went on vacations and we had to do something or on trips, it can be that in the evenings you sit there also with a laptop and do something. That was very much blended, to be honest. (P15, Pos. 44)
	Yeah, so I don't really think that we had a clear split of what is our private life and our business life. [...] So, there was not really any neither physical nor content wise or timing wise split. (P15, Pos. 48)

businesses or somewhat riskier and unknown business models while sharing a certain amount of entrepreneurial spirit. Over time, they start working on the idea, whether one person only is helping or being equally involved. They agree that both want to be involved in a shared business. The dotted open rectangle symbolizes the start of a more concrete way of working on this idea. This is the point where they move over into the Formation phase. Here, the basis for the company is built. The couple starts to talk about equity slit, roles and responsibilities, working styles, commitment, resource allocation, and legal structures. At this stage, the first challenges occur unequal points of view, different operating practices and ethics, and communication differences or tensions from relationship-related discrepancies.

The oval around the now closer-placed circles, being now the couple who share most of their domains, reflects the registration of the business and is also the starting point of the Working Phase. Moving into the Working Phase, the couple determines who is responsible for what and how main decisions are made. Here, we see that their work and private lives go in parallel. From this point, dependent on the chosen work commitment, either no one, both, or only one person keeps an individual working outside of this construct to support the business and family, reflected by the dotted arrows going out of the rectangle and going in the right direction. The same is true for the individual's private life, which is based on the couples' preferences, which are more or less pronounced. As mentioned initially, both share values, goals, and dreams. These may change and develop over time but are always present and are reflected in their way of working and maintaining the relationship.

The following chapters are devoted to a detailed explanation of the development dynamics of the copreneurial couple businesses framework, as shown in Figure 6. Designed to be applicable in real-life scenarios, the framework is a step-by-step guideline for couples who want to start a business together or have already started working on an idea. The guiding questions have been derived from the participant's statements and descriptions. The framework should be helpful in making decisions and creating structures to combine their private domain with a shared work domain. It's essential to note that the framework is very simplified and unable to illustrate the complexity of the development of a couple business due to the many areas and personal needs of each couple. But breaking this complexity down to some core principles and approaches can be a basis for discussion and will provide essential aspects that should be considered by couples who want to start a business together. Parts of this framework could also serve as a guideline for other founders and their handling of each phase. In the best-case scenario, couples will adopt the framework very early and follow the steps described below in one session or short intervals. When moving on to a new phase, the framework can be used again to incorporate new insights.

4.5.1. Pre-formation phase

In the pre-formation phase, copreneurial couples define their joint entrepreneurial venture. It is a stage where individual goals and dreams converge, laying the foundation for shared aspirations. Each partner's values, motivations to start a business, and entrepreneurial spirit intertwine, shaping the collective vision.

During this crucial phase, couples delve into introspective considerations, exploring their desires and ambitions. Reflecting from a first-person perspective, they should talk about their aspirations for the business and how these align with broader life goals. Values play a pivotal role in shaping the foundation of the business. Couples should consider the core principles they want their venture to embody, exploring how their values align and how they can integrate these principles into the fabric of their business. Motivation becomes a driving force as couples contemplate the reasons behind their decision to embark on this entrepreneurial journey together. They should explore what fuels their passion and how it translates into a shared business purpose. Understanding the intrinsic motivations of each partner lays the groundwork for a professionally rewarding and personally fulfilling business venture. The entrepreneurial spirit, an intangible force driving innovation and resilience, should be examined closely. Couples consider what sparks the entrepreneurial fire within each partner and how they can collectively harness this spirit to overcome challenges.

By embracing their individuality in this pre-formation phase, copreneurial couples set the stage for a business that leverages their shared vision. This phase demands open communication and a deep understanding of each other's perspectives to foster a harmonious alignment, leading to the identification of the largest overlaps and deviations.

4.5.2. Formation phase

In the formation phase, as the idea of collaborating in a shared venture solidifies, copreneurial couples should delve into critical aspects that shape the foundation of their business. Here, couples must carefully assess their commitment to allocating resources to the venture. Additionally, they should discuss legal agreements and fundamental considerations about how they want to work together. The guiding questions move from an individual into a team perspective.

This phase involves a pragmatic evaluation of financial investments, time, and energy dedicated to the business. Furthermore, they should discuss their commitment expectations regarding business and private life. Legal agreements become paramount during this phase. Couples should articulate and formalize the terms of their partnership, defining general roles, responsibilities, and the framework for decision-making. Clear and comprehensive legal agreements establish a solid foundation for the business and help prevent potential conflicts. It is advisable to obtain specialist expertise, such as lawyers or coaches. Equity split is another crucial consideration in the formation phase. Couples must decide how ownership and profits will be distributed, aligning

Table 18: Selected interview statements about advantages and opportunities

Interview	Statement
Anna (P01)	Yeah. So, what I'm trying to say to summarize is that I think it's really good that we are married, or not necessarily married. Like we are also emotionally together because we can rely on each other in ups and downs, but we still do not take advantage of each other. (P01, Pos. 126)
Alexander (P02)	Of course, we work together, and we travel together, that's also a good thing I would say because then we don't lose the sight of each other, we always meet each other, we have time travel also. [...] But in general, I would say they are more positive benefits in working together because first of all we know each other, we can trust each other. Second of all, we complement each other in the technical and the business and the management. (P02, Pos. 52)
Brigitte (P03)	So, Benjamin is a good engineer and he's a bit more introvert and super, like super detail oriented. I'm more like the outgoing person. I'm more like, I get super excited. I'm like a bit like that and Benjamin is super stable. So we are, we just complement each other quite well. (P03, Pos. 56)
	But then just in general, I think it's important you like, who you're working with. And you have, because I worked in the startup before where the communication was bad. And it's actually quite nice to be somewhere where you have a lot of trust, where you really enjoy spending time together. (P03, Pos. 100)
	Like, he always, and by kind of feeling being admired by someone, I get more confidence in what I do. [...] And I think that's also what makes it easy to do a startup together, because you also cherish what you have in your partner. (P03, Pos. 120)
Benjamin (P04)	[...] because Brigitte and I are quite aligned, I guess, because we come from similar backgrounds, we talk a lot, we spend a lot of time together. (P04, Pos. 36)
Carolin (P05)	I think that the basic conditions were just right for us. We knew that we complemented each other really well and that's why it somehow made sense. [...] And Christopher is actually someone who is completely contrary and totally complemented me. And that's why it was somehow a good fit for us. (P05, Pos. 24)
	I would say that we have grown closer together. It has also become more serious. [...] But at the moment when the company was actually there, it was also clear to us that we wanted to get married at some point and that it was a bit of a forever decision and that we probably wouldn't have done it like that and wouldn't have done it so unbureaucratically and because we knew that this was somehow the deal we had made, forever, for our feelings. (P05, Pos. 112)
Christopher (P06)	With us it was I already had a very close bond with her, I knew that this woman would probably get married, that it was only a question of time. (P06, Pos. 36)
	The advantage is that one person can devote 100% of their time to the job. While the other is still working somewhere else and earning money. Because that's what for example, what if you do it with friends? No friend would say you're earning your 40 hours now. I don't know, you have a good salary for now. You're secure, and I'm joining this company. We have equal shares, and I'm doing 100 % startup for now. And if it turns out great, we'll have 50 % of it. If not, yes, you have your job, and I have nothing. So that's a real advantage, that the relationship allows you to take such extreme measures, because you say, okay, this is a family or a common goal, we're already going together anyway. (P06, Pos. 116)
Debora (P07)	We are very straightforward in our communication. We have the advantage of short distances, and, to some extent, we are very well attuned to how we work together. That makes much easier if we can also support each other well. (P07, Pos. 72)
Dennis (P08)	Of course, [starting our business] also gave me the chance, to be there as the little ones grew up, especially in the last two years. And then all the first steps, the first laughs and so on, I was there with her. Which was a super nice situation. (P08, Pos. 131)
Emily (P09)	I also like to say that we're not a pot and a lid, we're a lid and lid, because sometimes it clashes because we're so different, but I see a lot of things that Emanuel doesn't see and Emanuel sees a lot of things that I don't see and that actually works well and even when we had projects in the past, even when we were really young, it always worked well, because we always picked each other up. (P09, Pos. 16)
	We work together very intuitively, actually. It's very exciting, even though we are so different when we work together for example, when we have an application or an applicant. In the first step, we always do this via Zoom or via teams. Then it's always the case that we don't even need to talk to each other, but I know what he's thinking [...]. (P09, Pos. 20)
	So, for positive things, sweet, Emanuel always calls me. Yes, he always calls me first and when I'm not there and tells me when he's having a positive experience. That's very sweet. (P09, Pos. 96)
Emanuel (P10)	The pro in any case is that you basically spend more time together as a couple than if you didn't work in the same company. The second big pro is that nobody in the world understands me as well as Emily. That means you often don't have time in the company, so I throw two or three chunks at her, and she and she understand in half a sentence what I would need two pages of briefing for someone else. [...] And what that has definitely done to us is that we have gotten to know each other in a certain way and in a new way, because we had never worked together so intensively before. (P10, Pos. 36)
Fiona (P11)	I think he also has a completely different level of trust than I would have had with an acquaintance or another team member. And that in any case, the trust is simply completely different. (P11, Pos. 116)
Frederick (P12)	Yes, I'd say that has grown out of our past. Of course, you've built up a certain amount of trust over the last few decades, you're your partner is at your side, where we were of the opinion that we could do something like this together. We know how to work together. We can keep professional and private matters relatively well. And that led us to say, people, we'll do it together and we don't have to get together with strangers. not get together with any strangers. (P12, Pos. 12)
	You always have someone you can trust when you have worries and needs, someone you can communicate with relatively openly without being afraid it will be embarrassing, or the other person will laugh about it or whatever. (P12, Pos. 100)

Table 18 — continued

Gabriela (P13)	I think one big advantage is that we both know each other very well and know how each other's working methods work. So, we can plan relatively well. And you just know that you can rely on the other person. Yes, and the other person is also there when you need them or when you're stuck somewhere, so that you can find good solutions together. can find good solutions together. I think that's the biggest advantage, simply that you know how the other person works and that you can rely on someone else. (P13, Pos. 128)
Henry (P15)	And also then, as we have our kid also in this time, it gave a lot of freedom and flexibility, but on the other hand, what your life, it was the family and the business together somehow. (P15, Pos. 48)
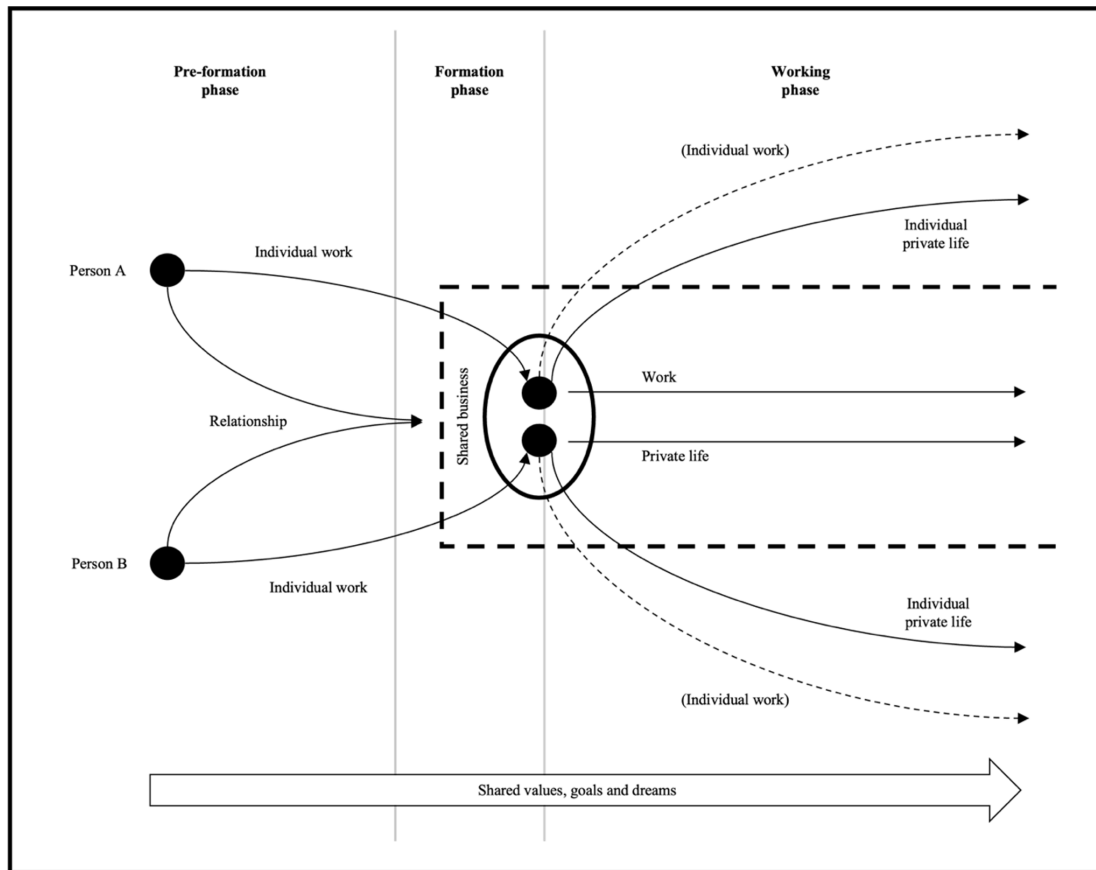
Figure 5: Development dynamics of copreneurial couple businesses model (Own illustration)

this with the contributions and responsibilities of each partner. This process involves transparent discussions to ensure a fair and equitable distribution of benefits. At this point, they should reflect the equity split with their values and the meaning of their relationship. Fundamental considerations about how they want to work together become integral to the formation phase. Couples should explore the dynamics of their collaborative efforts, including communication styles, work preferences, and conflict resolution strategies. Combining these considerations with their relationship dynamics is essential to fostering a harmonious and productive working partnership. They should examine the unique strengths and skills they bring to the partnership, considering how these attributes can contribute to the success of their joint venture.

This phase is marked by strategic discussions, negotiation, and a mutual commitment to laying a robust foundation for their joint venture. Successful navigation through the formation phase sets the stage for the operational aspects of the business, where the collaborative vision transforms into tangible business practices. As in the pre-formation phase, copreneurial couples should evaluate their largest overlaps and deviations.

4.5.3. Working phase

In the working phase, the final phase of the copreneurial couples' business development journey, the integration of work and relationship dynamics reaches a more stable position. Having addressed foundational requirements in the preceding phases, this stage primarily involves refining and challenging established decisions and creating more intricate structures and detailed practices. With the basic groundwork in place, copreneurial couples should now focus on the nuances of their roles and responsibilities within the business and the relationship. This clarification entails a thorough examination and, if necessary, adjustment of individual contributions to ensure optimal collaboration and efficiency.

Table 19: Selected interview statements about principles of working together

Interview	Statement
Anna (P01)	I think we do [the final decision making] together, to be honest (P01, Pos. 68)
	So, in that sense, I think talking to each other regularly and not holding to themselves is very important and writing down emotion and setting the boundaries. I think it's really important. (P01, Pos. 138)
Alexander (P02)	I think most important thing is communications. So, I think we should always communicate openly. We should not leave something in the darkest spot. (P02, Pos. 124)
Brigitte (P03)	In general, everybody can decide. So, in the shareholder agreement, we have decided on which decisions everybody can site on their own on which topics we need the majority vote. (P03, Pos. 24)
	So, we are always trying, so we're always making really clear cuts. So, when I'm like calling Benjamin I'm like, okay, I want to talk about [startup name] or I'm calling you like, okay, now I'm just calling you as your wife. (P03, Pos. 56)
	And also, I would say for Benjamin and myself, it was always clear that we do the startup, but also the relationship is most important. (P03, Pos. 84)
	Yes, we don't work on Friday evenings. So, because Friday evenings are holy. (P03, Pos. 92)
Carolin (P05)	I would say that I'm more the one who works through the whole thing a bit administratively, I get all the information, I look at what I really had and then I give him a feeling, which I find useful. I then talk to him, and he usually goes into more depth on individual things, deeper research and then says, calculates it and then says okay, from his point of view it makes … and then we discuss what the advantages are and what the disadvantages are. (P05, Pos. 32)
	No, [we do not have rules,] not really. So, every now and then, one person says to the other, "I'm done now, I can't hear any more about the company" and that's fine. But otherwise, it's never been necessary. (P05, Pos. 60)
Christopher (P06)	We often discuss it and then we come to an agreement in the end. So, it's not that one of us is somehow imposing on the other, but sometimes we argue, we discuss and then in the end we come to a joint decision. (P06, Pos. 76)
	Yes, because we are naturally very efficient, yes, and of course we try to optimize everything or let's say to have fixed structures somewhere, because everything that has structures and you don't have to think about it […]. (P06, Pos. 96)
Debora (P07)	We are a founding couple; we are a team in life. It's quite normal that we don't always agree. I'm actually rather worse when you always agree, but we always find a good way to reach agreement. And there are also points where I say, hey, this is your area of decision and responsibility, you make the decision now. And elsewhere in my area of responsibility, that's where I make the decision, but generally speaking, we always come to a good agreement, both privately and professionally. (P07, Pos. 32)
	We tend to do this over the Christmas period, or the period over the years, so we basically close all the doors. This is our vision-building and goal-setting time, when we as a couple deal very intensively with our own goals […]. (P07, Pos. 52)
	So, mindfulness is already very much part of our everyday lives. […] But that you always give each other the opportunity to bring mindfulness into everyday life and to develop further as people. (P07, Pos. 68)
	So, I think the first tip is simply to keep finding breaks where you have time as a couple for romance and it's not about business. That you simply clear your head again. (P07, Pos. 100)
	The third is to clarify how we actually communicate. Well, I've done further training in non-violent communication. This is also heavily incorporated into our training courses but is now also a recurring part of our dialog in the partnership. (P07, Pos. 104)
	We have a network of coaches and most of them are also coaches. We meet with them once a year and they are very willing to be there somehow as a spearhead partner and to mirror the principle a bit and we are all friends with them. (P07, Pos. 108)
Dennis (P08)	It always depends a bit on the circumstances. As you know, you have a better day, and you have a worse day. Depending on that, in a professional context, it's the person who officially wears the hat for the topic, has the final say in the end. (P08, 52)
	If there are any things that affect every day working life, then you can of course can always be sent over by e-mail. And then you can leave it there for a while and then answer it somehow, if you have time, in a private context, the answers usually have to be there very quickly, which means you can WhatsApp around a living room if it's about food, but otherwise it's all in conversation form. I would but otherwise I wouldn't say there are any major differences. (P08, Pos. 108)
	Yes, you don't really have to go to an office now, although that has become a point although we say that would even make sense, more to separate private and professional life. (P09, Pos. 136)
Emily (P09)	But exactly, so Emanuel has never made a decision without me, without my consent, and I haven't done it the other way around either. I think we would quickly get to the point where we both, because we're both alfa personalities, would no longer want or be able to work together, yes. (P09, Pos. 28)
	Sometimes I hear from him in particular, he says, yes, but you have to understand, I'm wearing the managing director's hat right now. I understand that, but actually... Sure, we actually have to look at it from two perspectives. But it's not really that separate or that we're different. We're quieter in the office. We've never argued publicly here. We've never snapped at each other or anything like that. Not that. Sure, sometimes we're a bit bitchy. But that's the way it is. It's different at home. (P09, Pos. 40)
	So, it really is very important, and Emanuel and I manage it very well. You always have to have respect for each other. You always have to think, even when you're angry. And we get angry with each other, too, from time to time of course. And that's still my Emanuel. So, I'm still his Emily. And even if we somehow have a difference of opinion about work things, I think you always have to swallow and think and reflect first, but this is still the guy I married, even if he's annoying me at the moment. And so, as I said, I think respect and reflection are super important. And always lots of love, that's also very important. (P09, Pos. 104)

Table 19 — continued

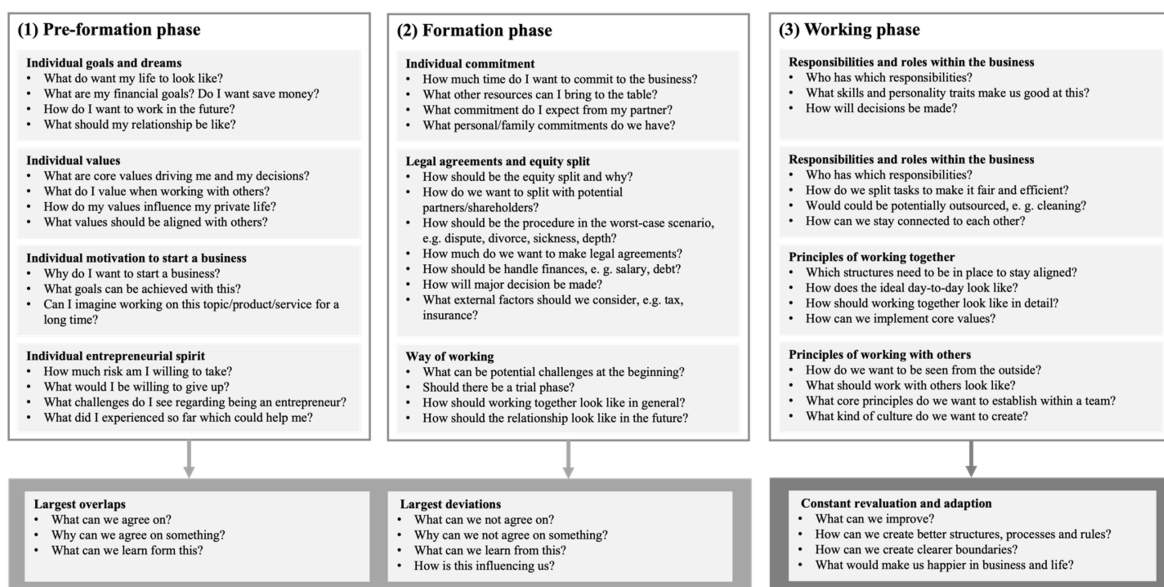|	
Fiona (P11)	[. . .] we simply know where our strengths and weaknesses lie and everything that really concerns the blatant craftsmanship, Frederick is simply the one who always has the expertise or wears the hat. And when it comes to business management, that's always me. I study business psychology on the side and everything else in between, then you sit down, look at the pros and cons and then an agreement is always reached quite quickly. (p11, Pos. 60)
	Especially when major decisions have to be made or something like that, but we've also developed our timetable so that when the kids are there, i.e. when they're still awake or something like that on the day, then work isn't an issue at all. So, there's no talk about work, no one takes out their cell phone to check emails or do anything on their laptop. (P11, Pos. 80)
	Yes, never written down, so not that we don't have a sheet somewhere with rule number one or something on it. But we have developed our principles over the last few years. (P11, Pos. 84)
Frederick (P12)	Always together. So, it's when there are any problems, purchases of a financial nature. We always talk about it, does it make sense, can we afford it etc.? But we discuss all the options and decide together. She never decides on her own. I'm going to do this and that and I never decide on my own that I'm going to do this. Of course, if you want certain things, then logically you try to push for them. But we actually always make the decision together. (P12, Pos. 32)
	Then we'll sleep on it for a few nights. That will be put aside for the time being, the topic will be put aside, if it's not quite so urgent now, I say. And then it's taken up again later, where we think again about the pros and cons, everyone thinks for themselves and thinks through the whole story again and then a week later or something similar we talk about it again, it's brought up again and then we just look at it, is it worth it, does it make sense, is it affordable and so on. (P12, Pos. 36)
	Actually, at home I've never called her Fiona for 15 years, only pet names like darling or what it's like in a relationship. And at work it's unusual at first, for example, if I haven't been at work for a long time, I don't shout through the store "Honey, come here.", but I do shout "Fiona, can you please come here.", for example. (P12, Pos. 124)
Gabriela (P13)	It's not always easy, but basically, we communicate a lot with each other and try to find the best solution, especially for the customer. [. . .] in the morning we have a short meeting, a discussion, in which we clarify precisely such questions, if we are now victorious like customer-related, still have open gaps or somehow have a problem [. . .]. (P13, Pos. 60)
	Nevertheless, we make sure that we don't just talk about business at lunch or dinner, for example, or that we close the office door in the evening and are then at home, so to speak. (P13, Pos. 100)
George (P14)	Here we have as I said earlier, depending on the job or the customer. We're a bit like that when it's a design project, then the client is clearly with Gabriela, Gabriela has the final say. If it's something that has more to do with strategy and I have the client, I have the last word. (P14, Pos. 40)
	I don't think there's a big difference [between how we communicate at work and in private]. It's already relatively similar. At work, it's a bit more professional, a bit more serious or you're more likely to try to tick off and nod off a topic where you would have talked about it longer or differently in your private life. But basically, I think it's important that, regardless of whether it's professional or private, you simply talk it through so that it's satisfactory for both of you in the end. (P14, Pos. 76)
Henry (P15)	Well, I mean, we did have lots of discussions. We can have also argued heavily with each other, no doubt about it. Nevertheless, when we were not coming to a conclusion in that moment, we postponed the decision. We slept over it. We saw it again through it. We saw the alternatives, how to do it and we in the end always came together to join decision. (P15, Pos. 32)

Figure 6: Development dynamics of copreneurial couples businesses framework (Own illustration)

Moreover, couples should confront the details of their lived principles for working together as a team. This step includes refining their communication strategies, adapting to changing circumstances, and maintaining a shared vision for the business.

Additionally, couples must extend these principles beyond their partnership and consider how they interact with external stakeholders, such as potential collaborators, stakeholders, and employees. A continuous process of improvement and adaptation characterizes this phase. Copreneurial couples engage in ongoing dialogue to navigate challenges, enhance operational efficiency, and foster a workplace culture that aligns with their shared values. The working phase represents the maturation of their collaborative efforts, where the initial vision transforms into refined, sustainable business practices.

5. Discussion and implications

The thesis aimed to understand how copreneurial couples combine their relationship with a shared business, especially in the fast-changing world of startups. For this, the paper summarized the review of the existing literature regarding copreneurial couples and explored the underlying theoretical context of the social exchange, the work-life interface, the family systems, and relational dynamics theory. Then primary data was collected from interviews, which was then analyzed and used to create a model and framework to provide value. The following chapters will highlight the theoretical and practical implications of the thesis and lay out limitations and future research possibilities.

5.1. Theoretical implications

In pursuing a nuanced understanding of copreneurial couples within both startup and traditional business contexts, this research aims to fill a notable gap in existing scholarship, as described in previous chapters. To the best of my knowledge, exploring these dynamics is timely and substantively significant, given the scarcity of comprehensive studies in this unique domain. Furthermore, this work challenges the assumptions about work and private life, provides an understanding of strategic management of both domains, highlights the relevance of family businesses, and promotes diversity in the startup world.

This thesis is pivotal in addressing a conspicuous void in current scholarly discourse by providing a nuanced understanding of copreneurial couples operating in both startup and traditional business environments. By meticulously examining these dynamics, the research contributes significantly to building a more comprehensive knowledge base in an area that academic inquiry needs to address. By filling this gap, the study advances our understanding of copreneurship and provides a foundation for future research and a more holistic perspective on collaborative entrepreneurship.

The research holds timely and substantive significance considering the evolving mindset of the younger generation,

which increasingly seeks a seamless integration of work and personal life. In a society where the boundaries between professional and personal domains are shifting, the findings of this study offer valuable insights into the changing dynamics of work-family interfaces. By aligning with contemporary trends and addressing the needs of a generation striving for balance, the research becomes a pertinent source of information for individuals, businesses, and policymakers alike, contributing to a deeper understanding of the challenges and opportunities in achieving harmony between professional and personal spheres.

This study contributes to the broader discourse on work-family interfaces, illustrating how copreneurial couples navigate the intricate integration of work and personal life. The insights from this exploration provide a valuable resource for discussions surrounding achieving a balanced and harmonious integration of these two crucial aspects. The research informs academic conversations by shedding light on the coping mechanisms, challenges, and successes of copreneurial couples. It offers practical guidance for individuals and organizations seeking effective strategies for managing the interplay between work and family responsibilities.

Another aspect of this research is challenging societal assumptions that rigidly compartmentalize work and private life. The study challenges conventional notions of separating work and personal life by demonstrating that these realms are intricately intertwined and mutually influential. This paradigm shift has far-reaching implications for societal attitudes, organizational policies, and individual well-being. The recognition that satisfaction in one domain positively impacts the other opens avenues for evaluating how we perceive and manage the interdependence of work and personal life.

The study emphasizes the crucial role of life-work balance and provides strategic insights into how copreneurial couples can navigate and strategically manage this delicate equilibrium. By highlighting the importance of minimizing physical consequences such as stress, burnout, and anxiety through thoughtful life-work balance strategies, the research offers practical guidance for individuals striving to maintain a healthy and sustainable integration of work and personal life. These strategic insights contribute to the well-being of copreneurial couples and serve as a valuable resource for organizations aiming to foster a supportive and balanced work environment.

The findings of this research hold relevance for the study of family businesses, offering more profound insights into the dynamics of copreneurial couples within this unique context. By unraveling the intricacies, challenges, and opportunities that arise when couples collaborate in business ventures, the study contributes to a better understanding of family businesses' distinctive characteristics. This enhanced understanding can inform future research agendas, guide family business practitioners, and foster a more comprehensive comprehension of the complexities inherent in familial collaborations within a business setting.

Moreover, the data collected and analyzed about parents in startup or classical business settings can contribute to un-

Table 20: Selected interview statements about working with others

Interview	Statement
Alexander (P02)	But we also have some positive feedbacks for example from some institutional investors of course they didn't invest because we were very early. But there were positive feedbacks from one or two or three of them that they liked this because they think that there's a very good communication, good trust between the co-founders and the co-founders since they know each other very well and that can help the company also to grow faster. So, it's always very mix reaction I've seen. (P02, Pos. 80)
Brigitte (P03)	And then we were, Benjamin was looking for a co-founder. And also, we were also super afraid that we won't find a co-founder because we were giving you an expert, but who wants to start a startup with a couple, with a married couple? It's really difficult to find anyone who would like to go on holiday with a married couple and then find a startup, so we were sceptical. And then, yeah, you found [third cofounder's name], and he was like super nice, and he went along very well I got along very well with Benjamin and also with me, and I kind of supported a bit. (P03, Pos. 8)
	[The feedback we got from investors was] much better than I thought, to be honest. So, in the beginning, I thought it would be a red flag for the investors. And I also once participated in a workshop when they were like, what's your red flag? And they were like couples, that's the very first thing they said. (P03, Pos. 72)
Carolin (P05)	There were quite a few of us for a short time. Last year, we were around ten people. Now we currently have three people who we count as employees. We also have our parents who support us and are also employed. (P05, Pos. 40)
	So, the very first [employee] said at some point, because we were all sitting in an office together, that when we discuss things, she feels like a child of divorce. (P05, Pos. 128) That was the kind of thing where we realized, okay, we have to be a bit careful about how we are with each other when the employees are around. Because what's kind of normal for us is for outsiders, it's like "oh God, are they going to argue or not", we don't really do that. We paid a lot of attention to that and otherwise the feedback was mainly that they thought it was really cool, but that most of them couldn't imagine it with their own partner and that it was somehow a mixture of remarkable and somehow also amazing that it works. (P05, Pos. 132)
Debora (P07)	Yes, I think it has become clear on one or two occasions that we have an easier time coordinating than they do with us. And that's something we've perhaps also had to learn, that we simply need to bring clarity to it. And to be transparent in our communication. Otherwise, we've always tried to keep it really separate. Depending on where the employees have worked or collaborated. And the other thing is that we adopted a New Work approach very early on, where we said that we would organize ourselves into projects that employees could work on independently. And then, in principle, Dennis and I were more just spearheading partners. (P07, Pos. 96)
	[...] but it is sometimes the case that the acceptance of founding couples is not always there, especially in Germany. We always smile a little at that. It was her husband who wrote the email and so on. I sometimes see that with customers too. I always find it almost absurd, because I think to myself that if he had a different name, people wouldn't react like that at all. (P07, Pos. 92)
Dennis (P08)	It's a mixed bag. It's really negative for investors, because they always see the risk that if you split up the company falls apart. More or less, yes, it doesn't have to be that way, but it can be. For the customer, customers don't really care, it's sometimes perceived positively because the communication channels are supposedly shorter. But we don't usually go out and peddle it, just to find out what people are like. The general perception is always a bit more negative than positive, because then you realize that you've founded with your wife, it's not really a real startup because of that, it's a family thing that you just kind of do. It's more like that, it goes more in that direction. (P08, Pos. 84)
Emily (P09)	I can't say that. So, I've never heard anything negative about Emanuel from anyone, not even through the grapevine or that it's somehow strange or that they would invest more or less because there's a couple there now. (P09, Pos. 80)
Emanuel (P10)	And actually, I would have expected more that the employees would really appreciate that a modern company [...]. But it's just normal for them, I think. And it's nothing that needs to be emphasized, because that's just the way it is. (P10, Pos. 68)
	I also know investors who say, "Never invest in couples". (P10, Pos. 76)
Frederick (P12)	Exactly, we didn't want that ourselves. We still wanted to be professional, even if we were employed, but of course there was a certain amount of pressure, right? And we saw that, our boss at the time, he had a girlfriend himself who had worked in the store. That's a different constellation, of course. She was very much favored. And she was always gossiping at work, so of course the employees couldn't look up to the boss the way they used to. (P12, Pos. 132)
Gabriela (P13)	Isn't it always very advantageous, especially for the reason that yes, we've already had one case where we didn't get an order. Of course, it wasn't communicated that way, but I'm pretty sure it was for that reason, because we are a couple. (P13, Pos. 136)
George (P14)	But it's not the case that we immediately say at the first client appointment that we are a couple both professionally and privately. Then, even in a professional context, we speak very clearly of business partners and otherwise not of partners. (P14, Pos. 80)
Henry (P15)	Let's say in the industries or from customer side, I think that was perceived quite positively. (P15, Pos. 80)

derstanding gender roles, care-work splitting and parental organization. The insights gained from this research also apply to advancing diversity initiatives within companies, particularly regarding equal maternity and parental leave rights. Understanding copreneurial couples' challenges provides a perspective on the interplay between work responsibilities and family life. This understanding can be leveraged to inform and shape workplace policies, contributing to more inclusive practices that support individuals in balancing their familial and professional roles. By championing equal rights and recognizing the unique challenges of copreneurial couples, the research advocates for a more diverse, equitable, and inclusive corporate landscape.

5.2. Practical implications

In practical application, this study unfolds a roadmap for copreneurial couples, and various stakeholders involved in their entrepreneurial endeavors. The insights gained from the research translate into tangible steps to enhance the day-

to-day operations and overall success of copreneurial ventures.

This study extends a practical, step-by-step framework tailored for couples venturing into business together. Beyond theoretical considerations, the framework offers an actionable discussion balancing private and professional lives. By providing focus topics in each phase of the dynamic copreneurial journey, the framework can be used at multiple points to reach a shared vision and jump-off point. This practical resource aims to be a reliable companion for copreneurial couples, aiding them in navigating the complexities of joint entrepreneurship.

For founding teams, some practical approaches emerge from the study's findings. For example, the "working on one goal" mindset is presented as an untapped strategy for optimizing commitment, where one person provides financial security for the team by staying employed. By exploring previously overlooked opportunities to split commitment, startup teams can strategically channel their joint efforts toward shared objectives. This practical implication encourages couples to leverage the synergies within their relationships, fostering a unified vision for more effective collaboration. This approach is only one of the by-not-piece founding teams that overlook strategies and open new possibilities in designing copreneurial team settings. Furthermore, the study provides real-life examples of how teams can start a business while focusing on personal needs.

Investors, startup coaches and consultants are integral to the success of copreneurial ventures. The study's practical insights equip these stakeholders with actionable information to better understand and advise copreneurial couples. Going beyond theoretical perspectives, this resource dismantles stereotypes and offers a detailed viewpoint. This practical guidance facilitates more informed discussions, fostering a supportive ecosystem that nurtures the growth of copreneurial ventures.

5.3. Limitations and future research

This study delves into the intricate dynamics of copreneurial couples in startups and classical businesses, unraveling numerous insights. However, it is essential to acknowledge certain limitations that open doors for future research opportunities.

Firstly, the sample size of 15 interviews, driven by the constraints of a master's thesis timeframe and the unavailability of participants due to their high workloads, is a notable limitation. Additionally, the need for more diversity within the selected couples, mainly German couples aged 30 to 40 in exclusively female-male relationships, restricts the generalizability of findings. The absence of same-sex couples in the sample further limits the study's comprehensiveness. Future research could benefit from a more extensive and diverse sampling, encompassing various cultural backgrounds, age groups, and different relationship dynamics to capture a more holistic understanding of copreneurial experiences.

Secondly, while insightful, the study's focus on startups is influenced by the high workload of copreneurial couples.

Only half of the participants strictly align with the conventional definition of startups, slightly adapting the research design (see Chapter 3.). Future research avenues should consider a more granular focus on startups maybe even in specific industries, such as high-tech or sustainability, to deepen our understanding of the influences of different ecosystems and external factors on copreneurial dynamics.

Furthermore, despite a methodological approach grounded in a comprehensible system, the inherent subjectivity and potential bias associated with qualitative research must be acknowledged. Future research endeavors could enhance objectivity by involving multiple evaluators in the data analysis. This collaborative approach would reduce potential bias and contribute to more centralistic insights, strengthening the reliability of the study's findings.

In addition, other theoretical principles, such as Work-life Interface or Relational Dynamics Theory, could be applied to the topic of copreneurial couples, introducing fresh perspectives and expanding the understanding of how work and personal life intertwine within entrepreneurial partnerships. Work-life Interface explores the interconnectedness of professional and personal domains, shedding light on the challenges and synergies that arise. On the other hand, Relational Dynamics Theory delves into the intricacies of interpersonal relationships, providing insights into how dynamics within a couple impact their collaborative ventures in business. By incorporating these theoretical frameworks, a more comprehensive and nuanced analysis of copreneurial dynamics can be achieved.

Lastly, considering the dynamic nature of copreneurial ventures, future research could adopt a longitudinal approach to explore the impact of external factors, economic fluctuations, and long-term trends on copreneurial dynamics. Since the interviews only capture a snapshot, this would provide valuable insights into the evolution of copreneurial ventures over time, offering practical implications for practitioners and researchers.

6. Conclusion

In summary, this comprehensive study delved into the intricate dynamics of copreneurial couples in the startup landscape, aiming to unravel the nuanced ways they navigate the intersection of their work and private domains. The multifaceted exploration was conducted through in-depth semi-structured interviews with both partners of seven copreneurial couples, offering a comprehensive understanding of their motivations, goals, strategies, and approaches. This dual-partner perspective enriches the findings and provides a deeper insight into the dynamics of couples engaged in entrepreneurial ventures.

These efforts culminated in developing a cohesive model that effectively simplifies the complex dynamics inherent in copreneurial venture building. A practical framework emerged as a step-by-step guide tailored to support copreneurial couples throughout their entrepreneurial journey. This framework strategically focuses on the three identified

phases and articulates core questions that demand attention. This research significantly contributes to the ongoing discourse on creating more diverse and inclusive startup ecosystems by providing a comprehensive model and framework. It underscores copreneurial couples' crucial role, emphasizing their importance and influence within the broader entrepreneurial landscape.

Furthermore, the study's conclusion acknowledges the inherent limitations, providing valuable insights into potential starting points for future research endeavors. This recognition highlights the dynamic nature of copreneurial dynamics and signals the importance of continued exploration in this domain. By paving the way for further research, the study contributes to the current understanding of copreneurial ventures. It underscores the vast opportunities for future scholars to delve into unexplored facets of collaborative entrepreneurship within startups.

References

Ackerman, N. (2022). What's it like to run and scale a startup with your romantic partner? *Sifted*. https://sifted.eu/articles/startup-founder-couples

Ahmad, R., Nawaz, M. R., Ishaq, M. I., Khan, M. M., & Ashraf, H. A. (2022). Social exchange theory: Systematic review and future directions. *Frontiers in Psychology*, *13*, 1015921.

Aldrich, H. E., & Cliff, J. E. (2003). The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective. *Journal of Business Venturing*, *18*(5), 573–596.

Bacon, T. (n.d.). Between the Spreadsheets. Retrieved December 29, 2023, from https://open.spotify.com/show/1jBObcaapRUP8SGFHkIGyV?si=400b242d2f054ab1

Barnett, F., & Barnett, S. (1988). *Working together: Entrepreneurial couples* (1st). Ten Speed Press.

Bebbington, A. C. (1973). The function of stress in the establishment of the dual-career family. *Journal of Marriage and Family*, *35*(3), 530–537.

Biernat, M., & Wortman, C. B. (1991). Sharing of home responsibilities between professionally employed women and their husbands. *Journal of Personality and Social Psychology*, *60*(6), 844–860.

Blau, P. M. (1964). *Exchange and power in social life*. Wiley.

Blenkinsopp, J., & Owens, G. (2010). At the heart of things: The role of the "married" couple in entrepreneurship and family business. *International Journal of Entrepreneurial Behavior & Research*, *16*(5), 357–369.

Block, J., Goerke, L., Millán, J. M., & Román, C. (2014). Family employees and absenteeism. *Economics Letters*, *123*(1), 94–99.

Block, J. H., Millán, J. M., Román, C., & Zhou, H. (2015). Job satisfaction and wages of family employees. *Entrepreneurship Theory and Practice*, *39*(2), 183–207.

Bowen, M. (1966). The use of family theory in clinical practice. *Comprehensive Psychiatry*, *7*(5), 345–374.

Bowen, M. (1993). *Family therapy in clinical practice*. Jason Aronson.

Bowen, M. (2004). *Family therapy in clinical practice*. Rowman & LittleField Publishers.

Brown, J. (1999). Bowen family systems theory and practice: Illustration and critique. *Australian and New Zealand Journal of Family Therapy*, *20*(2), 94–103.

Bryson, R. B., Bryson, J. B., Licht, M. H., & Licht, B. G. (1976). The professional pair: Husband and wife psychologists. *American Psychologist*, *31*, 10–16.

Cook, K., & Rice, E. (2006). Social exchange theory. In *Social Forces* (pp. 53–76, Vol. 68).

Corbin, J., & Strauss, A. (2008). *Qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.).

Cox, J. A., Moore, K. K., & Van Auken, P. M. (1984). Working couples in small business. *Journal of Small Business Management (Pre-1986)*, *22*(000004), 24.

Cropanzano, R., Anthony, E. L., Daniels, S. R., & Hall, A. V. (2017). Social exchange theory: A critical review with theoretical remedies. *Academy of Management Annals*, *11*(1), 479–516.

Cropanzano, R., & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. *Journal of Management*, *31*(6), 874–900.

Dahl, M. S., Van Praag, M., & Thompson, P. (2015). Entrepreneurial couples. *Academy of Management Proceedings*, *2015*(1), 14776.

Danes, S. M., & Jang, J. (2013). Copreneurial identity development during new venture creation. *Journal of Family Business Management*, *3*(1), 45–61.

Danes, S. M., & Morgan, E. A. (2004). Family business-owning couples: An EFT view into their unique conflict culture. *Contemporary Family Therapy*, *26*(3), 241–260.

Daspit, J. J., Holt, D. T., Chrisman, J. J., & Long, R. G. (2016). Examining family firm succession from a social exchange perspective: A multiphase, multistakeholder review. *Family Business Review*, *29*(1), 44–64.

Davidsson, P., Steffens, P., Gordon, S., & Senyard, J. (2009). Characteristics of high-potential start-ups: Some early observations from the CAUSEE project.

De Bruin, A., & Lewis, K. (2004). Toward enriching united career theory: Familial entrepreneurship and copreneurship. *Career Development International*, *9*(7), 638–646.

Dixon, A. (2021). The unstoppable rise of the co-founder power couple. *LinkedIn*. https://www.linkedin.com/pulse/unstoppable-rise-co-founder-power-couple-amanda-dixon/

Dyer, W. G. (1992). *The entrepreneurial experience: Confronting career dilemmas of the start-up executive*. Jossey-Bass, Inc.

Dyer, W. G., Dyer, W. J., & Gardner, R. G. (2013). Should my spouse be my partner? Preliminary evidence from the panel study of income dynamics. *Family Business Review*, *26*(1), 68–80.

Edwards, J. R., & Rothbard, N. P. (2000). Mechanisms linking work and family: Clarifying the relationship between work and family constructs. *Academy of Management Review*.

El Shoubaki, A., Block, J., & Lasch, F. (2022). The couple business as a unique form of business: A review of the empirical evidence. *Management Review Quarterly*, *72*(1), 115–147.

Elman, M. R., & Gilbert, L. A. (1984). Coping strategies for role conflict in married professional women with children. *Family Relations*, *33*(2), 317.

Emerson, R. M. (1976). Social exchange theory. *Annual Review of Sociology*, *2*, 335–362.

Epstein, C. F. (1971). Law partners and marital partners: Strains and solutions in the dual-career family enterprise. *Human Relations*, *24*(6), 549–564.

Escher, A. (2020). Married co-founders are a startup's secret weapon. *TechCrunch*. https://techcrunch.com/2020/02/14/married-co-founders-are-a-startups-secret-weapon/

Facebook Groups | Successful couples in business - Couplepreneurs. (n.d.). Successful couples in business - Couplepreneurs. Retrieved December 29, 2023, from https://www.facebook.com/groups/couplepreneurscommunity

Festinger, L., Schachter, S., & Back, K. (1950). *Social pressures in informal groups: A study of human factors in housing*. Harper.

Firth, R. (Ed.). (2013). *Themes in economic anthropology*. Routledge.

Fitzgerald, M. A., & Muske, G. (2002). Copreneurs: An exploration and comparison to other family businesses. *Family Business Review*, *15*(1), 1–16.

Five startups co-founded and run by couples. (n.d.). Retrieved December 29, 2023, from https://itarena.ua/5-startups-co-founded-and-run-by-couples/

Fletcher, D. (2010). 'Life-making or risk taking'? Co-preneurship and family business start-ups. *International Small Business Journal: Researching Entrepreneurship*, *28*(5), 452–469.

Foley, S., & Powell, G. N. (1997). Reconceptualizing work-family conflict for business/marriage partners: A theoretical model. *Journal of Small Business Management*, *35*(4), 36.

Gegamova, A. (2023, August). "For better, for worse, for richer, for poorer": 20 Startups with co-founders being more than... https://medium.com/letavc/for-better-for-worse-for-richer-for-poorer-20-startups-with-co-founders-being-more-than-40f5b83f4782

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the gioia methodology. *Organizational Research Methods*, *16*(1), 15–31.

Goffee, R., & Scase, R. (2015). *Women in charge (Routledge Revivals): The Experiences of Female Entrepreneurs*. Routledge.

Gottman, J. M., Coan, J., Carrere, S., & Swanson, C. (1998). Predicting marital happiness and stability from newlywed interactions. *Journal of Marriage and Family*, *60*(1), 5–22.

Gottman, J. M., & Krokoff, L. J. (1989). Marital interaction and satisfaction: A longitudinal view. *Journal of Consulting and Clinical Psychology*, *57*(1), 47–52.

Gottman, J. M., & Silver, N. (1995). *Why marriages succeed or fail: And how you can make yours last*. Simon and Schuster.

Gouldner, A. W. (1960). The norm of reciprocity: A preliminary statement. *American Sociological Review*, *25*(2), 161–178.

Gurman, A. S., & Kniskern, D. P. (Eds.). (2014). *Handbook of family therapy*. Routledge.

Haley, J. (1991). *Problem solving therapy* (0002 Revised). Jossey-Bass Inc.,U.S.

Hamilton, E. (2006). Whose story is it anyway? Narrative accounts of the role of women in founding and establishing family businesses. *International Small Business Journal: Researching Entrepreneurship*, *24*(3), 253–271.

Hazony, T. (2017). Together is better—How to start a successful startup with your spouse and stay sane. https://www.startupgrind.com/blog/together-is-better-how-to-start-a-successful-startup-with-your-spouse-and-stay-sane/

Heckman, N. A., Bryson, R., & Bryson, J. B. (1977). Problems of professional couples: A content analysis. *Journal of Marriage and the Family*, *39*(2), 323.

Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology*.

Homans, G. C. (1961). The humanities and the social sciences. *American Behavioral Scientist*, *4*(8), 3–6.

Jaffe, D. T. (1990). *Working with the ones you love: Conflict resolution & problem solving strategies for a successful family business*. Conari Press.

Jaouen, A., & Lasch, F. (2015). A new typology of micro-firm owner-managers. *International Small Business Journal*, *33*(4), 397–421.

Jennings, J. E., & Brush, C. G. (2013). Research on women entrepreneurs: Challenges to (and from) the broader entrepreneurship literature? *Academy of Management Annals*, *7*(1), 663–715.

Johnson, B. E., & Ray, W. A. (2016). Family systems theory. In *Encyclopedia of Family Studies* (pp. 1–5). John Wiley & Sons, Ltd.

Jones, L., & Jones, T. B. (n.d.). Couple & company. Retrieved December 29, 2023, from https://open.spotify.com/show/04h3yCUYOx6EPSGji0IS5k?si=9bb839f5f59b4502

Kanter, R. M. (1989). Work and family in the United States: A critical review and agenda for research and policy. *Family Business Review*, *2*(1), 77–114.

Kopera, S., Wszendybył-Skulska, E., Cebulak, J., & Grabowski, S. (2018). Interdisciplinarity in tech startups development – Case study of 'Unistartapp' project. *Foundations of Management*, *10*(1), 23–32.

Kuschel, K., & Lepeley, M.-T. (2016). Copreneurial women in start-ups: Growth-oriented or lifestyle? An aid for technology industry investors. *Academia Revista Latinoamericana de Administración*, *29*(2), 181–197.

Lee, Y. G., Kelley, H. H., Wiatt, R., & Marshall, M. I. (2023). Work-family balance and perceived business outcomes among copreneurial and noncopreneurial small business owners. *Journal of Family and Economic Issues*.

Leven, S. (2022, February). What all co-founders can learn from couples who start businesses together. https://news.crunchbase.com/startups/couples-co-founder-startups-codesee-shanea-leven/

Levinger, G. (1976). A social psychological perspective on marital dissolution. *Journal of Social Issues*, *32*(1), 21–47.

Machek, O., Hnilica, J., Kolouchová, D., & Machek, M. (2015). Are couple-run companies more profitable than professionally managed firms? *International Advances in Economic Research*, *21*(3), 351–353.

Marshack, K. J. (1993). Coentrepreneurial couples: A literature review on boundaries and transitions among copreneurs. *Family Business Review*, *6*(4), 355–369.

Marshack, K. J. (1994). Copreneurs and dual-career couples: Are they different? *Entrepreneurship Theory and Practice*, *19*(1), 49–69.

McAdam, M., & Marlow, S. (2012). Sectoral segregation or gendered practices? A case study of roles and identities in a copreneurial venture. *Global Women's Entrepreneurship Research*.

McGoldrick, M. (2016). *The genogram casebook: A clinical companion to genograms: Assessment and Intervention*. W. W. Norton & Company.

McGoldrick, M., Gerson, R., & Petry, S. (2020). *Genograms: Assessment and treatment*. W. W. Norton & Company.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE.

Minuchin, S. (2018). *Families and family therapy*. Routledge.

Minuchin, S., & Fishman, H. C. (1981). *Family therapy techniques*. Harvard University Press.

Murphy, I. (2022, February). Working with your partner: 22 startups founded by couples. https://techround.co.uk/startups/working-with-your-partner-22-startups-founded-by-couples/

Muske, G., & Fitzgerald, M. A. (2006). A panel study of copreneurs in business: Who enters, continues, and exits? *Family Business Review*, *19*(3), 193–205.

Nakonezny, P. A., & Denton, W. H. (2008). Marital relationships: A social exchange theory perspective. *The American Journal of Family Therapy*, *36*(5), 402–412.

Neergaard, H., & Leitch, C. M. (2015). *Handbook of qualitative research techniques and analysis in entrepreneurship*. Edward Elgar Publishing.

Nelton, S. (1986, November). Nation's Business [November 1986] [Hagley ID, Nation's Business (f HF1 .N38), Published Collections Department, Hagley Museum and Library, Wilmington, DE 19807].

O'Connor, V., Hamouda, A., McKeon, H., Henry, C., & Johnston, K. (2006). Co-entrepreneurial ventures: A study of mixed gender founders of ICT companies in Ireland. *Journal of Small Business and Enterprise Development*, *13*(4), 600–619.

On Valentine's Day, we ask 3 couple co-founders what it's like working with their partners. (n.d.). Retrieved December 20, 2023, from https://thestartupscene.me/EntrepreneurLife/On-Valentine-s-Day-We-Ask-3-Couple-Co-Founders-What-It-s-Like-Working-With-Their-Partners

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. John Wiley & Sons.

Pagano-Parente, M., & Parente, T. (n.d.). A couple of entrepreneurs. https://open.spotify.com/show/5taj6tAAEwGCVWvoPabvRq?si=613ab0bfd41b4a47

Paternoster, N., Giardino, C., Unterkalmsteiner, M., Gorschek, T., & Abrahamsson, P. (2014). Software development in startup companies: A systematic mapping study. *Information and Software Technology*, *56*(10), 1200–1218.

Poloma, M. M., & Garland, T. N. (1972). On the social construction of reality: Reported husband-wife differences. *Sociological Focus*, *5*(2), 40–54.

Ponthieu, L. D., & Caudill, H. L. (1993). Who's the boss? Responsibility and decision making in copreneurial ventures. *Family Business Review*, *6*(1), 3–17.

Rapoport, R., & Rapoport, R. (1965). Work and family in contemporary society. *American Sociological Review*, *30*(3), 381.

Reichmuth, T., & Ewald, C. Y. (2022). Ten simple rules for building a successful science start-up. *PLOS Computational Biology*, *18*(4), e1009982.

Reisdorfer-Leite, B., Marcos De Oliveira, M., Rudek, M., Szejka, A. L., & Canciglieri Junior, O. (2020). Startup definition proposal using product lifecycle management. In *Product Lifecycle Management Enabling Smart X* (pp. 426–435, Vol. 594). Springer International Publishing.

Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. Crown.

Rodrigues, M., & Franco, M. (2021). Revisiting copreneurial from a business perspective: Theoretical developments. *Journal of Family Business Management*, *12*(4), 780–798.

Rodriguez, S. N., Hildreth, G. J., & Mancuso, J. (1999). The dynamics of families in business: How therapists can help in ways consultants don't. *Contemporary Family Therapy*, *21*(4), 453–468.

Rothbaum, F., Rosen, K., Ujiie, T., & Uchida, N. (2002). Family systems theory, attachment theory, and culture. *Family Process*, *41*(3), 328–350.

Ruef, M., Aldrich, H. E., & Carter, N. M. (2003). The structure of founding teams: Homophily, strong ties, and isolation among US entrepreneurs. *American Sociological Review*, 195–222.

Sahlins, M. D. (1972). *Stone age economics*. Aldine-Atherton.

Salamzadeh, A., & Kawamorita Kesim, H. (2017). The enterprising communities and startup ecosystem in Iran. *Journal of Enterprising Communities: People and Places in the Global Economy*, *11*(4), 456–479.

Satir, V. (1987). The therapist story. *Journal of Psychotherapy & The Family*, *3*(1), 17–25.

Satir, V. (1988). *The new peoplemaking*. Science & Behavior Books.

Satir, V., Stachowiak, J., & Taschman, H. A. (1994). *Helping families to change*. Jason Aronson, Incorporated.

Sharifian, M., Jennings, P. D., & Jennings, J. E. (2012). Should women go into business with their family partner? *Global Women's Entrepreneurship Research*.

Strauss, A. L., & Corbin, J. M. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd). Sage Publications.

Thibaut, J., & Kelley, H. (1959). The social psychology of groups. In *The Social Psychology of Groups* (p. 342).

Thompson, K. D. (1990). Married. . . with business. *Black Enterprise*, *20*(9), 46–52.

Tolentino, L., Dela Cruz, A. L., Chirico, F., & Garcia, P. R. M. (2022). The crossover of psychosocial resources among copreneurs: An actor-partner interdependence model. *Academy of Management Proceedings*, *2022*(1), 15539.

Tompson, G. H., & Tompson, H. B. (2003). Determinants of Successful Copreneurship. *SMA Annual Meeting Track 3: BPS & ENT*, 25.

VERBI Software. (2021). MAXQDA 2022 [computer software]. maxqda.com

Vogt, N. (n.d.). Mach dis Ding. Retrieved December 29, 2023, from https://open.spotify.com/intl-de

Whitaker, C. A., & Bumberry, W. M. (1988). *Dancing with the family: A symbolic-experiential approach*. Brunner/Mazel.

Wicker, A. W., & Burley, K. A. (1991). Close coupling in work-family relationships: Making and implementing decisions in a new family business and at home. *Human Relations*, *44*(1), 77–92.

Yang, T., & Aldrich, H. E. (2014). Who's the boss? Explaining gender inequality in entrepreneurial teams. *American Sociological Review*, *79*(2), 303–327.

Junior Management Science

Berufstätigkeit mit Autismus: Welchen Aufklärungs- und Anpassungsbedarf haben Arbeitgeber:innen in Österreich aus Sicht von Frauen mit Autismus mit geringer Symptomausprägung?

Employment with Autism: What Are Educational and Adaptive Needs of Employers in Austria from the Perspective of Women with Low-Symptom Autism?

Antonia Cichocki

Vienna University of Economics and Business

Abstract

People on the autism spectrum have little chance of finding adequate, satisfying, and long-term employment in the primary labor market, and little is known about the factors that promote labor market participation from the perspective of individuals with autism. In this master's thesis, a qualitative study was conducted to investigate which educational and adaptive measures on the part of employers lead to the successful employment of people with autism in Austria. Eleven female autistic experts and two neurotypical experts on autism and work identified framework conditions for the employment success of autistic people as well as needs for change in the recruitment, onboarding and retention phases of organizations. The findings were presented in a comprehensive model and can be summarized as follows: People on the autism spectrum need more clarity in communication, they have a greater need for structure and predictability, and they require more support than neurotypical people in some areas of everyday work. Thus, employers in the primary labor market should address these needs and create an inclusive and understanding work environment that is lived authentically. As such, this work has important implications for both diversity management practice and research on autism and work.

Zusammenfassung

Menschen im Autismus-Spektrum haben geringe Chancen auf eine qualifikationsadäquate, zufriedenstellende und langfristige Beschäftigung am ersten Arbeitsmarkt, und es gibt wenig Wissen darüber, welche Faktoren aus Sicht der Betroffenen förderlich für die Teilhabe am Arbeitsmarkt sind. In der vorliegenden Masterarbeit wurde im Zuge einer qualitativen Studie untersucht, welche Aufklärungs- und Anpassungsmaßnahmen auf Seiten der Arbeitgeber:innen zur erfolgreichen Beschäftigung von Menschen mit Autismus in Österreich führen. Elf weibliche autistische Expertinnen in eigener Sache und zwei neurotypische Autismus-und-Arbeit-Expertinnen identifizierten dabei Rahmenbedingungen für den Beschäftigungserfolg von Autist:innen sowie organisationalen Veränderungsbedarf in den Phasen Rekrutierung, Onboarding und Retention. Die Ergebnisse wurden in einem umfassenden Modell dargestellt und lassen sich wie folgt zusammenfassen: Menschen im Autismus-Spektrum brauchen mehr Klarheit in der Kommunikation, sie haben ein höheres Bedürfnis nach Struktur und Vorhersehbarkeit, und sie benötigen in manchen Bereichen des Arbeitsalltags mehr Unterstützung als neurotypische Menschen. Arbeitgeber:innen des ersten Arbeitsmarktes sollten also Maßnahmen setzen, um auf diese Bedürfnisse einzugehen und ein inklusives und verständnisvolles Arbeitsklima zu schaffen, das authentisch vertreten wird. Somit hat diese Arbeit wichtige Implikationen sowohl für die Praxis des Diversitätsmanagements als auch für die Forschung im Bereich Autismus und Arbeit.

Keywords: autism; diversity management; inclusion; labor market

1. Einleitung

Bereits in der Allgemeinen Erklärung der Menschenrechte der Vereinten Nationen ist das Recht auf Arbeit unter befriedigenden Bedingungen verankert (Vereinte Nationen, 1948, S. 5). Seit 1970 ist die Inklusion von Menschen mit Beeinträchtigungen am Arbeitsmarkt in Österreich rechtlich durch das Behinderteneinstellungsgesetz (BEinstG, früher Invalideneinstellungsgesetz) festgehalten. Im Jahr 2000 veröffentlichte die Europäische Union (EU) die Richtlinie 2000/78/EG zur Gleichbehandlung in Beschäftigung und Beruf. Und auch die in 2015 formulierten Sustainable Development Goals (SDG) der Vereinten Nationen (2015) behandeln die Gleichstellung von benachteiligten Personengruppen und Minderheiten. Dennoch konzentrieren sich Maßnahmen des Diversitätsmanagements in Organisationen zumeist auf Dimensionen wie Geschlecht, Alter und Herkunft und weniger auf Behinderungen von Menschen (Johnson et al., 2020, S. 124). Vor allem Personen, deren Beeinträchtigungen auf den ersten Blick nicht sichtbar sind, haben immer noch größere Schwierigkeiten, in einem inklusiven Umfeld eine zufriedenstellende Beschäftigung zu finden (Sarrett, 2017). So müssen Menschen mit Autismus (Autismus-Spektrum-Störung) unabhängig von ihrem Bildungsniveau hohe Hürden überwinden, um eine Beschäftigung auf dem ersten bzw. regulären Arbeitsmarkt zu finden und langfristig zu behalten (Wolf, 2020; Ratto und Mesibov, 2015, S. 1012). In Anlehnung an das soziale Modell von Behinderung (Oliver, 1983) wird in dieser Arbeit die Ansicht vertreten, dass diese Barrieren nicht allein auf die Schwächen der Menschen mit Beeinträchtigungen zurückzuführen sind, sondern auf das Zusammentreffen dieser Schwächen mit einer mangelnden Anpassung des Arbeitsumfelds, die es ermöglichen würde, die Schwächen der Person auszugleichen und ihre Stärken zur Geltung zu bringen.

Trotz Anpassungsbedarf haben Autist:innen grundsätzlich sehr ähnliche Wünsche und Vorstellungen wie neurotypische Personen, also Menschen, deren neurologische Entwicklung als normal gilt. Dazu zählt eine reguläre Beschäftigung am ersten Arbeitsmarkt, die nachweislich die Lebensqualität und das Selbstwertgefühl von Autist:innen steigern kann (Dudley et al., 2015, S. 1; Interagency Autism Coordinating Committee, 2017, S. 68; Tomczak et al., 2021, S. 1; Weld-Blundell et al., 2021, S. 1). Autist:innen sind jedoch im Vergleich zu Menschen ohne Behinderung und Menschen mit anderen Beeinträchtigungen überproportional stark von Arbeitsplatzunsicherheit, Unterbeschäftigung – einer Beschäftigung, die nicht den Qualifikationen der Arbeitnehmer:in entspricht – und Arbeitslosigkeit betroffen (Tomczak et al., 2021, S. 1; Dudley et al., 2015, S. 2; Kirchner und Dziobek, 2014, S. 77, 81; Lord et al., 2020, S. 19). So liegt die Arbeitslosenquote von Menschen im Autismus-Spektrum in Österreich bei rund 80 Prozent (Salzburger Nachrichten, 2016). Dies hat nicht nur negative Auswirkungen auf die psychische Gesundheit der Betroffenen. Einige Forscher:innen betonen auch die Kosten für die Gesellschaft, die aus der großen Zahl an arbeitslosen Autist:innen resultieren (Weld-Blundell et al., 2021, S. 1, 26f. Kirchner und Dziobek, 2014, S. 81; Dudley et al., 2015, S. 1; Scott et al., 2017). Allgemein werden die Kosten der Ausgrenzung von Menschen mit Behinderungen aus dem Arbeitsmarkt auf bis zu sieben Prozent des Bruttoinlandsprodukts (BIP) eines Landes geschätzt (Buckup, 2009, S. 51).

Verschiedene Barrieren können die hohe Erwerbslosenquote und Arbeitsplatzunsicherheit erklären. Abgesehen von den individuellen Einschränkungen der Betroffenen, wie dem Schweregrad der autistischen Symptomatik und der Verfügbarkeit von familiärer oder anderer Unterstützung, sind Autist:innen oft mit Stigmatisierung und unzureichendem Vertrauen seitens der Arbeitgeber:innen konfrontiert (Weld-Blundell et al., 2021, S. 28; Dudley et al., 2015, S. 3ff.). Bereits bei der Personalauswahl durch Vorstellungsgespräche haben Arbeitssuchende mit Autismus eher als Menschen ohne Autismus Schwierigkeiten, einen Arbeitsplatz zu finden, weil es ihnen schwerer fällt, die richtigen Worte zu finden und die verbale und nonverbale Kommunikation zu verstehen (Solomon, 2020, S. 4210f. Tomczak et al., 2021, S. 2). Der Fokus auf soziale Kompetenzen statt auf fachliche Fähigkeiten und Qualifikationen in Einstellungsverfahren stellt für Menschen im Autismus-Spektrum ein Hindernis bei der Arbeitssuche dar (Griffiths et al., 2020, S. 4; Petty et al., 2022; Sarrett, 2017, Solomon, 2020, S. 4211). Wenn Autist:innen erwerbstätig sind, verlieren sie ihren Arbeitsplatz eher aufgrund von Schwierigkeiten in der sozialen Interaktion als aufgrund der Unfähigkeit, die ihnen zugewiesenen Arbeitsaufgaben auszuführen (Westbrook et al., 2012, S. 26). Auch die Offenlegung der Diagnose ist für die Betroffenen ein sensibles Thema, das entweder zu positiven Reaktionen und notwendigen Anpassungen des Arbeitsumfelds oder zu negativen Reaktionen, Diskriminierung und Ausgrenzung führen kann (Tomas et al., 2022, S. 2; Waisman-Nitzan et al., 2021, S. 9).

Diese Darlegung steht den vielen Fähigkeiten und positiven Eigenschaften gegenüber, die Autist:innen zugeschrieben werden. Menschen im Autismus-Spektrum gelten als ehrliche, zuverlässige, produktive und effiziente Mitarbeiter:innen mit einem Blick für Details, die bei entsprechender beruflicher Tätigkeit eine hohe Konzentrationsfähigkeit aufweisen und sich nicht an Mikropolitik beteiligen (Hayward et al., 2019b, S. 48; Khalifa et al., 2019, S. 2). Die Tatsache, dass die Zahl der von Expert:innen diagnostizierten Autist:innen in den letzten Jahrzehnten deutlich zugenommen hat, unterstreicht weiter die Notwendigkeit, über Autismus aufzuklären und Autismus-inklusive Arbeitsmarktpraktiken einzuführen (Pellicano et al., 2014, S. 756; Dudley et al., 2015, S. 1).

Ein Blick in die Forschung soll nun Aufschluss darüber geben, inwiefern Autist:innen in Bezug auf das Arbeitsleben bereits unterstützt werden, und wo weiterer Forschungsbedarf besteht. Seit den Anfängen der Autismus-Forschung durch Asperger und Kanner in den 1930er Jahren hat sich diese Forschung weitgehend auf die Diagnose und Frühförderung von Kindern konzentriert (Micai et al., 2022, S. 2; Scott et al., 2019, S. 25). Da sich zusätzlich der Großteil

der Wissenschaft mit männlichen Betroffenen aus hohen Einkommensklassen beschäftigt, mangelt es an Studien zu weiblichen Betroffenen und deshalb auch an Klarheit über die Manifestation von Autismus in Mädchen und Frauen (Interagency Autism Coordinating Committee, 2017, S. 60, 83; Dudley et al., 2015, S. 1; Zeidan et al., 2022, S. 786; Pellicano et al., 2014, S. 764, 766; Lord et al., 2020, S. 12). Relativ wenig Literatur befasst sich außerdem mit autistischen Erwachsenen, wobei die Autismus- und Arbeit-Forschung im Laufe der Jahre zunehmend Aufmerksamkeit erhalten hat (Scott et al., 2019, S. 25; Tomczak, 2022, S. 1468). Mehrere wissenschaftliche Arbeiten behandeln z.B. den Einsatz von Trainings für Autist:innen, etwa zur langfristigen Sicherung eines Arbeitsplatzes (siehe z.B. Kyriaki und Syriopoulou-Delli (2022), Littin und Haspel (2021) und Westbrook et al. (2013). Bei dieser Art von Intervention steht die Gewöhnung von Autist:innen an neurotypische Konventionen im Vordergrund. Obwohl solche Maßnahmen eine wichtige Hilfestellung für Autist:innen darstellen, fordern Forscher:innen sowie Betroffene und Angehörige zunehmend, mögliche Aufklärungs- und Anpassungsmaßnahmen der neurotypischen Arbeitswelt zu identifizieren (Pellicano et al., 2014, S. 761, 765; Tomczak et al., 2021, S. 7f. Sarrett, 2017). Mit anderen Worten: Während die erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum traditionell als vom autistischen Individuum abhängig betrachtet wurde, wird immer mehr erkannt, dass auch externe Faktoren wie das Arbeitsumfeld die Beschäftigungsverhältnisse beeinflussen (Dreaver et al., 2020, S. 1658). Diese Perspektivenumkehr ist wichtig, weil eine permanente einseitige Anpassung der Autist:innen, wie bereits dargestellt, negative Folgen hat und u.a. mit dem Risiko für autistisches Burnout einhergeht (Mantzalas et al., 2022, S. 1ff.).

Die Literaturrecherche zeigt, dass die meisten Forschungsarbeiten über die Veränderung der Arbeitsmarktpraktiken zugunsten autistischer Arbeitnehmer:innen in den letzten zehn Jahren veröffentlicht wurden (Johnson et al., 2020, S. 127). Beispielsweise stellen Griffiths et al. (2020) Methoden zur Verbesserung der Arbeitsverhältnisse von Personen mit hochfunktionalem Autismus vor. Andere Arbeiten konzentrieren sich auf spezifische Aspekte des Arbeitsmarktes. Sarrett (2017) konzentriert sich in ihrer Forschung auf Interviewsituationen im Einstellungsprozess und wie diese zugunsten von Autist:innen verändert werden könnten. Die Arbeit von Parr und Hunter (2014) untersucht, welche Führungsstile zu einer Verbesserung der Arbeitssituation von Autist:innen führen. Waisman-Nitzan et al. (2020) befassen sich mit den Einflussfaktoren auf die Arbeitsleistung von Autist:innen. Tomas et al. (2022) schreiben über Offenlegungstaktiken von Menschen mit Autismus. Mantzalas et al. (2022) untersuchen Risiko- und Schutzfaktoren für autistisches Burnout. Angesichts des relativ jungen stärkenorientierten Ansatzes in der Beschäftigung von Menschen mit Autismus, der in Forschung und Praxis versucht, den Fokus auf die Fähigkeiten von Autist:innen anstatt auf ihre ‚Fehler' zu legen, stellt diese Forschungsrichtung einen wichtigen Schritt in Richtung Inklusion und Diversität dar (Wong et al.,

2021; Courchesne et al., 2020, S. 2; Lorenz et al., 2016, S. 14).

Im Rahmen der Literaturrecherche für die vorliegende Arbeit konnten nur wenige wissenschaftliche Untersuchungen identifiziert werden, die sich speziell mit den Arbeitserfahrungen von autistischen Frauen befassen. Hayward et al. (2019a, S. 297) schreiben z.B., dass in keiner bisherigen Forschung betroffene Frauen nach förderlichen Faktoren für die Erlangung und den Erhalt eines Arbeitsplatzes befragt wurden. Die Forscher:innen vergleichen deshalb die Sichtweisen autistischer Frauen mit denen neurotypischer Frauen und autistischer Männer, um Unterschiede in den Arbeitserfahrungen zu identifizieren (Hayward et al., 2019a). Generell wird die Perspektive der Betroffenen selten berücksichtigt (Pellicano et al., 2014, S. 758; Interagency Autism Coordinating Committee, 2017, S. 84; Lord et al., 2020, S. 20). So beleuchten Studien zur Berufstätigkeit oftmals lediglich die Meinungen von Arbeitgeber:innen und Kolleg:innen, die mit Autist:innen arbeiten oder gearbeitet haben, sowie von Familienmitgliedern Betroffener (siehe z.B. Scott et al., 2017; Stankova und Trajkovski, 2010; Thavapalan et al., 2021).

Insgesamt stammt der Großteil der Forschung zu Autismus sowie zu Autismus und Arbeit aus dem englischsprachigen Raum, vor allem aus den USA, Kanada, Australien und England (Khalifa et al., 2019, S. 3; Lindsay et al., 2021, S. 600). Aus dem deutschsprachigen Raum, insbesondere aus Österreich, konnten keine für diese Arbeit relevanten wissenschaftlichen Untersuchungen gefunden werden. Speziell fehlt es noch an Forschung zu Diversitätsmanagement-Maßnahmen für Menschen mit Autismus, die eine langfristige und zufriedenstellende Beschäftigung am ersten Arbeitsmarkt in Österreich anstreben.

Aus den vorangegangenen Ausführungen geht hervor, dass autistischen Erwachsenen und insbesondere autistischen Frauen nicht die notwendige Aufmerksamkeit geschenkt wird, um zumindest einem Großteil der Betroffenen eine erfüllende Beschäftigung in einem inklusiven Umfeld zu ermöglichen. Diese Masterarbeit wendet sich der Forschungslücke zu und knüpft an den Forschungsstrang zu Interventionen auf organisationaler Ebene an. Ziel ist die Erstellung eines umfassenden Modells, das den Informations- und Anpassungsbedarf für die Schaffung eines autismusfreundlichen allgemeinen Arbeitsmarktes in Österreich zusammenfasst. Dafür werden Frauen mit leichter autistischer Symptomatik (Asperger-Syndrom, hochfunktionaler Autismus) zu ihren Sichtweisen bezüglich erforderlicher Veränderungen befragt. So soll Autist:innen der Zugang zum ersten Arbeitsmarkt erleichtert und langfristig eine erfüllende berufliche Position gesichert werden. Als sekundäres Ziel der Arbeit wird die Erhöhung der Lebensqualität und Zufriedenheit von Menschen mit Autismus gesehen. Es wird erwartet, dass die Forschungsergebnisse nicht ausschließlich für autistische Frauen, sondern auch für Männer und andere Geschlechtsidentitäten relevant sein können. Die der Masterarbeit zugrunde liegende Forschungsfrage lautet daher:

„Welchen Aufklärungs- und Anpassungsbedarf haben Arbeitgeber:innen in Österreich aus Sicht von Frauen mit Autismus mit geringer Symptomausprägung?"

Die vorliegende wissenschaftliche Arbeit ist folgendermaßen aufgebaut: Im ersten Schritt werden die Begriffe ‚Autismus' und ‚Diversitätsmanagement' definiert und relevante Eckpunkte beschrieben, um ein allgemeines Verständnis bei den Leser:innen zu erzeugen. In weiterer Folge wird der theoretische Rahmen, auf dem die Empirie der Masterarbeit basiert, vorgestellt. Bei dieser Grundlage handelt es sich um drei Studien, die sich vorwiegend mit Maßnahmen auf Arbeitgeber:innenseite zur Verbesserung der Teilhabe von Autist:innen am Arbeitsmarkt befassen. Die im Rahmen der Studien entwickelten Modelle werden anschließend in einer Modellsynthese zusammengeführt, welche als Ausgangspunkt für die qualitative Datenanalyse dienen soll. Das vierte Kapitel befasst sich mit dem methodischen Vorgehen der Arbeit. Dabei wird auf die Stichprobenlogik, die Methodik der Datenerhebung und -auswertung sowie auf relevante forschungsethische Aspekte eingegangen. Im Anschluss daran werden die Forschungsergebnisse präsentiert. Es handelt sich hierbei um eine detaillierte Darstellung des Aufklärungs- und Anpassungsbedarfs am ersten Arbeitsmarkt in Österreich. Die Ergebnisse werden nach Phasen des Beschäftigungszyklus gegliedert. Abschließend werden die Ergebnisse diskutiert, mit bestehender Literatur verglichen, sowie Limitationen und Implikationen der Arbeit aufgezeigt, bevor die wichtigsten Aspekte der Masterarbeit in einer Conclusio zusammengefasst werden.

2. Erläuterung zentraler Begriffe

Um ein Verständnis für den Anpassungsbedarf am allgemeinen Arbeitsmarkt zu ermöglichen, werden im Folgenden die für diese Arbeit zentralen Begriffe Autismus und Diversitätsmanagement erläutert. Einerseits werden die Diagnosekriterien für Autismus, dessen Prävalenz und bekannte Komorbiditäten beschrieben. Zum anderen wird Diversitätsmanagement definiert, und es werden seine Ziele und Vorteile erläutert.

2.1. Autismus

Die aktuelle medizinische Bezeichnung für Autismus ist Autismus-Spektrum-Störung. Sie ist eine vererbbare und stark heterogene neurologische Entwicklungsstörung mit kognitiven Merkmalen (Lord et al., 2020, S. 2). Autistische Menschen werden auch als neurodivers oder neurodivergent bezeichnet, wobei sich Neurodiversität bzw. Neurodivergenz auf die Vielfalt der menschlichen Wahrnehmung bezieht und definiert wird als jede Art der kognitiven Verarbeitung oder Sinngebung der Welt, die von den ‚typischen' Denk- und Lebensweisen abweicht. Neurodiversität umfasst nicht nur Autismus, sondern beispielsweise auch Dyslexie (Leseschwäche), Dyspraxie (Entwicklungsstörung in der Motorik), Aufmerksamkeitsdefizit-Hyperaktivitätsstörung (ADHS), Epilepsie und Tourette-Syndrom (Tomczak, 2022, S. 1467). Die

weltweite Prävalenz von Autismus liegt bei knapp einem Prozent, wobei die Schätzungen für Länder mit hohem Einkommen höher liegen und Männer im Verhältnis von etwa 3:1 häufiger betroffen sind als Frauen (Lord et al., 2020, S. 1; Loomes et al., 2017, S. 466).

Die offiziellen Diagnosekriterien für Autismus laut der aktuellen Version der internationalen statistischen Klassifikation der Krankheiten und verwandter Gesundheitsprobleme (ICD-11) der Weltgesundheitsorganisation (2022) lassen sich wie folgt zusammenfassen:

> Die Autismus-Spektrum-Störung ist gekennzeichnet durch anhaltende Defizite in der Fähigkeit, wechselseitige soziale Interaktion und soziale Kommunikation zu initiieren und aufrechtzuerhalten, sowie durch eine Reihe von eingeschränkten, sich wiederholenden und unflexiblen Verhaltensmustern, Interessen oder Aktivitäten, die für das Alter und den soziokulturellen Kontext der Person eindeutig untypisch oder exzessiv sind. Der Beginn der Störung liegt typischerweise in der frühen Kindheit, aber die Symptome können sich auch erst später vollständig manifestieren, wenn die sozialen Anforderungen die begrenzten Fähigkeiten übersteigen. Die Defizite sind so schwerwiegend, dass sie zu Beeinträchtigungen in persönlichen, familiären, sozialen, erzieherischen, beruflichen oder anderen wichtigen Funktionsbereichen führen, und sie sind in der Regel ein durchgängiges Merkmal der Funktionsweise der Person, das in allen Bereichen zu beobachten ist, obwohl sie je nach sozialem, erzieherischem oder anderem Kontext variieren können. Personen im Autismus-Spektrum weisen ein breites Spektrum an intellektueller Funktionalität und Sprachfähigkeit auf. (World Health Organization [WHO], 2022, eigene Übersetzung)

Autismus geht häufig mit einer anhaltenden Beschäftigung mit Spezialinteressen und einer anhaltenden Über- oder Unterempfindlichkeit gegenüber Sinnesreizen (z.B. Geräusche, Licht, Texturen, Gerüche, Temperatur) einher (World Health Organization [WHO], 2022). Diese Besonderheiten können im Arbeitsalltag hinderlich sein, unter Umständen aber auch die Grundlage für besondere Begabungen bilden. Autismus kann bei Menschen aller Intelligenzstufen auftreten und auch bei normaler Intelligenz mit unterschiedlichen Ausprägungen der sprachlichen Fähigkeiten verbunden sein. Neben den Kernsymptomen treten bei Menschen mit Autismus häufig psychiatrische oder neurologische Störungen auf, wobei Hyperaktivität und Aufmerksamkeitsstörungen, Angstzustände, Depressionen und Epilepsie relativ weit verbreitet sind (Lord et al., 2020, S. 2). Aufgrund der Vielfalt der Erscheinungsformen wird Autismus seit 2013 diagnostisch nicht mehr in Asperger-Syndrom, frühkindlichen Autismus und atypischen Autismus unterschieden, sondern als ein Spektrum klassifiziert, das viele Dimensionen umfasst (Lord et al., 2020, S. 43). Keine zwei Autist:innen

haben exakt dieselben Stärken und Schwächen. Die vorliegende Arbeit konzentriert sich auf autistische Frauen ohne intellektuelle und sprachliche Beeinträchtigungen. Es werden vorrangig die Begriffe Autismus, Autismus-Spektrum und Neurodiversität verwendet, um der von den Betroffenen mehrheitlich bevorzugten Terminologie Rechnung zu tragen.

2.2. Diversitätsmanagement am ersten Arbeitsmarkt

Diversität und Inklusion haben durch die Menschenrechtsbewegungen Mitte des 20. Jahrhunderts Einzug in die Arbeitswelt gehalten und sowohl Theorie als auch Praxis beschäftigen sich zunehmend mit Diversitätsmanagement in Organisationen (Abdul-Hussain und Hofmann, 2013; Bendl und Hanappi-Egger, 2015, S. 417). Diversitätsmanagement ist ein Ansatz zur Wahrnehmung, Nutzung und Förderung von Gemeinsamkeiten und Unterschieden in der Belegschaft (Bendl & Hanappi-Egger, 2015, S. 418). Diversität bezieht sich dabei auf die Vielfalt bzw. Heterogenität von Menschen und stellt die Anerkennung unterschiedlicher Identitäten und Lebensstile in den Mittelpunkt (Franken, 2015, S. 18). In der Theorie wird Diversität auf verschiedene Weisen näher definiert. Ein bekanntes Modell differenziert zwischen inneren, äußeren und organisationalen Dimensionen. Beispielsweise wird bei den inneren Diversitätsdimensionen in Alter, Geschlecht, sexuelle Orientierung, physische und psychische Fähigkeiten, Ethnie/Herkunft und Hautfarbe untergliedert, wobei diese Dimensionen im Vergleich zu den äußeren und organisationalen als eher stabil und nur mit großem Aufwand veränderbar gelten (Bendl & Hanappi-Egger, 2015, S. 420).

Organisationen verfolgen mit einer Diversitätsmanagementstrategie zwei Ziele: ein soziales und ein wirtschaftliches. Ersteres besteht darin, Chancengleichheit für verschiedene Beschäftigtengruppen und soziale Gerechtigkeit aus ethischen Gründen und im Sinne der Corporate Social Responsibility (CSR) zu ermöglichen (Franken, 2015, S. 11 f., 105). Maßnahmen können gleiche Aufstiegschancen für alle, die Beschäftigung von Menschen mit Beeinträchtigungen, die Vereinbarkeit von Familie und Beruf oder altersgerechte Arbeitsbedingungen sein (Franken, 2015, S. 11 f., 105). Mit dem zweiten Ziel wird versucht, von den positiven Effekten vielfältiger Arbeitnehmer:innen zu profitieren (Franken, 2015, S. 11 f., 105). Dabei geht es darum, spezifische Fähigkeiten und Kompetenzen zu nutzen, um z.B. die Wahrnehmung von Zukunftstrends und Kund:innenbedürfnissen zu verbessern, die Bereitschaft zur Weiterentwicklung zu erhöhen, und letztlich die Effizienz und Wettbewerbsfähigkeit von Organisationen zu steigern (Franken, 2015, S. 11 f., 105). In der Tat bestätigen Studien, dass Diversität die Leistung von Organisationen verbessert, weil Heterogenität von Mitarbeiter:innen und Manager:innen zu optimierten Entscheidungsprozessen beiträgt (Lorenzo, 2017, Abschn. 03:26). Des Weiteren berichten Arbeitnehmer:innen in inklusiven Organisationen von höherer Arbeitszufriedenheit, Motivation und einem angenehmeren Betriebsklima. Dies führt wiederum zu einer höheren Mitarbeiter:innenbindung und einer geringeren Fluktuation (Franken, 2015, S. 105).

Bei der Umsetzung von Diversitätsmanagement ist darauf zu achten, dass die Reproduktion von Stereotypen vermieden und indirekte Barrieren abgebaut werden. In diesem Sinne ist die Organisationskultur zu hinterfragen, d.h. welche Werte und Normen in einer Organisation vorherrschen (Bendl & Hanappi-Egger, 2015, S. 432ff.). Andernfalls kann es in heterogenen Arbeitsgruppen zu Wahrnehmungsfehlern, Kommunikationsproblemen und Konflikten kommen, die sich negativ auf die Arbeitszufriedenheit und -leistung auswirken (Franken, 2015, S. 101f.). Bendl und Hanappi-Egger (2015, S. 419) schreiben hierzu: *„Den Leitgedanken von Inklusion von Diversitäten in der Organisation zu verankern, bedeutet das Erlernen und Umsetzen eines wertschätzenden Umgangs mit Vielfalt auf der organisationalen Ebene."*. Die Implementierung eines funktionierenden Diversitätsmanagements ist auch mit Kosten verbunden, z.B. für Aus- und Weiterbildungsmaßnahmen (Franken, 2015, S. 101f.). Allerdings überwiegen die Vorteile, die sich, wie bereits erwähnt, u.a. auf geringere Fehlzeiten und Fluktuation, erhöhte Flexibilität, Innovationskraft und Kundenzufriedenheit beziehen (Bendl und Hanappi-Egger, 2015, S. 432ff. Franken, 2015, S. 101f.). Viele Argumente sprechen also dafür, die Homogenität in Unternehmen aufzubrechen und den Fokus auf Inklusion zu legen. Vor diesem Hintergrund soll im nächsten Schritt die theoretische Grundlage ausgearbeitet werden.

3. Theoretischer Rahmen

Den theoretischen Rahmen der Forschungsarbeit bilden drei Modelle zur Beschäftigung von Menschen im Autismus-Spektrum von Dreaver et al. (2020), Tomczak (2022) und Tomczak et al. (2021). Sie wurden ausgewählt, weil sie sich zum einen im Vergleich zu anderen wissenschaftlichen Arbeiten hauptsächlich auf die Aufklärung und Anpassungen beziehen, die von Seiten der Arbeitgeber:innen vorgenommen werden können, und weil sie zum anderen den Arbeitsplatz ganzheitlich betrachten. Das bedeutet, dass nicht nur bestimmte Aspekte einer Beschäftigung, wie z.B. das Führungsverhalten der Vorgesetzten, beleuchtet werden, sondern nahezu die gesamte Erfahrung als autistische Arbeitnehmer:in. Da die gewählten Modelle jedoch in Bezug auf die angesprochenen Aspekte des Arbeitsmarktes im Einzelnen erweiterbar sind, erscheint eine Synthese der Modelle als Grundlage für die Datenanalyse sinnvoll. Im folgenden Abschnitt werden die Modelle daher zunächst einzeln vorgestellt und anschließend zusammengeführt.

3.1. Modelle der organisationalen Anpassung und Aufklärung über Autismus

Das Rahmenwerk von Dreaver et al. (2020, S. 1658, 1661) beinhaltet fünf Schwerpunkte: soziale Unterstützung; adaptive Strategien; kognitive Unterstützung; berufliche Unterstützungsdienste, die sich vor allem an Manager:innen und Kolleg:innen von autistischen Mitarbeiter:innen richten; und Berufstrainings für Menschen im Autismus-Spektrum. Tomczak et al. (2021, S. 3ff.) haben das sogenannte inklusive Kommunikationsmodell für den Beschäftigungskreislauf

von Menschen mit Autismus entwickelt. Es enthält Empfehlungen, die sich auf die vier Phasen Rekrutierung, Selektion, Onboarding und Retention beziehen. In einer weiteren Arbeit von Tomczak (2022, S. 1471) identifiziert der Autor technologiebasierte und nicht-technologiebasierte Lösungen für vier Problembereiche: effektive Kommunikation; Zeitmanagement, Aufgabenpriorisierung und Arbeitsorganisation; Stressmanagement und Emotionskontrolle; und sensorische Sensibilität.

3.1.1. Strategien und Unterstützungen für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum von Dreaver et al. (2020)

Dreaver et al. (2020, S. 1657) sehen die Stärken von Autist:innen als äußerst wertvoll für viele Branchen, wobei die Nutzung dieser Fähigkeiten von der Übereinstimmung zwischen den individuellen Bedürfnissen und der Beschäftigungssituation abhängt. Deshalb haben die Forscher:innen nach organisationalen und individuellen Faktoren gesucht, die eine erfolgreiche Beschäftigung von autistischen Erwachsenen ermöglichen (Dreaver et al., 2020, S. 1658). Diese wurde definiert als ein Arbeitsverhältnis auf dem regulären Arbeitsmarkt, das mindestens sechs Monate besteht und bei dem die autistische Arbeitnehmer:in eine Vergütung mindestens in Höhe des Mindestlohns erhält (Dreaver et al., 2020, S. 1658). Im Rahmen der Forschung wurden vier Unternehmensleiter:innen und 16 Vorgesetzte von Autist:innen aus Schweden und Australien befragt, die Erfahrung mit einem solchen Beschäftigungsverhältnis haben (Dreaver et al., 2020, S. 1658). Die Forschungsergebnisse legen nahe, dass die drei übergreifenden Themen ‚Wissen über und Verständnis für Autismus‘, ‚Arbeitsumfeld‘ und ‚Job Match‘ eine erfolgreiche Beschäftigung von Autist:innen erleichtern (Dreaver et al., 2020, S. 1660).

Wissen über und Verständnis von Autismus wurde in Australien und Schweden als Schlüssel zur Förderung erfolgreicher Beziehungen am Arbeitsplatz identifiziert und war von grundlegender Bedeutung, um das Vertrauen der autistischen Mitarbeiter:innen in sich und andere Mitarbeiter:innen zu stärken. Als wirksamster Ansatz zur Förderung effektiver Kommunikation, positiver Beziehungen und zur Minimierung von Konflikten und Missverständnissen wurden Schulungen zur Autismus-Aufklärung und -Sensibilisierung beschrieben. Demnach können Vorgesetzte durch formale Ausbildungen ihre Fähigkeit zur Unterstützung von autistischen Mitarbeiter:innen und zur Schaffung eines integrativeren und akzeptierenderen Arbeitsumfelds verbessern. (Dreaver et al., 2020, S. 1660f.)

Die Befragten betonten im Zusammenhang mit dem Arbeitsumfeld, dass autismusspezifische Unterstützungsdienstleistungen von Expert:innen für eine erfolgreiche Beschäftigung relevant sind und sowohl neurodiverse als auch neurotypische Arbeitnehmer:innen und Arbeitgeber:innen davon profitieren (Dreaver et al., 2020, S. 1661). Für Vorgesetzte von Autist:innen sind etwaige Angebote von Bedeutung, um die Fähigkeiten von Autist:innen richtig zu fördern (Dreaver et al., 2020, S. 1661). In Bezug auf Kommunikations-

stile sollten Vorgesetzte und Mitarbeiter:innen bei der Arbeit mit Menschen im Autismus-Spektrum konsistent, prägnant und deutlich sein (Dreaver et al., 2020, S. 1661f.). So sollten Anweisungen und Instruktionen sowohl mündlich als auch schriftlich gegeben und Aufgaben in aufeinanderfolgende Schritte unterteilt werden (Dreaver et al., 2020, S. 1661f.). Auch die Klärung der Arbeitserwartungen und kontinuierliches Feedback sind wichtig für die Förderung der Arbeitsleistung und Zufriedenheit der autistischen Mitarbeiter:innen, wobei auf die individuellen Bedürfnisse in Bezug auf formelle oder informelle Arbeitsevaluierung zu achten ist (Dreaver et al., 2020, S. 1661f.). Ein klar benannter Vorgesetzter wurde zudem als eine wichtige Strategie genannt, um Mitarbeiter:innen mit Autismus dabei zu unterstützen, ihre Anliegen mitzuteilen und ihre Performanz zu optimieren (Dreaver et al., 2020, S. 1661f.).

Da kurzfristige Änderungen von Abläufen und Dienstplänen den Befragten zufolge für Menschen im Autismus-Spektrum besonders problematisch sind, reduzieren Struktur der physischen Umgebung, Routine der Arbeitsaufgaben und die Vorbereitung auf unvermeidbare Veränderungen das Stressniveau von Menschen mit Autismus. In Verbindung mit dem Arbeitsumfeld sind laut den Forscher:innen insbesondere Lärm, Licht und Raum, aber auch die Größe des unmittelbaren Teams zu berücksichtigen. Aus Sicht der Vorgesetzten besteht ein wichtiger Faktor für die erfolgreiche Unterstützung von autistischen Arbeitnehmer:innen darin, eine offene und flexible Haltung in Bezug auf die Notwendigkeit von Änderungen am Arbeitsplatz oder der Arbeitsrolle zu bewahren. Dazu gehört die Bereitschaft, die physische Umgebung, die Arbeitsplatzbeschreibungen oder die Arbeitsabläufe zu verändern und anzupassen. (Dreaver et al., 2020, S. 1662)

Job Match als drittes übergreifendes Ergebnis der Forschung beschreibt die Übereinstimmung zwischen den Anforderungen und Bedingungen des Arbeitsplatzes und den Fähigkeiten, Stärken und Interessen der Mitarbeiter:in. So ist es für die Studienteilnehmer:innen bedeutsam, die Fähigkeiten und Fertigkeiten der autistischen Arbeitnehmer:innen anzuerkennen und Weiterbildungs- und Aufstiegsmöglichkeiten zu bieten, indem Verantwortungsbereiche langsam aufgebaut werden. Beim Job Match muss ebenso die Struktur der Arbeitsaufgaben berücksichtigt werden, wobei eine größere Struktur zu einem geringeren Überwachungsbedarf und einer höheren Arbeitszufriedenheit führt. Manche der Befragten merkten an, dass sichergestellt sein muss, dass autistische Arbeitssuchende bereit für eine Beschäftigung sind. Dies kann durch Training, bei dem zwischenmenschliche Fähigkeiten und Grundlagen des Arbeitsplatzes erlernt und ausgebaut werden, erreicht werden. Nichtsdestotrotz sollte der Beschäftigungskreislauf mitsamt seinen Barrieren betrachtet und angepasst werden. Beispielsweise sollten neben dem Vorstellungsgespräch auch andere Alternativen wie eine Arbeitsprobe in Erwägung gezogen werden. (Dreaver et al., 2020, S. 1663)

Tabelle 1 fasst die Ergebnisse von Dreaver et al. (2020, S. 1661) zusammen. Demnach werden Strategien und Unterstützungen für eine erfolgreiche Beschäftigung von Men-

Soziale Unterstützung	Adaptive Strategien	Kognitive Unterstützung	Berufliche Unterstützungsdienste	Autismusspezifische Berufstrainings
- Offene, ehrliche Organisationskultur - Zusätzliche Supervision & Unterstützung für Autist:in (z.B. Mitarbeiter:in als Mentor:in) - Regelmäßige Kommunikation mit Vorgesetzten, u.a. zur Klärung der Erwartungen des Vorgesetzten - Unterstützendes Arbeitsteam - Kleine Teamgröße	- Alternative zum Vorstellungsgespräch - Klare Kommunikationswege - Schriftliche Schritt-für-Schritt-Anweisungen - Routine & Struktur am Arbeitsplatz - Ggf. Umstrukturierung der Arbeitsrolle - Anpassung an die sensorischen Anforderungen	- Regelmäßiges Feedback, informelle Beurteilung - Stärkung des positiven Verhaltens & Ermutigung - Vorbereitung auf neue Aufgaben & Veränderungen - Entwicklung von Problemlösungs- & Stressbewältigungsstrategien	- Autismus-Schulungen für Vorgesetzte & Mitarbeiter:innen - Laufende externe Unterstützung durch Expert:in für Vorgesetzte (z.B. für Job-Matching) & Autist:in - Regelmäßige Treffen mit Autist:in - Ggf. Einzelbetreuung für Autist:in	- Formulierung realistischer Ziele - Schulungen & Trainings zu Arbeitsplatzgrundlagen, Geschäftssprache, Transport, angemessenem Verhalten & persönlicher Vorsorge

Tabelle 1: Kategorien von Strategien und Unterstützungen, die eine erfolgreiche Beschäftigung von Personen im Autismus-Spektrum erleichtern (Eigene Darstellung, in Anlehnung an Dreaver et al. (2020, S. 1661))

schen im Autismus-Spektrum in fünf Themenbereiche unterteilt. In Bezug auf die soziale Unterstützung für neurodiverse Mitarbeiter:innen ist es u.a. von Vorteil, zusätzliche Supervision und Hilfestellung, z.B. durch eine Mentor:in, anzubieten sowie eine regelmäßige und offene Kommunikation zu pflegen. In diesem Zusammenhang ist es wichtig, die Erwartungen der Leitung zu klären. Zudem erleichtern kleine Arbeitsteams bzw. eine geringe Zahl an direkten Arbeitskolleg:innen den Arbeitsalltag der autistischen Mitarbeiter:in. Adaptive Strategien beinhalten die Erwägung einer Alternative zum Vorstellungsgespräch, klare Kommunikationswege, Schritt-für-Schritt-Anweisungen und Struktur am Arbeitsplatz. Gegebenenfalls sollten die Rolle und die Arbeitsumgebung an die Bedürfnisse der autistischen Person angepasst werden. So sollte die Möglichkeit bestehen, das Licht zu dimmen, Jalousien zu verwenden und Kopfhörer zu benutzen. Durch regelmäßiges Feedback, Ermutigung und Verstärkung des erwünschten Verhaltens seitens neurotypischer Kolleg:innen und Vorgesetzten können autistische Arbeitnehmer:innen kognitiv unterstützt werden. Belastende Situationen können durch die Entwicklung von Problemlösungs- und Stressbewältigungsstrategien minimiert werden. Auf Veränderungen und neue Aufgaben sollten neurodiverse Mitarbeiter:innen im Vorfeld vorbereitet werden. Wie bereits erwähnt, richten sich berufliche Unterstützungsdienste vorwiegend an Manager:innen und Kolleg:innen von autistischen Mitarbeiter:innen. Schulungen, u.a. auch Führungstrainings für direkte Vorgesetzte, und generelle Unterstützung durch eine Expert:in können das Diversitätsklima zusätzlich fördern. Solche Autismus-Expert:innen können auch beim Job-Matching, in unerwarteten oder schwierigen Situationen und bei der Einzelbetreuung von Autist:innen unterstützend wirken. Im Rahmen von Berufstrainings für Menschen im Autismus-Spektrum sollten gemeinsam mit der betroffenen Person realistische Berufsziele formuliert und berufsvorbereitende Trainings durchgeführt werden. Diese

können sich auf die Vermittlung von Grundlagen des Arbeitsplatzes, den Umgang mit Verkehrsmitteln, angemessenes Verhalten und persönliche Vorsorge beziehen. (Dreaver et al., 2020, S. 1661)

3.1.2. Das inklusive Kommunikationsmodell von Tomczak et al. (2021)

Tomczak et al. (2021, S. 1) erkennen Schwierigkeiten in der zwischenmenschlichen Kommunikation, die Menschen im Autismus-Spektrum haben, als einen Grund für die erhebliche Unterrepräsentation von Autist:innen am Arbeitsmarkt und für Probleme während der Erwerbstätigkeit. Die Forscher:innen sehen es deshalb als notwendig an, zu verstehen, wie die Kommunikation innerhalb des Beschäftigungskreislaufs für autistische Menschen verbessert werden kann (Tomczak et al., 2021, S. 1). Insbesondere identifizieren sie Möglichkeiten, wie die Kommunikationsprozesse rund um die Rekrutierung, Auswahl, Eingliederung und Weiterbeschäftigung so verändert werden können, dass den spezifischen Merkmalen und Bedürfnissen der Betroffenen Rechnung getragen wird (Tomczak et al., 2021, S. 1). Den Rahmen der Forschung bildet die Theorie der Ressourcenerhaltung, die besagt, dass eine Bedrohung der eigenen Ressourcen bei der Arbeit oder das Ausbleiben von Ressourcen nach einer Ressourceninvestition zu einem höheren Maß an erlebtem Stress führt (Hobfoll, 1989). Die Forscher:innen argumentieren daher, dass die Defizite, die mit Autismus einhergehen, die vorhandenen Ressourcen und das Potenzial für die Gewinnung neuer Ressourcen gefährden (Tomczak et al., 2021, S. 2f.). Letztlich können Schwierigkeiten bei der Arbeit zu erlebtem Stress führen und autistische Personen anfälliger für die Erfahrung von Verlustspiralen machen, d.h. für weitere zukünftige Verluste (Tomczak et al., 2021, S. 2f.). Mit diesem Hintergrund führten Tomczak et al. Interviews mit 21 Therapeut:innen, Berufsausbilder:innen und Unternehmer:innen, die Autist:innen beschäftigen, hauptsächlich

aus Polen, aber auch aus Kanada, Spanien und Australien (Tomczak et al., 2021, S. 2f.).

Die Erkenntnisse in Bezug auf Rekrutierungsprozesse von Organisationen zeigen im Allgemeinen, dass nicht die ,perfekte' Mitarbeiter:in gesucht werden sollte, sondern eine, die mit einem angemessenen Maß an Unterstützung und unter guten Arbeitsbedingungen qualitativ hochwertige Ergebnisse liefern kann. Wie in Tabelle 2 dargestellt, sollten Personalverantwortliche versuchen, eine neurodiversitätsfreundliche Stellenanzeige zu erstellen, in der die Inhalte in einfacher Sprache formuliert sind und unnötige Qualifikationsanforderungen vermieden werden. Die Studie ergab auch, dass Stellenanzeigen klare und präzise Informationen über die Anforderungen der Stelle, eine genaue Definition der täglichen Aufgaben sowie den Umfang der Aufgaben und Verantwortlichkeiten enthalten sollten. Das Layout und die Farbgebung sollten einfach gehalten werden. Alternativ zur traditionellen Anzeige wurde zudem vorgeschlagen, die Bewerber:innen zur Lösung eines relevanten Problems aufzufordern. So könnten im weiteren Verfahren die besten Lösungen und nicht die besten Lebensläufe ausgewählt werden. (Tomczak et al., 2021, S. 5)

In Bezug auf die Selektion neuer Mitarbeiter:innen sollte laut den der Tabelle entnehmbaren Studienergebnissen eine kompetenzbasierte Bewertung vorgenommen werden. Die Konzentration auf die aktuellen Kompetenzen und nicht auf die Berufserfahrung und das Verhalten in der Vergangenheit führt laut den Befragten zu einer weniger voreingenommenen Auswahl (Tomczak et al., 2021, S. 5). Es wurde des Weiteren berichtet, dass Vorstellungsgespräche in einer ruhigen Atmosphäre geführt werden sollten, in der die Bewerber:innen ihre Fähigkeiten präsentieren können. Dies kann durch die Verwendung kurzer und relevanter verbaler Anweisungen erreicht werden. Die Fragen im Interview sollten detailliert und präzise sein und Abstraktionen und Mehrdeutigkeiten sollten vermieden werden. Darüber hinaus berichteten die Studienteilnehmer:innen, dass es oft notwendig ist, einen klaren Zeitrahmen für die Durchführung von Aufgaben oder die Beantwortung von Fragen während eines Interviews vorzugeben. Praktische Kompetenztests, einschließlich spielbasierter Aufgaben, können auch im Auswahlprozess innerhalb einer Gruppe von Menschen mit Autismus wirksam sein. Wenn Organisationen nicht über ausreichende Erfahrung bei der Einstellung von neurodiversen Personen verfügen, ist es nützlich, die Hilfe von Expert:innen in Anspruch zu nehmen. Diese können darüber aufklären, was zu erwarten ist und wie Akzente bei der Befragung von autistischen Kandidat:innen gesetzt werden können. (Tomczak et al., 2021, S. 6)

Der erstmaligen Einstellung einer autistischen Person sollten Schulungsprogramme sowohl für Führungskräfte und Vorgesetzte als auch für alle Mitarbeiter:innen vorausgehen. Solche Autismus-Trainings fördern die Akzeptanz neurodiverser Menschen als fähige und wertvolle Mitarbeiter:innen, um letztlich ein integratives Umfeld und ein Klima der Vielfalt zu unterstützen. Auch die Bereitstellung einer erfahrenen Mitarbeiter:in als Buddy oder Mentor:in würde die notwendige Unterstützung bei der Einführung neuer Aufgaben oder der Klärung von Zweifeln bieten, insbesondere in den ersten Tagen an einem neuen Arbeitsplatz. Neueinsteiger:innen mit Autismus sollten ebenso ermutigt werden, bei Bedarf um Hilfe zu bitten, über ihre Bedürfnisse zu informieren und Feedback zum Anpassungsprozess zu geben. Die Forschungsergebnisse deuten außerdem darauf hin, dass die Einarbeitung neben einer klaren Kommunikation des Aufgabenbereichs auch eine Erläuterung der ungeschriebenen Regeln am Arbeitsplatz beinhalten sollte, z.B. in Bezug auf die Häufigkeit von Pausen, die Kleiderordnung und andere Gepflogenheiten der Organisation. Zur Strukturierung des Einarbeitungsprozesses können Onboarding-Checklisten oder Leitfäden eingesetzt werden. (Tomczak et al., 2021, S. 6)

Tomczak et al. (2021, S. 6f.) betonen in ihrer Arbeit, dass inklusive Rekrutierungs-, Auswahl- und Onboardingprozesse noch keine Garantie für eine erfolgreiche Beschäftigung von Menschen mit Autismus sind. Entscheidend ist die Bindung dieser Menschen an den Arbeitsplatz. So ist es von Vorteil, eine klare Hierarchie mit einem Vorgesetzten festzulegen sowie die Größe des Arbeitsteams der autistischen Mitarbeiter:in überschaubar zu halten. Die Strukturierung der Arbeitswoche, das Festlegen von Aufgabensequenzen und die Information über Veränderungen im Voraus helfen zusätzlich, das Stresslevel der autistischen Mitarbeiter:innen gering zu halten. Neben der Art des Kontakts zu Vorgesetzten und Teammitgliedern sollte auch die Häufigkeit und Intensität an die individuellen Vorlieben und Bedürfnisse der autistischen Mitarbeiter:in angepasst werden, wobei Regelmäßigkeit und Wiederholbarkeit gewährleistet sein sollten. Es kann hilfreich sein, vor Besprechungen eine schriftliche Agenda und nach Besprechungen ein Protokoll zu erstellen. Insgesamt können präzise Mitteilungen und das Vermeiden von Metaphern den Kommunikationsprozess für Autist:innen weniger belastend machen. Ähnlich wie beim Vorstellungsgespräch sollten kurze Mitteilungen und klare Anweisungen verwendet werden, die keinen Zweifel daran lassen, um welche Aufgabe es sich handelt, wie und wann sie zu erledigen ist sowie wer die Ansprechpartner:in für Rückfragen ist. Hierbei können visuelle Arbeitspläne oder Anweisungsbilder unterstützend wirken. Es sollte auch sichergestellt werden, dass die Empfänger:in die Informationen versteht. Das Nutzen nicht-direkter und elektronisch vermittelter Formen der innerbetrieblichen Kommunikation wie durch E-Mail, Instant Messaging oder Online-Plattformen ist ebenso effektiv. Schriftliche Kommunikation hat den Vorteil, dass sie keine sofortige mündliche Antwort erfordert und im Zweifelsfall nachgelesen werden kann. Auf mündliche Anweisungen sollte daher die schriftliche Form folgen. Letztlich sollte Feedback direkt, aber einfühlsam sein. (Tomczak et al., 2021, S. 6f.)

Die Praktiken, die im inklusiven Kommunikationsmodell von Tomczak et al. (2021, S. 7) vorgestellt werden, scheinen für Mitarbeiter:innen im Autismus-Spektrum weniger belastend zu sein. Die Forscher:innen hoffen daher, durch die Implementierung dieses Modells in Organisationen das Stressniveau dieser Gruppe von Arbeitnehmer:innen verringern zu können.

Rekrutierung	Selektion	Onboarding	Retention
- Stellenausschreibungen mit übersichtlichem Layout in leichter Sprache & mit klaren, präzisen Informationen über die Anforderungen & täglichen Aufgaben - Aufgabenstellung in Stellenanzeige; Selektion nach bester Lösung als Alternative zur Selektion nach dem besten Lebenslauf	- Kurze, präzise Fragen & Anweisungen ohne Abstraktion & Ambiguität - Praktische Fähigkeitstests & spielbasierte Aufgaben - Klare Zeitrahmen für die Ausführung von Anweisungen - Unterstützung durch Expert:in für Personalverantwortliche	- Stärkung einer inklusiven & diversen Organisationskultur - Bereitstellung eines Jobcoaches / Mitarbeiter:in als Mentor:in - Ermutigung, nach Hilfe zu bitten & eigene Bedürfnisse darzulegen - Ermutigung zum Feedback - Erklärung ungeschriebener Regeln	- Klare Hierarchie & ein:e Vorgesetzte - Kleine Teamgröße - Struktur & Aufgaben-sequenzierung - Vorbereitung auf Veränderungen - Art & Häufigkeit des Kontakts (z.B. Meetings) nach individuellen Bedürfnissen - Schriftliche Agenden & Protokolle für Besprechungen - Präzise mündliche & schriftliche Anweisungen & Nutzung visueller Darstellungen; Prüfung, ob Information verstanden wurde - Elektronisch vermittelte Kommunikation - Direktes, einfühlsames Feedback

Tabelle 2: Mögliche Lösungen auf der Grundlage eines verbesserten Kommunikationsmodells zur Unterstützung von Mitarbeiter:innen im Autismus-Spektrum (Eigene Darstellung, in Anlehnung an Tomczak et al. (2021, S. 4f.))

3.1.3. Anpassungen des Arbeitsumfeldes und der Managementpraktiken von Tomczak (2022)

Ähnlich wie bei den zuvor vorgestellten Modellen zielt Tomczak (2022, S. 1467) mit seiner Arbeit darauf ab, optimale Bedingungen für Menschen im Autismus-Spektrum zu schaffen, damit diese erfolgreich am Arbeitsplatz arbeiten und ihr Wohlbefinden verbessern können. Im Unterschied zu den oben genannten Frameworks identifiziert der Forscher insbesondere Möglichkeiten, die sich aus der Entwicklung digitaler Technologien ergeben, um das Arbeitsumfeld durch innovative Ansätze zu verändern (Tomczak, 2022, S. 1467). Der Autor untersucht aber sowohl technologiebasierte als auch nicht-technologische Anpassungen, die helfen, Herausforderungen am Arbeitsplatz für autistische Mitarbeiter:innen zu bewältigen (Tomczak, 2022, S. 1467). Die Forschungsergebnisse basieren auf denselben 21 Interviews mit Expert:innen zum Thema Autismus und Arbeit wie in Abschnitt 2.1.2. Als theoretischen Hintergrund bezieht sich Tomczak (2022, S. 1469f.) dabei auf das soziale Modell von Behinderung, das von Oliver (1983) eingeführt und in der Einleitung erwähnt wurde. Es geht davon aus, dass nicht nur Beeinträchtigungen, sondern auch die Struktur und das Umfeld, die zumindest teilweise von anderen konstruiert werden, Barrieren für behinderte Arbeitnehmer:innen schaffen (Oliver, 1983). Für Arbeitnehmer:innen mit Autismus umfassen diese Barrieren laut Tomczak (2022, S. 1470) das Arbeitsumfeld, die Organisationskultur, Einstellungen bzw. Ansichten und Technologie. Die Befragten wurden daher um Empfehlungen für Anpassungsmaßnahmen und Managementpraktiken zu vier Aspekten gebeten: Effektive Kommunikation; Zeitmanagement, Aufgabenpriorisierung und

Arbeitsorganisation; Stressmanagement und Emotionskontrolle; sowie sensorische Sensibilität.

Wie aus Tabelle 3 hervorgeht, ist unter den Lösungen, die die Qualität und Effektivität in der zwischenmenschlichen Kommunikation unterstützen, die Kommunikation zu nennen, die auf nicht-direktem und nicht-mündlichem Kontakt basiert. Hierfür können z.B. E-Mails, Chats, Diskussionsforen, Chatbots, Online-Formulare und Online-Plattformen genutzt werden. Eine Studienteilnehmer:in beschreibt, dass so Situationen vermieden werden, in denen autistische Arbeitnehmer:innen Aufgaben aufgrund von Unsicherheiten nicht erledigen können, aber auch nicht wissen, wie sie um Hilfe bitten können. Als Teil der Kommunikation kann es nützlich sein, visuelle Zeitpläne, Diagramme, Tabellen, Piktogramme, Emoticons und Anleitungsbilder zu verwenden. Anweisungen sollten die Form von Leitfäden haben, in denen die Mitarbeiter:innen nachschlagen können. Sie müssen verständlich sein und von regelmäßigen, konstruktiven und ehrlichen Rückmeldungen begleitet werden. Es ist jedoch zu erwähnen, dass technologische Lösungen die direkte, mündliche Kommunikation nicht vollständig ersetzen, sondern neben ihr bestehen und bei Bedarf unterstützen sollen. (Tomczak, 2022, S. 1472, 1476)

Im Zusammenhang mit verbessertem Zeitmanagement, Aufgabenpriorisierung und Arbeitsorganisation ergeben die Befragungen, dass Zeitstrukturierungstools, Kalender, Aufgabenlisten, Erinnerungen oder Benachrichtigungen, die den Aufgabenumfang und eine klare Reihenfolge der Aufgaben bieten, an Computern und mobilen Geräten genutzt werden können. Solche Anwendungen erlauben es beispielsweise, die an einem bestimmten Projekt beteiligten Mitarbei-

Effektive Kommunikation	Zeitmanagement, Aufgabenpriorisierung und -organisation	Stressmanagement und Emotionskontrolle	Sensorische Sensibilität
- Flexibler, nicht-direkter Kontakt, gestützt durch Texte (z.B. E-Mails, Chats, Online-Formulare) & visuelle Hilfsmittel (z.B. Diagramme, Anleitungs-bilder) - Leicht verständliche Nachrichten - Regelmäßiges, konstruktives Feedback	- Transparente Arbeitsstruktur - Programme zur Zeitstrukturierung (z.B. Online-Kalender), Benachrichtigungen mit Aufgabenumfang & -sequenzierung - Programme zur Prüfung des Arbeitsfortschritts, (z.B. interaktive To-Do-Listen) - Klarer Arbeitsplan für Tag/Woche/Monat; Checklisten - Unterstützung bei der Aufgabenpriorisierung - Flexibilität bei Arbeitszeiten, Einzel-/Teilzeit-/Hybrid-/Remote-Arbeit	- Geräte zur Echtzeitmessung des Stressniveaus - Stressmanagement-training, d.h. Entwicklung von Stressbewältigungs-strategien - Vereinbarte Kommunikation zur Vermittlung von Emotionen (z.B. Emoticons, Schlüsselwörter) - Dynamische Anpassung der Umgebung	- Vermeiden von großen, offenen Büroräumen - Einzelarbeitsplätze & -büros - Individuelle Gestaltung des Arbeitsumfeldes - Nutzen von Kopfhörern - Separater Ruheraum bzw. Entspannungs-bereich

Tabelle 3: Mögliche Anpassungen des Arbeitsumfelds und der Managementpraktiken
(Eigene Darstellung, in Anlehnung an Tomczak (2022, S. 1473f.))

ter:innen daran zu erinnern, dass ein Meeting stattfindet oder eine Deadline näher rückt. Eine weitere Lösung kann eine interaktive und geteilte To-Do-Liste für Manager:in und Mitarbeiter:in sein, die darauf abzielt, den Arbeitsfortschritt zu verfolgen. So wird nicht nur Struktur, sondern auch Sicherheit geboten. Als herkömmliche Alternative bieten sich Checklisten und klare Arbeitspläne für die kommenden Tage, Wochen und Monate an. Die Gewährleistung von Regelmäßigkeit bei der Zuweisung von Aufgaben und Evaluierungen sowie transparente Verantwortlichkeiten, Arbeitsstruktur und Arbeitsorganisation sind ebenso wichtig, wobei zusätzliche Unterstützung bei der Prioritätensetzung von Aufgaben hilfreich sein kann. (Tomczak, 2022, S. 1472)

Tomczak (2022, S. 1472ff.) hebt hervor, dass angesichts der spezifischen Merkmale der Arbeitskräfte im Autismus-Spektrum ein Ansatz erforderlich ist, der auf Toleranz, einem Inklusionsklima und dem Bewusstsein für unterschiedliche Bedürfnisse basiert. Ein Ausdruck hierfür kann Flexibilität bezüglich der Arbeitszeiten sein, wobei nicht die verbrachte Zeit bei der Arbeit, sondern die erledigten Aufgaben bewertet werden. So könnten z.B. vier Stunden intensiver und effizienter Arbeit als Äquivalent von acht Stunden ermöglicht werden. Die Offenheit für Teilzeitarbeit ist auch dann von Vorteil, wenn eine Vollzeitbeschäftigung zu anspruchsvoll für die autistische Mitarbeiter:in ist. Zudem können Formen der Remote-Arbeit oder der hybriden Arbeit, die den direkten Kontakt und nicht notwendige soziale Interaktionen einschränken, von Vorteil sein. (Tomczak, 2022, S. 1475)

Der Autor beschreibt, dass Menschen mit Autismus manchmal Schwierigkeiten haben, Stress zu erkennen und zu kontrollieren. Eine Echtzeitmessung und Benachrichtigung des Stressniveaus durch ein am Handgelenk getra-

genes Gerät wie eine Smartwatch könnte daher laut den Forschungsergebnissen eine wirksame Lösung sein. Eine solche Stressmessung könnte mit einem Stressmanagementtraining am Arbeitsplatz kombiniert werden, bei dem Strategien zur Stressbewältigung entwickelt und geeignete Entspannungstechniken und stressreduzierende Aktivitäten eingesetzt werden. Um den Ausdruck von Emotionen zu erleichtern, besteht außerdem die Möglichkeit, Kolleg:innen oder Vorgesetzte über eine wahrgenommene Zunahme von Stress oder Unbehagen mit Hilfe einfacher Mittel, z.B. durch Emoticons oder Schlüsselwörter, zu informieren. Gleichzeitig ist es sinnvoll, autistischen Mitarbeiter:innen zu ermöglichen, Stressoren am Arbeitsplatz zu reduzieren, indem Temperatur, Luftfeuchtigkeit, Lärm, Geruch und Sonneneinstrahlung dynamisch angepasst werden. (Tomczak, 2022, S. 1475)

In Bezug auf die Reizsensibilität ist es nach Ansicht der Befragten hilfreich, Bedingungen zu schaffen, die diese Einschränkungen überwinden. Soweit es die Situation erlaubt, sollte jeder Mitarbeiter:in ein eigener Arbeitsplatz oder Raum zur Verfügung gestellt werden, in dem das Arbeitsumfeld nach persönlichen Vorlieben gestaltet werden kann. Offene Büroräume sollten möglichst vermieden werden, um Reize von außen zu begrenzen. Der einfachste Schutz vor akustischer Reizüberflutung sind Kopfhörer mit mechanischer Schalldämpfung oder elektronischer Geräuschunterdrückung. Für Personen, die am Computer arbeiten, wäre eine Tastatur mit geräuschlosen Tasten von Vorteil. Auch die Anpassung des Computerbildschirms an die individuellen Vorlieben in Bezug auf Kontrast, Helligkeit und Farbsättigung kann eine Lösung sein. Eine Studienteilnehmer:in beschreibt außerdem, dass ein Entspannungsbereich bzw. Ruheraum eine systematische Lösung für alle sein sollte, da

dieser nicht nur Menschen im Autismus-Spektrum, sondern allen Mitarbeiter:innen zugute kommt. (Tomczak, 2022, S. 1475f.)

Tomczak (2022, S. 1476) hält fest, dass das Arbeitsumfeld für Menschen im Autismus-Spektrum nicht perfekt sein muss. Betroffene sollten die Möglichkeit haben, sich angemessenen Entwicklungsherausforderungen zu stellen und sich so anzupassen, dass sie erfolgreich und dauerhaft in den Arbeitsmarkt integriert werden können. Es sollte also ein Gleichgewicht zwischen Entwicklungsförderung und Stressreduzierung bestehen. Dem ist hinzuzufügen, dass jede eingeführte Lösung zur Unterstützung von Personen aus dem Autismus-Spektrum für alle Mitarbeiter:innen verfügbar sein sollte. Viele der vorgeschlagenen Änderungen, wie z.B. flexible Arbeitszeiten, das Arbeiten mit Kopfhörern oder die persönliche Gestaltung des Arbeitsplatzes, könnten eine Verbesserung für alle Berufstätige darstellen. So kann auch das Gefühl vermieden werden, dass eine bestimmte Gruppe Privilegien genießt. (Tomczak, 2022, S. 1476ff.)

Durch die Einführung geeigneter Managementpraktiken und Arbeitsplatzanpassungen in Organisationen, wie in der Arbeit von Tomczak (2022, S. 1470) dargestellt, können nach Ansicht des Autors Barrieren für autistische Arbeitnehmer:innen überwunden werden und zur Entwicklung eines Arbeitsplatzes führen, der eine erfolgreiche Eingliederung von Menschen mit Autismus ermöglicht, indem er zur Verbesserung des langfristigen Wohlbefindens der Vertreter:innen dieser Gruppe beiträgt.

3.2. Modellsynthese

Damit die in den vorhergehenden Abschnitten beschriebenen Modelle zu Aufklärungs- und Anpassungsmaßnahmen am Arbeitsmarkt für die Datenanalyse genutzt werden können, werden die Inhalte nun in einer Modellsynthese zusammengefasst. Als Orientierung für den Aufbau der Modellsynthese wird die Grundstruktur des inklusiven Kommunikationsmodells von Tomczak et al. (2021) verwendet. Dieses bietet Klarheit für Entscheidungsträger:innen in Organisationen, da die Maßnahmen entsprechend der Phasen im Beschäftigungskreislauf dargestellt werden. Die Phasen Rekrutierung und Selektion werden in der Modellsynthese zusammengefasst als Recruiting-Phase dargestellt.

Wie Tabelle 4 zeigt, bilden Recruiting-Phase, Onboarding-Phase, Retention und Rahmenbedingungen die Hauptkategorien für die Analyse der im Rahmen dieser Arbeit erhobenen Daten. Rahmenbedingungen wurden als eigene Kategorie in die Modellsynthese aufgenommen, da sie inhaltlich keiner spezifischen Kategorie zuzuordnen sind. Demnach ist eine inklusive und diverse Organisationskultur, die bereits in der Rekrutierungsphase sichtbar ist, eine Grundvoraussetzung für die erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum. Wie zuvor angemerkt, sind Schulungen zum Thema Autismus eine hilfreiche Maßnahme, um dies zu erreichen (Tomczak et al., 2021, S. 6). Und obwohl sich diese Lösung nicht an Organisationen, sondern an autistische Arbeitnehmer:innen richtet, erwähnen einige Befragte in der

Studie von Dreaver et al. (2020, S. 1661f.), dass auch arbeitsvorbereitende Trainings von Bedeutung sein können.

Aus der Darstellung ist ersichtlich, dass die Unterstützung durch Autismus-Expert:innen in jeder Phase des Beschäftigungszyklus sowohl für die Organisation als auch für autistische Arbeitnehmer:innen hilfreich sein kann. Aufgrund der Bedürfnisse von Autist:innen kann zusätzlich davon ausgegangen werden, dass die in der Kategorie Retention abgebildeten Maßnahmen teilweise auch für die Phasen Rekrutierung und Onboarding gelten. So könnte bereits während der Rekrutierung bei Bewerbungsgesprächen auf die sensorische Sensibilität von neurodiversen Personen geachtet werden und nicht erst nach der Integrationsphase. Auch die Einführung von Routine und klaren Strukturen wäre schon beim Eintritt autistischer Mitarbeiter:innen in die Organisation sinnvoll.

Zusammenfassend bildet Tabelle 4 die Grundlage für die Datenanalyse der empirischen Forschung dieser Arbeit. Wie dieses Kategoriensystem angewandt wird, wird im folgenden Kapitel näher erläutert.

4. Methodik

In diesem Kapitel wird die empirische Vorgehensweise der Arbeit vorgestellt. In Abschnitt 4.1 wird die Sampling-Logik dargestellt; die Voraussetzungen für die Teilnahme an der Studie, die Kontaktaufnahme zu den Befragten sowie relevante Eckpunkte der teilnehmenden Personen werden beschrieben. In Abschnitt 4.2 wird die Methode der Datenerhebung erläutert. Dies beinhaltet sowohl den grundsätzlichen Ablauf und die behandelten Themen als auch wie und in welchem Zeitraum die Daten erhoben und transkribiert wurden. Der nächste Abschnitt des Kapitels befasst sich mit der Methode der Datenanalyse. Dabei wird schrittweise beschrieben, wie das Datenmaterial in den im vorherigen Abschnitt vorgestellten Modellrahmen integriert und das Modell erweitert wurde. Ebenso wird auf Aspekte der Qualitätssicherung eingegangen. Abschließend wird auf relevante forschungsethische Aspekte Bezug genommen.

4.1. Sampling-Methode

Zur Beantwortung der Forschungsfrage fokussierte die Autorin bei der Arbeit auf die Sichtweisen von autistischen Frauen über die Bedürfnisse von Autist:innen am ersten – also regulären – Arbeitsmarkt. Es wurden elf weibliche Betroffene mit leichter Autismus-Symptomatik als Expertinnen in eigener Sache im Zuge von qualitativen Interviews befragt. Zudem wurden zwei neurotypische Expertinnen im Bereich Autismus und Arbeitswelt in die Forschung miteinbezogen. Mit ihnen wurden, ebenfalls im Rahmen von Interviews, die Sichtweisen der Autistinnen aus den vorangegangenen Interviews aufgearbeitet und weitere Aspekte betrachtet.

Die Stichprobenziehung erfolgte nach vorher festgelegten Kriterien. Diese waren in Bezug auf die Expertinnen in eigener Sache (1) Volljährigkeit, (2) biologisches/soziales Geschlecht, (3) Autismus-Diagnose durch eine klinische Psy-

Rahmenbedingungen		
- Inklusive, diverse Organisationskultur - Schulungen für Führungskräfte & Mitarbeiter:innen zur Aufklärung über Autismus - Vorbereitung auf die Arbeitswelt für Menschen im Autismus-Spektrum, d.h. Schulungen über Arbeitsplatzgrundlagen, Geschäftssprache, Transport, angemessenes Verhalten & persönliche Vorsorge		
Recruiting-Phase	**Onboarding-Phase**	**Retention**
Unterstützung durch Expert:in für Organisation	Unterstützung durch Expert:in (z.B. Jobcoach); Mitarbeiter:in als Mentor:in für Autist:in	Unterstützung durch Expert:in für Organisation (z.B. für Job-Matching); Unterstützung & Supervision durch Expert:in (falls erforderlich Einzelbetreuung), Kolleg:innen & Vorgesetzte für Autist:in
Stellenausschreibungen: - Übersichtliches Layout - Ohne unnötige Qualifikations-anforderungen - Präzise Informationen über Anforderungen & Aufgabenbereiche	Kommunikation: - Ermutigung, nach Hilfe zu bitten & eigene Bedürfnisse darzulegen - Ermutigung zum Feedback - Erklärung ungeschriebener Regeln	Routine und Struktur: - Transparente Arbeitsstruktur, klare Kommunikationswege - Ein:e Vorgesetzte, kleine Teamgröße - Ggf. Umstrukturierung der Arbeitsrolle - (Unterstützung bei) Aufgabenpriorisierung & -sequenzierung - Arbeitsplan für Tag/Woche/Monat - (Interaktive) To-Do-Listen, Kalender, Benachrichtigungen - Vorbereitung auf neue Aufgaben & Veränderungen
Auswahlverfahren: - Kurze, präzise Fragen/ Anweisungen ohne Abstraktion/Ambiguität - Alternative zum Gespräch (z.B. Arbeitsprobe); spezifische, praktische Aufgabenstellung zur Einschätzung der Fähigkeiten & Selektion nach bester Lösung - Klare Zeitrahmen		Kommunikation: - Klarer & präziser mündlicher & schriftlicher Kontakt & (Schritt-für-Schritt-) Anweisungen, ggf. mit visuellen Darstellungen - Schriftliche Agenden & Protokolle für Besprechungen - Klarheit über Erwartungen - Regelmäßige & offene Kommunikation mit Vorgesetzten, Art & Häufigkeit nach individuellen Bedürfnissen - Flexible Kommunikation ohne persönlichen Kontakt (z.B. E-Mails, Chats) - Direktes, konstruktives, einfühlsames Feedback; Stärkung des positiven Verhaltens & Ermutigung
		Sensorische Sensibilität: - Vermeiden von großen, offenen Büroräumen; Einzelarbeitsplätze & -büros - Individuelle Gestaltung des Arbeitsumfeldes - (Dynamische) Anpassung der Umgebung - Kopfhörer
		Stress: - Echtzeitmessung des Stressniveaus, z.B. durch Smart Watch - Vereinbarte Kommunikation zur Vermittlung des Stressniveaus (z.B. Emoticons, Schlüsselwörter) - Entwicklung von Stressbewältigungs- & Problemlösungsstrategien - Ruheraum bzw. Entspannungsbereich
		Arbeitszeit und Arbeitsort - Flexibilität bei Arbeitszeitpräferenzen; Teilzeitarbeit - Hybrid-Arbeit, Home-Office-Arbeit

Tabelle 4: Modellsynthese
(Eigene Darstellung, in Anlehnung an Dreaver et al. (2020, S. 1661), Tomczak et al. (2021, S. 4f.) und Tomczak (2022, S. 1473f.))

cholog:in (Autismus-Spektrum-Störung mit niedrigem Symptomlevel, Asperger-Syndrom oder hochfunktionaler Autismus), sowie (4) Erfahrung am ersten Arbeitsmarkt in Österreich. Das Vorliegen weiterer Behinderungen, psychischer Erkrankungen oder körperlicher Einschränkungen war kein Ausschlusskriterium. Bei der Berufserfahrung musste es sich um bezahlte Beschäftigungsverhältnisse handeln, d.h. keine Voluntärarbeit. Die Wochenarbeitsstunden, die Dauer der Berufserfahrung und die Anzahl der Beschäftigungsverhältnisse waren keine Entscheidungskriterien für die Auswahl der Interviewpartnerinnen. Die teilnehmenden Autistinnen sollten selbst entscheiden, ob sie genügend persönliche Einblicke in typische Abläufe des ersten Arbeitsmarktes sowie in den Umgang mit Arbeitskolleg:innen, Vorgesetzten und etwaigen Mitarbeiter:innen haben, um darüber zu sprechen.

Auswahlkriterium für die Befragung von Autismus-und-Arbeit-Expert:innen war die aktuelle Ausübung einer Beratungsfunktion für Menschen mit Autismus bezüglich der Arbeitswelt oder eine autismusspezifische therapeutische Tätigkeit in Österreich. Da sich die erstgenannte Personengruppe speziell mit dem Thema Autismus und Arbeit auseinandersetzt, wurde diese bei der Auswahl der Interviewpartner:innen bevorzugt.

Für die Kontaktaufnahme mit den neurodiversen und neurotypischen Expert:innen wurde eine Präferenzliste mit Anlaufstellen in Österreich erstellt. Dabei handelte es sich um Beratungs- und Unterstützungseinrichtungen für Menschen aus dem Autismus-Spektrum, Institutionen zur beruflichen Rehabilitation von Menschen mit Beeinträchtigungen, sowie Diagnostik- und Therapiezentren und -praxen. Alle Kontaktdaten wurden mittels Internetrecherche ermittelt. Die Anlaufstellen wurden von der Verfasserin per E-Mail und telefonisch kontaktiert mit der Bitte, Einladungen zu Interviews in geeigneten Räumlichkeiten auszulegen oder direkt

an Autistinnen zu überreichen. Kontaktpersonen, die ihre Hilfe anboten, wurden im weiteren Verlauf der Studie selbst als neurotypische Expert:innen zur Teilnahme an einem Interview eingeladen. Da trotz der Verteilung der Einladungen an 15 Anlaufstellen in Österreich nur sechs autistische Interviewpartnerinnen gewonnen werden konnten, wurde die Einladung nach ca. zwei Monaten Wartezeit auch in der Facebook-Gruppe ‚Autismus Österreich' geteilt. Durch dieses Posting war es möglich, die restlichen Teilnehmerinnen zu gewinnen. Die gewählten Methoden der Kontaktaufnahme ermöglichten es den autistischen Frauen, sich selbstbestimmt für die Teilnahme an der Forschung zu entscheiden und ihre Sicht auf die Herausforderungen des ersten Arbeitsmarktes mitzuteilen.

Soweit die autistischen Befragten dies angaben, wurden Alter, Zeitpunkt der Diagnose, formaler Bildungsabschluss und Berufstätigkeit erfasst. Demnach waren die Frauen zwischen 22 und 56 Jahre alt; nur bei einer Person wurde die Diagnose einer Autismus-Spektrum-Störung im Jugendalter gestellt, bei den anderen erst im Erwachsenenalter und nach ersten Berufserfahrungen. Von der nicht vollendeten Ausbildung nach der Pflichtschule bis zum abgeschlossenen Doktoratsstudium waren alle Bildungsniveaus vertreten, mit der Tendenz zu mehreren begonnenen und teilweise abgeschlossenen Ausbildungen oder Studien pro Person. Es waren 45,5 Prozent der autistischen Interviewpersonen zum Zeitpunkt des Interviews berufstätig, wobei eine Person wegen ihrer geringfügigen Arbeitsstelle dennoch auf Jobsuche war. Die anderen 54,5 Prozent waren arbeitssuchend oder erholten sich von einem Burnout. Fünf der elf befragten Autistinnen hatten Berufserfahrung außerhalb Österreichs, wobei eine Person ausschließlich in Deutschland beschäftigt war bzw. ist. Trotzdem wurde sie in die Studie aufgenommen, da sie aufgrund ihrer beruflichen Tätigkeit als Assistenz für ein autistisches Schulkind und als Autismus-Therapeutin in Ausbildung besonders tiefe Einblicke für die Forschungsarbeit geben konnte. Die beiden neurotypischen Interviewpartnerinnen verfügen über mehrjährige professionelle Erfahrung einerseits in der beruflichen Beratung und Unterstützung von Menschen im Autismus-Spektrum und andererseits in der Sensibilisierung und Aufklärung von Organisationen zum Thema Autismus. Eine der Personen war zum Zeitpunkt des Interviews zusätzlich in der Diagnostik und Therapie von Kindern, Jugendlichen und Erwachsenen im Autismus-Spektrum tätig.

4.2. Methode der Datenerhebung

Die vorliegende Masterarbeit ist eine qualitative Forschungsarbeit mit 13 leitfadengestützten Einzelinterviews. Die Form der halbstrukturierten Interviews wurde gewählt, um eine Fülle von Antworten zu gewährleisten und die Möglichkeit zu haben, auf spezifische und wichtige Aspekte näher einzugehen. Der Inhalt des Interviewleitfadens für die Befragung der autistischen Teilnehmerinnen orientierte sich an der vorhandenen Literatur zum Thema Autismus und Arbeitswelt. Zu Beginn wurden die Autistinnen nach ihrer Definition von ‚Zufriedenheit im Beruf' gefragt. Anschließend wurden sie gebeten, ihren Bildungs- und Berufsweg zu beschreiben. Danach wurden die Fragen nach den Phasen des Beschäftigungszyklus gegliedert, d.h. die Autistinnen wurden zunächst nach ihren Erfahrungen in der Bewerbungsbzw. Rekrutierungsphase, dann nach ihren Erfahrungen in der Einarbeitungsphase und schließlich nach ihren Erfahrungen in der Zeit nach der Einarbeitung befragt. Dabei wurden sie angeregt, neben positiven und negativen Erfahrungen auch zu schildern, was sie sich anders gewünscht hätten bzw. wünschen würden. Die befragten Autistinnen wurden ebenso über die physische Umgebung und sensorische Sensibilitäten, allgemeine Herausforderungen, Beziehungen zu Vorgesetzten und Arbeitskolleg:innen sowie Organisationskulturen befragt. Die Fragen wurden im Gesprächsverlauf an die Erfahrungen und Wünsche der jeweiligen Teilnehmerin angepasst, um den Gesprächsfluss zu fördern.

Für die Interviews mit den neurotypischen Personen wurde ein zweiter Interviewleitfaden entwickelt, der weitgehend auf den eigenen Forschungsergebnissen basierte. Im Rahmen dieser Befragungen wurden die Interviewpartnerinnen gebeten, die Forschungsergebnisse zu diskutieren und weitere Aspekte entsprechend der Phasen im Beschäftigungskreislauf zu ergänzen. Weiters wurden sie zu wichtigen Inhalten von Schulungen zur Sensibilisierung für Autismus, zu möglichen Unterschieden zwischen den Berufserfahrungen von Männern und Frauen mit Autismus und zu externen Unterstützungsangeboten sowohl für Autist:innen als auch für Organisationen befragt.

Die Dauer aller mündlichen Interviews betrug im Durchschnitt 57,5 Minuten, wobei das kürzeste Interview ca. 33 Minuten und das längste eine Stunde und 57 Minuten dauerte. Um den Bedürfnissen der autistischen Teilnehmerinnen gerecht zu werden, konnten sie selbst entscheiden, auf welchem Weg sie den Interviewleitfaden beantworten. So wurden die Interviewfragen in zwei Fällen schriftlich beantwortet und per E-Mail übermittelt, ein Interview fand persönlich statt, eines telefonisch, die restlichen neun waren Online-Interviews mit Video. Alle mündlichen Interviews wurden mit einem Audio-Aufnahmegerät aufgezeichnet.

Die Daten wurden im Zeitraum vom 23.03.2023 bis zum 17.05.2023 erhoben. Der Ablauf der Datenerhebung erfolgte in zwei Phasen. In der ersten Phase wurden sechs Interviews mit autistischen Expertinnen in eigener Sache geführt, die anschließend transkribiert und anhand eines Kodierleitfadens ausgewertet wurden. Das sich daraus ergebende Zwischenfazit über die Sichtweisen der Autistinnen wurde im Rahmen eines Interviews mit einer der neurotypischen Expertinnen bearbeitet. Durch das theoretische und praktische Wissen dieser Expertin über autistische Menschen in neurotypisch geprägten Arbeitsumfeldern sollte ein tieferes Verständnis für den notwendigen Aufklärungs- und Anpassungsbedarf am ersten österreichischen Arbeitsmarkt zugunsten von Autist:innen erreicht werden. In der zweiten Phase wurde dieser Vorgang wiederholt, d.h. nach fünf weiteren Interviews mit Autistinnen wurden die Daten analysiert und es folgte ein abschließendes Interview mit der zweiten neurotypischen Autismus-Expertin.

Die Interviews wurden mit Einverständnis der Interviewpartnerinnen aufgezeichnet und anschließend unter Wahrung der Anonymität der Teilnehmerinnen wörtlich ins Hochdeutsche transkribiert. Als Transkriptionsmethode wurde das vereinfachte Transkriptionssystem nach Dresing und Pehl (2011) gewählt.

4.3. Methode der Datenanalyse

Um zu den Ergebnissen zu gelangen, erfolgte die Auswertung der erhobenen Daten qualitativ-inhaltsanalytisch in Anlehnung an Mayring (2010) und mit Hilfe der Analysesoftware MAXQDA. Mayring stellt in einem Ablaufmodell sowohl die deduktive Kategorienanwendung als auch die induktive Kategorienentwicklung dar. Von den elf Schritten einer qualitativen wissenschaftlichen Arbeit sollen nun die für diesen Abschnitt wesentlichen und letzten sieben Schritte anhand der Masterarbeit beschrieben werden. Je nach Vorgehensweise unterscheidet der Autor bei den Schritten fünf bis sieben zwischen Deduktion und Induktion. (Mayring, 2010, S. 600f.)

5. Theoriegeleitete Festlegung der Kategorien (Deduktion)/Festlegung der Kategoriendefinition (Induktion): Die Aussagen der befragten Personen wurden dem zuvor vorgestellten Kategoriensystem zugeordnet, das deduktiv aus den Arbeiten von Dreaver et al. (2020), Tomczak (2022) und Tomczak et al. (2021) abgeleitet und in Abschnitt 3.2 abgebildet wurde. Da es sich bei dem Kategoriensystem um eine zusammenfassende Darstellung von drei verschiedenen Modellen handelt, wurden die vier Hauptkategorien ‚Rahmenbedingungen‘, ‚Recruiting-Phase‘, ‚Onboarding-Phase‘ und ‚Retention‘ von der Verfasserin selbst gewählt. In diesem Sinne wurde beispielsweise die erste Hauptkategorie induktiv als ‚phasenübergreifende Voraussetzung für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum‘ definiert. Auf der zweiten Ebene dieser Kategorie finden sich wiederum Elemente, die deduktiv aus der Theorie abgeleitet wurden.

6. Formulierung des Kodierleitfadens (Deduktion) /Bestimmung des Abstraktionsniveaus (Induktion): Der Kodierleitfaden bestimmt, was die Aussagen der Befragten beinhalten müssen, um einer bestimmte Kategorie zugewiesen zu werden und somit die Kategorien voneinander abzugrenzen (Mayring, 2010, S. 599f.). Es wurde z.B. festgelegt, dass die im Fragenblock ‚Onboarding‘ erwähnten externen Unterstützungshilfen für Autist:innen der Hauptkategorie ‚Onboarding-Phase‘ bzw. deren Unterkategorie ‚Unterstützung durch Expert:in für Autist:innen‘ zugeordnet werden. Auch die Festlegung des Abstraktionsniveaus erfolgte im Rahmen der induktiven Kategorienbildung, da sich im Zuge der Interviewanalysen herausstellte, dass bestimmte Bedürfnisse der autistischen Interviewpartnerinnen nicht in die deduktiv gebildeten Kategorien eingeordnet werden konnten. So wurde beispiels-

weise in der Hauptkategorie ‚Retention‘ entschieden, eine zweite und dritte Unterkategorie zu bilden

7. Beginn der deduktiven Kategorienanwendung (Deduktion)/Beginn der induktiven Kategorienbildung (Induktion): In diesem Schritt wurden die Datensätze analysiert und sowohl deduktiv als auch induktiv kodiert. Dabei wurde zunächst geprüft, inwieweit sich die Aussagen in das bestehende Kategoriensystem einordnen lassen. Für Aussagen, die sich auf Informations- und Anpassungsbedarf und andere relevante Aspekte bezogen, aber nicht in das System eingeordnet werden konnten, wurden neue Unterkategorien entwickelt. Neue Hauptkategorien wurden nicht gebildet.

8. Überarbeitung des Kategoriensystems, Intracodercheck: Nach jeweils vier Interviews wurden alle Interviewaussagen im Rahmen von Rückkoppelungsschleifen nochmals überprüft, um die Konsistenz und Kohärenz der Kodierung zu gewährleisten. So wurden iterativ ähnliche Aussagen aus verschiedenen Interviews miteinander verglichen, um sicherzustellen, dass sie gleich kategorisiert wurden und die jeweiligen Kategorien die Inhalte adäquat abbilden. War dies nicht der Fall, wurden Aussagen in eine andere Kategorie verschoben oder neue Unterkategorien gebildet.

9. Endgültiger Materialdurchgang: Nach Abschluss aller Interviewanalysen wurden die kodierten Teile der erhobenen Daten und die Inhalte der Kategorien nochmals getrennt voneinander überprüft. In diesem Schritt wurden keine Änderungen mehr vorgenommen. Damit galt das Kategoriensystem als finalisiert.

10. Intercoder-Reliabilitätsprüfung: Hier überprüft eine zweite Kodierer:in zumindest einen Teil des Datenmaterials, um die Objektivität bei der Auswertung sicherzustellen (Mayring, 2010, S. 600). Dieser Schritt konnte nicht durchgeführt werden, da es sich bei der vorliegenden Arbeit um eine Einzelarbeit handelt. Aus diesem Grund ist nicht gewährleistet, dass die Inhalte der Interviews vollständig objektiv den Kategorien zugeordnet wurden. Das in Kapitel 4.2 beschriebene zweistufige Vorgehen bei der Datenerhebung wurde jedoch bewusst so gewählt, dass eine externe Qualitätssicherung stattfindet. Insofern erfolgte, wie von Flick (2019, S. 477f.) beschrieben, eine zweifache Validierung der Ergebnisse durch neurotypische Autismus-Expertinnen, die um ihre Einschätzung der Forschungsergebnisse gebeten wurden. Zudem wurden die einzelnen Forschungsschritte transparent dargelegt.

11. Quantitative und qualitative Analyse der Kategorien: Das Vorhandensein eines stabilen Kategoriensystems kann nach Mayring (2010, S. 600) bereits das Resultat der qualitativen Analyse sein. Eine quantitative Analyse bietet sich an, um die Auftrittshäufigkeit der dem Datenmaterial zugeordneten Kategorien zu überprüfen

(Mayring, 2010, S. 600). Die Ergebnisse dieses Schrittes werden in Kapitel 5 dargestellt, und eine quantitative Analyse wurde an Stellen vorgenommen, an denen die Vergleichbarkeit der Kategorien gegeben ist.

4.4. Forschungsethische Aspekte

Bei der Masterarbeit stehen die Bedürfnisse von Menschen im Autismus-Spektrum im Vordergrund. Der Leitfaden für Integrität und Ethik in der Wissenschaft des Bundesministeriums für Bildung, Wissenschaft und Forschung (2020) wurde berücksichtigt. Im gesamten Forschungsprozess wurde auf intersubjektive Nachvollziehbarkeit, Gewissenhaftigkeit und Methodentransparenz geachtet. Die Teilnahme an den Interviews war freiwillig. Voraussetzung für die Durchführung jedes Interviews war die informierte Zustimmung der Befragten zur Aufzeichnung des Interviews und zur Verarbeitung der Daten. Die Forscherin war bemüht, eine angenehme Gesprächssituation und ein Klima des Vertrauens zu schaffen. So wurde der Interviewleitfaden den Teilnehmerinnen auf Wunsch vorab zugeschickt. Wenn die Teilnehmenden während des Interviews Fragen nicht beantworten konnten oder wollten, wurden diese übersprungen. Darüber hinaus hatten die Teilnehmenden jederzeit die Möglichkeit, das Interview ohne Angabe von Gründen abzubrechen. Bei der Transkription wurden alle genannten Personen anonymisiert.

Wie bereits erläutert, ist das Ziel der Forschungsarbeit die erfolgreiche Integration von Menschen im Autismus-Spektrum in den ersten Arbeitsmarkt in Österreich. Damit Autist:innen von dem identifizierten Aufklärungs- und Anpassungsbedarf profitieren können, musste sichergestellt werden, dass die teilnehmenden Autistinnen tatsächlich von Autismus betroffen sind. Dafür wurde die Diagnose durch eine Fachperson, d.h. eine klinische Psycholog:in, vorausgesetzt; eine Selbstdiagnose reichte nicht aus. Aus Gründen des Datenschutzes, der Verhältnismäßigkeit und des Vertrauensklimas wurde jedoch nicht verlangt, dass die Teilnehmerinnen diagnostische Unterlagen vorlegen. Auch ein amtlicher Nachweis des sozialen Geschlechts als Frau wurde nicht verlangt. Die Befragten wurden lediglich gebeten, bei der Einwilligung zur Aufzeichnung des Interviews ein Kästchen anzukreuzen, mit dem sie versicherten, dass sie alle Auswahlkriterien erfüllen.

Diese Arbeit wurde von einer Forscherin verfasst, die sich selbst als neurotypisch einstuft und zum Zeitpunkt der Datenerhebung noch keinen direkten Einblick in neurodivergente Sichtweisen durch die Bekanntschaft mit Menschen im Autismus-Spektrum hatte. Um mögliche Verzerrungen der Forschungsergebnisse durch die neurotypische Perspektive zu vermeiden, wurde im Forschungsdesign auf die Aufrechterhaltung eines neutralen Standpunktes geachtet. Eine gründliche Recherche der relevanten Literatur zu Beginn des Forschungsprozesses sowie eine intensive Auseinandersetzung mit autismusspezifischen Unterstützungsangeboten und rechtlichen Rahmenbedingungen in Österreich bildeten die Wissensgrundlage für die Masterarbeit. Die ausführlichen Gespräche mit autistischen Expertinnen in eigener Sache und die laufende Reflexion ihrer Erfahrungen und Wünsche führten zu einer ausgewogenen Darstellung. Die Einbeziehung neurotypischer Autismus-Expertinnen verhalf der Verfasserin zusätzlich zu einem objektiven Verständnis. Es war eine Herausforderung, die verschiedenen Standpunkte sorgfältig zu analysieren und zu verstehen, um sicherzustellen, dass die Stimmen von Menschen mit Autismus gehört und respektiert werden. Die Arbeit reflektiert den Wunsch nach echter Inklusion und Anerkennung der Vielfalt von Denk- und Arbeitsweisen, während gleichzeitig die spezifischen Bedürfnisse von Autist:innen berücksichtigt werden.

5. Ergebnisse

Die für diese Arbeit zur Datenanalyse herangezogenen Modelle wurden auf Basis von Interviews mit neurotypischen Expert:innen aus dem Bereich Autismus und Arbeit erstellt. Die Einbeziehung von Betroffenen liefert Sichtweisen aus erster Hand und ist damit ein wichtiger Baustein sowohl für die Weiterentwicklung der Forschung als auch für die Verbesserung der Inklusion von Menschen im Autismus-Spektrum in den allgemeinen Arbeitsmarkt. Im Folgenden werden diese Perspektiven in einem Rahmenwerk dargestellt, das sich an den Phasen des Beschäftigungszyklus orientiert. Zuerst wird auf die Rahmenbedingungen für ein funktionierendes Beschäftigungsverhältnis zwischen Arbeitgeber:innen und autistischen Mitarbeiter:innen eingegangen. Anschließend wird der Aufklärungs- und Anpassungsbedarf in der Rekrutierungsphase, in der Einarbeitungsphase und nach der Integrationsphase beschrieben. In einer abschließenden Darstellung werden relevante Argumente für die Umsetzung des Modells beleuchtet und die Teile des Modells hervorgehoben, die sich aus der Empirie dieser Forschungsarbeit ergeben haben.

5.1. Rahmenbedingungen

Als Voraussetzungen für eine zufriedenstellende Arbeitssituation thematisierten die Befragten insbesondere vier Aspekte: Die Organisationskultur; Autismus-Schulungen für neurotypische Arbeitgeber:innen, Vorgesetzte und Mitarbeiter:innen; berufsvorbereitende Beratungen und Unterstützungen für Autist:innen selbst; und den Fit. Obwohl die letzten beiden Rahmenbedingungen nur bedingt in der Disposition der Arbeitgeber:innen liegen, werden sie in das Modell einbezogen, da sie zum einen Teil der theoriegeleiteten Modellstruktur sind und zum anderen aus Sicht der autistischen Interviewpartnerinnen integraler Bestandteil von Zufriedenheit im Beruf sind. Nachfolgend werden die Rahmenbedingungen in Tabelle 5 zusammengefasst dargestellt.

5.1.1. Organisationskultur

Zunächst ist hervorzuheben, dass es für die Beschäftigung von Menschen im Autismus-Spektrum keine ‚One Size Fits All'-Lösungen gibt. Das bedeutet, dass die Bedürfnisse und Wünsche der Betroffenen im Arbeitsumfeld individuell

Rahmenbedingungen
- Authentische Organisationskultur geprägt von Inklusion, Offenheit, Lern- & Hilfsbereitschaft, Empathie, Wertschätzung, Respekt & ohne sozialen Zwang, unabhängig von der Offenlegung einer Diagnose - Schulungen für Führungskräfte & Mitarbeiter:innen zur Aufklärung über Autismus & Entstigmatisierung - Individualisierte Unterstützungen wie Jobcoaching für Menschen im Autismus-Spektrum für Arbeitsplatzsuche & -vermittlung, Kompetenzerweiterung, verbesserte Kommunikation, Erklärung über angemessenes Verhalten/ungeschriebene soziale Regeln - Fit zwischen Person & Branche; Fähigkeiten, Interessen & Organisation; sowie Person & Organisation

Tabelle 5: Rahmenbedingungen für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum

geklärt werden müssen. Dies ist zum Teil auf das Störungsbild zurückzuführen, das ein breites Spektrum an Erscheinungsformen umfasst. Eine Interviewpartnerin beschreibt diese Notwendigkeit folgendermaßen: *„Ja, gewisse Bedürfnisse überlappen sich wahrscheinlich. Aber es ist ja jeder dann doch wieder ein Individuum. Also wir sind alle anders. Wenn man einen von uns kennt, kennt man einen und nicht mehr."* (IP6, Pos. 73). In diesem Sinne ist eine offene Haltung seitens der Organisation bezüglich einer diversen Belegschaft zu bewahren. Diese Offenheit spiegelt sich laut einer Interviewpartnerin zwar häufig in Leitbildern und Organisationsphilosophien wider, wird aber laut den befragten Autistinnen in der Praxis zu wenig ernst genommen. So sollte eine Aufgeschlossenheit gegenüber vielfältigen Mitarbeiter:innen authentisch vertreten werden: Es sollte Fairness bei der Rekrutierung und zwischen allen Arbeitnehmer:innen herrschen, z.B. in Bezug auf Arbeitsverteilung und Weiterbildungsmöglichkeiten, sowie ein respektvoller und wertschätzender Umgang gepflegt werden. Hierbei ist die Grundeinstellung, dass autistische Arbeitnehmer:innen gerne und gut arbeiten möchten, wesentlich und vermittelt ein Gefühl von Sicherheit. Eine autistische Interviewpartnerin ergänzte, dass Autist:innen sich in Arbeitsbeziehungen nicht immer wieder durch höhere Arbeitsleistung beweisen müssen sollten, um auszugleichen, dass sie nicht wie andere *„zum Beispiel Smalltalk [...] führen [können], um sich sympathisch zu machen"* (IP12, Pos. 34).

Es ist ebenso darauf zu achten, dass die Mitarbeiter:innen auf Augenhöhe kommunizieren und dass Schikanen, Diskriminierungen sowie Gerüchte unterbunden werden. Eine Autistin sagte dazu, sie möchte, *„dass man als vollwertiges Mitglied eines Unternehmens gesehen wird, das ist wichtig, und nicht als Diversity-Hire, also [...] ich bin nicht die Quoten-Disabled."* (IP6, Pos. 95). Gleichzeitig wurde vermehrt betont, dass positive Beziehungen auf Gegenseitigkeit beruhen und dass neurodivergente genauso wie neurotypische Personen eine offene Einstellung haben müssen. Damit verbunden ist, dass die Organisationskultur von Lernbereitschaft und Empathie geprägt sein sollte. So sollte bei allen Kolleg:innen und Vorgesetzten der Wille vorhanden sein, sich mit den Realitäten der ‚Anderen' bzw. der Menschen, die sich von ihnen unterscheiden, auseinanderzusetzen und auf deren Bedürfnisse einzugehen. Dies ist auch notwendig, da sich die Bedürfnisse von Person zu Person unterscheiden. Gleichermaßen spielt für die befragten Autistinnen Empathie dahingehend eine wichtige Rolle, dass z.B. persönliche Anliegen sowie negative psychische und physische Befindlichkeiten ernst

genommen werden sollten. Darüber hinaus sollten Menschen im Autismus-Spektrum Verständnis, Geduld und Hilfsbereitschaft entgegengebracht werden, insbesondere bei der Einarbeitung und beim Erlernen neuer Tätigkeiten. Die Befragten berichteten, dass sie zum einen mehr Verarbeitungszeit als der Durchschnitt benötigen und zum anderen bei zu viel Druck durch Vorgesetzte in Stress geraten, was die Leistungsfähigkeit stark einschränkt und die autistischen Symptome verstärken kann. Obgleich das Arbeitsumfeld in der Regel stressig ist, kann eine gelassene Haltung eine positive Atmosphäre schaffen.

In Bezug auf die Organisationskultur wurde am häufigsten erwähnt, dass es wichtig ist, als Autist:in im Arbeitsumfeld keinen sozialen Zwang zu verspüren. Von Autist:innen sollte beispielsweise nicht erwartet werden, dass sie in einer Gruppe zu Mittag essen, sich in den Pausen mit Kolleg:innen unterhalten oder an Veranstaltungen wie Firmenfeiern teilnehmen. Gerade wenn diesbezüglich eine Erwartungshaltung bestand, wurden soziale Interaktionen von den neurodiversen Interviewpartnerinnen als äußerst unangenehm, stressreich und herausfordernd beschrieben. Die befragten Autistinnen meiden vor allem Smalltalk und belanglose Gesprächsthemen, da diese als belastend empfunden werden. Zumindest sollte Autist:innen daher der Freiraum gewährt werden, in informellen Gesprächen nicht zu sprechen und sich bei Bedarf in einer ruhigen Umgebung zu regenerieren, im Sinne von *„Es gibt Leute, die sind gerne dabei, aber die mögen nicht die ganze Zeit reden."* (IP5, Pos. 114). Im Nachhinein sollten Autist:innen nicht dazu gedrängt werden, zu erklären, warum sie an einer Veranstaltung nicht teilgenommen haben. Hierzu schilderte eine Autistin negative Erfahrungen aus ihren Berufserfahrungen:

> *Ich habe gemerkt, vor allem in diesen sozialen Situationen [...], die Leute reden miteinander und so weiter. Und man steht halt da wie das fünfte Rad am Wagen und man kann sich nicht wirklich einbringen. Aber auf der anderen Seite, [...] wenn man sich dann absondert, ist man gleich inkriminiert worden, dann hat man gleich gesagt ‚Oh Gott, die ist sozialgestört, die ist nicht richtig.'.* (IP5, Pos. 27)

Dies bedeutet jedoch nicht, dass soziale Interaktionen insgesamt vermieden werden sollten. Während manche der Befragten es bevorzugen, dass der Austausch zwischen Kolleg:innen auf rein fachlicher Ebene stattfindet, freuen sich

andere Autist:innen über freundschaftliche Beziehungen zu Kolleg:innen. Vereinzelt wurde auch der Wunsch geäußert, sich öfter mit Kolleg:innen auszutauschen als dies bisher der Fall war, und z.B. das Angebot zu haben, gemeinsamen sportlichen Aktivitäten nachzugehen. Grundsätzlich haben alle Autistinnen das Bedürfnis, sich unter den Kolleg:innen gut aufgehoben zu fühlen. Dies unterstreicht erneut die Notwendigkeit, auf individuelle Bedürfnisse einzugehen.

Da Autismus als ‚unsichtbare Beeinträchtigung‘ bezeichnet wird, wird hier das Thema der Offenlegung am Arbeitsplatz behandelt. Die Befragten hatten verschiedene Strategien, die sie u.a. aus früheren Erfahrungen mit der Bekanntgabe ihres Autismus entwickelt hatten. Einige merkten an, dass es vom Arbeitsumfeld abhängt, ob die Offenlegung Vor- oder Nachteile mit sich bringt, und dass sie das Klima im Unternehmen abwägen, bevor sie sich für oder gegen eine Offenlegung entscheiden. Manche möchten nicht, dass ihr Arbeitsumfeld von der Diagnose erfährt, weil sie der Meinung sind, dass sie die Stelle sonst nicht bekommen, oder weil sie in der Vergangenheit nach der Offenlegung stigmatisiert oder zumindest anders behandelt wurden. Eine Interviewteilnehmerin wurde z.B. bei einem Bewerbungsgespräch abgelehnt, weil sie wegen der freundlichen Gesprächsatmosphäre von ihrer Diagnose erzählte. Ihr wurde gesagt, die Organisation hat *„ihren Quoten-Behinderten schon und da wird nicht noch einer eingestellt"* (IP4, Pos. 39). Andere empfinden es nicht als relevant, den Autismus preiszugeben. Zwei Personen erwähnten jedoch, dass die Arbeitgeber:in im Idealfall über die Diagnose Bescheid wissen und darauf Rücksicht nehmen sollte.

Auch auf die Frage, wie, wem und wann sie ihren Autismus offenlegen würden, antworteten die Teilnehmerinnen unterschiedlich. Während einige nach einer Eingewöhnungsphase zuerst die Geschäftsleitung informieren würden, um niemanden zu verschrecken und keine Gerüchte in der Belegschaft aufkommen zu lassen, würden andere ihren Arbeitgeber:innen so früh wie möglich davon erzählen wollen. Wiederum andere Autistinnen würden ihren Autismus einer vertrauten Kolleg:in erklären. Eine Strategie, die sich für ein paar Interviewpartnerinnen als erfolgreich erwiesen hat, besteht darin, die eigenen Bedürfnisse oder Besonderheiten zu kommunizieren, ohne die Diagnose zu erwähnen, um die für sie passenden Arbeitsbedingungen zu erhalten: *„Unabhängig davon, ob man erwähnt, dass man diagnostiziert ist, oder nicht, würde ich auf jeden Fall die Bedürfnisse erwähnen, die man braucht, um die Arbeit gut ausführen zu können."* (IP5, Pos. 54). Eine Autistin brachte dazu ein wichtiges Argument vor:

> *Wenn man es nicht unbedingt offenlegen möchte, würde ich auf jeden Fall kommunizieren, so etwas wie ‚Ich bin ein Mensch, der das nicht haben kann, wenn zu viele Veränderungen stattfinden.'. Also indirekt den Autismus zu erklären, ohne das Wort zu benutzen, das kann vielleicht schon helfen. Aber man merkt ja irgendwie, wenn man so ein bisschen abrutscht, so ein bisschen unbeliebt wird, dann hilft einfach eine Erklärung am meisten. Also*

> *wenn die Leute nicht wissen, wo sie einen hinstecken sollen, fangen sie an, einen zu stigmatisieren. Dann gibt man sich selbst lieber das richtige Label als am Ende mit dem falschen rausgeschmissen zu werden.* (IP10, Pos. 73)

Umgekehrt hat eine Autistin positive Erfahrungen damit gemacht, nach einer Kennenlernphase zuerst zu erklären, was Neurodivergenz ist und welche Formen sie annehmen kann, um zu sehen, ob die Empfänger:innen offen reagieren. Wenn dies der Fall ist, kann die Person sich outen. Sie sagte dazu:

> *Das ist wie, wenn man sich zum Beispiel als Trans outet. Da weiß die Gesellschaft auch noch oft zu wenig, deswegen vorher erklären, dann outen. Und nicht mit einer Vorstellung hineingehen, wie die Reaktion dann sein muss, und mit allen anderen Reaktionen unzufrieden sein, also das ist bei jedem Outing glaube ich kontraproduktiv.* (IP6, Pos. 77)

Eine neurotypische Expertin kommentierte in Bezug auf die Offenlegung grundsätzlich: *„Ein Arbeitgeber, der sagt ‚Ich nehme jemanden nicht, weil ich mich mit dem nicht auseinandersetzen möchte', da wird diese Person mit und ohne Outing scheitern oder mit Masking*[1] *und mit Outing."* (IP13, Pos. 31). Fällt der Autismus bei Vorgesetzten und Kolleg:innen auf, wird die Autist:in laut der Expertin in einem verschlossenen Umfeld scheitern, unabhängig von ihrer Strategie. Die Auffälligkeit von Autismus unterscheidet sich allerdings tendenziell zwischen Männern und Frauen. Die andere neurotypische Expertin gab hierfür folgende Erklärung an:

> *Autistische Frauen haben meiner Erfahrung nach weniger Arbeitserfahrung noch als Männer. Wenn sie aber arbeiten, dann sind sie weniger als Autistinnen sichtbar üblicherweise. Und damit ecken sie wahrscheinlich weniger oft an, also dass sie vielleicht nicht so leicht gekündigt werden, aber sie sind selbst viel gestresster. [. . .] Während [hingegen] autistische Männer eher die Erfahrung haben, dass sie ihren Job nicht halten können; dass sie vielleicht den Job schon bekommen, aber ihn dann eben nicht halten können, weil sie vielleicht sichtbarer autistisch sind, damit leichter anecken können. Also beispielsweise ungefiltert das Feedback dem Vorgesetzten geben [. . .] und der weiß nicht Bescheid und reagiert dann nicht adäquat. Während Frauen doch meiner Erfahrung nach sich relativ gut einfühlen können und eher zu vorsichtigeren Strategien tendieren.* (IP9, Pos. 43)

Eine Autistin ergänzte, dass es nicht unbedingt nur am Autismus liegt, dass sich Männer und Frauen unterscheiden,

---

[1]　Das sog. Masking bezeichnet die Anpassung neurodivergenter Personen an neurotypische Konventionen und wird in Abschnitt 5.1.3 näher behandelt.

sondern auch an der unterschiedlichen Sozialisation. So sind die gesellschaftlichen Erwartungen an die soziale Kompetenz von Frauen höher als an Männer.

Fazit dieser Thematik ist, dass gerade dann, wenn die Andersartigkeit einer Mitarbeiter:in von anderen bemerkt wird, das Umfeld eher in einen neutralen Austausch mit der Person treten sollte, als sie vorschnell zu verurteilen. Weiterhin ist eine Grundvoraussetzung für die Beschäftigung von Menschen aus dem Autismus-Spektrum, Toleranz und Verständnis für jeden Menschen aufzubringen. Wie eine offene Haltung gegenüber neurodiversen Arbeitnehmer:innen signalisiert werden kann, wird in Abschnitt 5.2 behandelt.

5.1.2. Autismus-Schulungen für neurotypische Arbeitgeber:innen und Arbeitnehmer:innen

Autismus-Schulungen für neurotypische Personen in Führungspositionen und Arbeitnehmer:innen wurden innerhalb der Studie insofern erwähnt, als die Interviewpartnerinnen sagten, dass es in der Gesellschaft an Aufklärung über Autismus mangelt. Nach ihrer Ansicht bestehen nach wie vor verschiedene Stigmata. Eine Autistin erklärte z.B., dass es für die Kommunikation wichtig ist, zu verstehen, dass die Verarbeitung und der Gebrauch von Sprache anders funktionieren als bei neurotypischen Personen, dass dies aber kein Zeichen für eine geringere Intelligenz ist. Sie berichtete, dass *„man da oft reduziert wird auf das, was man können müsste [u.a. Rhetorik und Mimik], um intelligent zu wirken."* (IP6, Pos. 87). Ähnlich teilten andere Autistinnen mit, dass ihnen von uninformierten Kolleg:innen oft Unwillen oder Faulheit unterstellt wurde.

Eine nützliche Maßnahme zur Entstigmatisierung stellen Autismus-Schulungen dar. Grundsätzlich waren beide neurotypischen Expertinnen der Meinung, dass zu Beginn solcher Aufklärungsmaßnahmen die vorherrschenden Stereotype über Personen im Autismus-Spektrum unter den Teilnehmer:innen abgefragt werden sollten. In einem nächsten Schritt sollte die Realität des Autismus dargestellt werden, d.h. dass es sich um ein sehr breites Spektrum handelt, das weder ausschließlich hochbegabte Personen noch allein Personen betrifft, die nicht in die Gesellschaft integriert werden können. Es wäre sinnvoll, dies mit konkreten Beispielen und Vergleichen wie dem folgenden zu untermauern:

> *Schauen Sie, ich habe eine extreme Sehschwäche, das sieht man mir aber nicht an, weil ich habe keine Brille auf. Sie haben eine Brille auf, da sieht man es vielleicht eher. Wenn ich an einem Tag meine Brille vergesse oder vergesse, meine Linsen reinzugeben, dann sehe ich einfach nichts mehr. Das heißt, ich kann mich mit Ihnen nicht mehr austauschen; ich werde Sie auch nicht mehr erkennen, weil ich kurzsichtig bin; ich werde mich nicht mehr angesprochen fühlen, wenn Sie mir irgendetwas nonverbal mitteilen wollen. Das heißt, es ist etwas Unsichtbares, das können Sie nicht wissen.* (IP13, Pos. 29)

Sicherlich ist das lebenslange Störungsbild des Autismus nicht mit einer Brille zu vergleichen, die abgenommen und wieder aufgesetzt werden kann. Nichtsdestotrotz erleichtern solche Metaphern das Verständnis neurotypischer Menschen für neurodivergente Menschen. Im besten Fall sollte jedoch eine Expert:in in eigener Sache hinzugezogen werden, einerseits um freiwillig zu berichten, welche Schwierigkeiten auftreten können und was notwendig ist, um produktiv arbeiten zu können, andererseits um Fragen zu beantworten. Sorgen, die sich auf die Beschäftigung von autistischen Arbeitnehmer:innen beziehen, können außerdem gut durch Aufklärung entkräftet werden. Auf diese Weise kann vermittelt werden, dass ein autismusfreundliches Arbeitsumfeld trotz teilweiser externer Unterstützung auch mit geringen Mitteln geschaffen werden kann und keine großen Investitionen erfordert. Zudem kann durch Autismus-Schulungen Situationen entgegengewirkt werden, in denen sich Arbeitnehmer:innen mit Autismus wiederholt für ihre Bedürfnisse rechtfertigen müssen.

Eine Interviewpartnerin mit Autismus äußerte darüber hinaus den Wunsch, dass allgemeine Diversitätsschulungen institutionalisiert und für Personen in Führungspositionen verpflichtend werden sollten, um ihrer Verantwortung für die gesamte Belegschaft und nicht nur für dominante Arbeitnehmer:innengruppen gerecht zu werden. Dabei sollte über Diversitätsdimensionen wie Beeinträchtigung, Krankheit, Herkunft, sexuelle Identität und Alter der Arbeitnehmer:innen aufgeklärt werden. Diesbezüglich waren einige Interviewpartnerinnen der Ansicht, dass Arbeitgeber:innen aufgrund rechtlicher Bestimmungen oftmals davon absehen, bestimmte Arbeitnehmer:innengruppen einzustellen. So kann laut ihnen beispielsweise der Kündigungsschutz für begünstigte Behinderte sowie für werdende Mütter und Eltern in Karenz dysfunktional sein und bewirken, dass diese Personen gar nicht erst eingestellt werden. Allerdings scheinen sowohl Arbeitgeber:innen als auch Arbeitnehmer:innen nicht genau über ihre beruflichen Rechte und Pflichten aufgeklärt zu sein, was die Beschäftigung von Personen im Autismus-Spektrum weiter erschwert. Im Rahmen von allgemeinen Diversitätsschulungen sollte daher eine Aufklärung über rechtliche Aspekte erfolgen.

Bezüglich der Aufklärung über Menschen aus dem autistischen Spektrum hielt eine Autistin zusammenfassend fest:

> *[Es sollte] ein allgemeineres Bewusstsein dessen [geben], dass es Menschen mit Autismus gibt, dass nicht Menschen mit Autismus generell [. . .] einfach abgestempelt werden oder dass man über sie sagt ‚Die können nichts, die schaffen nichts, die sind nicht einsetzbar und so weiter, [die] sind behindert.'. Natürlich, man ist in gewisser Weise behindert, aber man kann eben sehr viel machen, um dem entgegenzuwirken. Aber auf der anderen Seite: Man braucht auch von der Gesellschaft Verständnis, dass man anders ist, aber trotzdem etwas Gutes machen kann.* (IP5, Pos. 108)

In diesem Sinne betonte sie, dass Barrieren u.a. durch eine nicht aufgeklärte Gesellschaft entstehen und dass ein stärkenbasierter Ansatz notwendig ist, damit Autist:innen ihre Fähigkeiten nutzen und einsetzen können.

5.1.3. Berufsvorbereitende Beratungen für Arbeitnehmer:innen im Autismus-Spektrum

Als dritte Rahmenbedingung wurden Beratungsstellen und Unterstützungsdienste für neurodiverse Arbeitende genannt. Diese würden nach Ansicht der meisten Betroffenen eine Hilfe bei verschiedenen Schwierigkeiten auf dem Arbeitsmarkt darstellen. Einige der Befragten nutzten solche Angebote zur Berufsorientierung, Stellensuche und -vermittlung sowie zur Unterstützung in der Bewerbungs- und Rekrutierungsphase. Andere wünschten sich Angebote zur Kompetenzerweiterung, z.B. für Computerprogramme, und zur Erklärung ungeschriebener Regeln sowie Kommunikationscoachings zur besseren Verständigung mit neurotypischen Arbeitskolleg:innen und zum Umgang mit negativen Situationen und Beleidigungen. Darüber hinaus wurde der Wunsch nach Stressbewältigungstrainings bzw. Trainings zum richtigen Umgang mit Meltdowns, also unkontrollierbaren, reflexartigen Reaktionen auf Reizüberflutung, geäußert.

Dienstleistungen zur beruflichen Integration wurden allerdings nur dann als hilfreich empfunden, wenn sie auf die individuellen Voraussetzungen abgestimmt waren. Vor allem Maßnahmen des Arbeitsmarktservice Österreich (AMS), aber auch vereinzelt von autismusspezifischen Anlaufstellen wurden von den Befragten als nicht adäquat bewertet, da zum Teil Inhalte vermittelt wurden, die für die Betroffenen nicht relevant waren, keine zufriedenstellenden Lösungen gefunden wurden oder bei der Zusammenstellung von Kursgruppen z.B. die sensorischen Anforderungen nicht berücksichtigt wurden. In diesem Zusammenhang ist zu erwähnen, dass manche Interviewpartnerinnen mit Autismus eine möglichst kurze Anfahrtszeit zur Arbeitsstelle als wichtig empfinden. Da der Arbeitsweg von Arbeitgeber:innen nicht verändert werden kann, sollte ein solcher Wunsch zumindest bei der Beratung von Autist:innen berücksichtigt werden. Neben der beruflichen Beratung wurden genauso therapeutische Angebote, Selbsthilfegruppen für Autist:innen und das Umfeld wie die Familie als positiv für das Arbeitsleben und allgemein für den Perspektivenwechsel, d.h. für das Verständnis neurotypischer Gegebenheiten bewertet.

Darüber hinaus ist anzumerken, dass prinzipiell berufsvorbereitende Hilfen von den befragten Autistinnen erst nach Berufserfahrung auf dem allgemeinen Arbeitsmarkt in Anspruch genommen wurden. Dies kann verschiedene Gründe haben, ist aber in erster Linie auf den Zeitpunkt der Diagnosestellung zurückzuführen. Wie bereits erwähnt, wurde nur bei einer Interviewpartnerin die Diagnose einer Autismus-Spektrum-Störung im Jugendalter gestellt, bei den anderen im Erwachsenenalter. Eine späte Autismus-Diagnose hat mehrere negative Konsequenzen: Da die Betroffenen keine adäquate Unterstützung erhalten, machen sie oft über Jahre hinweg schlechte Erfahrungen mit ihrem Umfeld und in Beschäftigungsverhältnissen. Dies und *„weil man nicht weiß,*

was los ist mit einem" (IP6, Pos. 61) kann die Entwicklung von Komorbiditäten wie Depressionen, sozialen Phobien und posttraumatischen Belastungsstörungen zur Folge haben, wie es bei vielen Teilnehmerinnen der Fall war. Hierbei ist hervorzuheben, dass die Frühdiagnostizierte genauso wie die Spätdiagnostizierten berichtete, von anderen für ihr Verhalten verurteilt zu werden. Durch eine frühe Diagnose ist also nicht sichergestellt, dass das Leben als Autist:in einfach wird.

Vor allem Frauen aus dem autistischen Spektrum setzen das sog. Masking ein, d.h. sie lernen und passen sich neurotypischen Konventionen an, um nicht als seltsam und ‚anders' wahrgenommen zu werden. Das Maskieren wiederum erschwert einerseits das Erkennen von Autismus und kostet andererseits die Betroffenen so viel Energie, dass sie immer wieder unter Burnouts leiden und arbeitslos werden. Zwei Autistinnen beschrieben ihre Erfahrungen damit folgendermaßen:

> *Solche Sachen zu verstecken und so tun, als wäre man ok oder ‚normal' oder neurotypisch schadet mehr, weil es belastet dich einfach psychisch die ganze Zeit und dann irgendwann hast du einen Zusammenbruch oder einen Meltdown, wo die Batterie dann aus ist und du sagst ‚Ich kann einfach nicht mehr. Ich kann das [diese Arbeit] einfach gar nicht mehr machen.'.* (IP11, Pos. 59);

> *Ich habe mein ganzes Leben lang eine Maske auf, das ist nicht arbeitsspezifisch. Vor allem als Spätdiagnostizierte ist es eher so, dass man öfter Maske trägt als nicht. Es ist halt einfach in unserer Gesellschaft so, dass man mitgeteilt bekommt, dass das, wie man eigentlich ist, nicht unbedingt wünschenswert ist. [. . .] Aber es ist halt extrem anstrengend. Man verliert sich halt irgendwo selbst.* (IP6, Pos. 37, 51)

Zusätzlich ist es für autistische Menschen ohne Autismus-Diagnose schwierig zu verstehen, warum sie anders sind, welche besonderen Bedürfnisse sie haben und wie sie diese kommunizieren sollen. So versuchen viele, durch verschiedene Ausbildungen und Berufswege einen Arbeitsplatz zu finden, an dem sie akzeptiert werden, scheitern aber oft jahrelang bereits in der Bewerbungsphase oder durch negative Beziehungen zu Arbeitskolleg:innen, was ihre psychische Verfassung weiter verschlechtert. Umgekehrt, wenn Autist:innen eine Diagnose erhalten haben, entsteht vor allem ein Bewusstsein dafür, was notwendig ist, um in der Gesellschaft und am Arbeitsplatz funktionieren zu können. Während viele autistische Menschen auch nach der offiziellen Diagnose noch Schwierigkeiten haben, ihre eigenen Bedürfnisse zu kommunizieren und zu vertreten, ist es zumindest ein Anstoß, sich selbst zu akzeptieren und eigene Grenzen zu setzen.

Nichtsdestotrotz gaben sowohl Autistinnen als auch Nichtautistinnen an, dass das Angebot beruflicher Autismus-Unterstützungen in Österreich ausgebaut werden sollte. Ein

Problem besteht hierbei auch darin, dass Autist:innen nicht wissen, wo und wie sie angemessene Hilfe in Anspruch nehmen können. Beispielsweise besteht die Möglichkeit, mit einem bescheinigten Grad der Behinderung[2] von mindestens 50 Prozent, also als begünstigte Behinderte, staatlich finanzierte berufliche Unterstützung zu erhalten. Während einige diese Möglichkeit nicht in Anspruch nehmen wollen, war es zumindest bei zwei der autistischen Befragten der Fall, dass ihnen trotz Unterstützungsbedarf keine 50-prozentige Beeinträchtigung zuerkannt wurde. Die neurotypischen Autismus-Expertinnen wiesen zwar darauf hin, dass sowohl eine Wiederholung der Evaluierung als auch eine Umgehung dieser Voraussetzung möglich sind, aber diese Optionen sind den Betroffenen oft unbekannt und kosten in jedem Fall zusätzliche Energie, die viele nur schwer aufbringen können. Diese Darstellung unterstreicht die Notwendigkeit einer transparenteren Informationsbereitstellung über das österreichweite Angebot an (autismusspezifischen) beruflichen Integrationsmaßnahmen.

5.1.4. Der Fit

Die vierte Voraussetzung für ein zufriedenstellendes Beschäftigungsverhältnis zwischen Neurotypischen und Neurodiversen kann in drei Unterpunkte gegliedert werden, nämlich in den Person-Branche-Fit, den Fähigkeiten-Interessen-Organisation-Fit und den Person-Organisation-Fit.

Ersterer bezieht sich auf das Zusammenspiel von den typischen Gegebenheiten einer Branche und den persönlichen Umständen der autistischen Person. Beispielsweise ist die Gastronomie in der Regel von der Notwendigkeit geprägt, möglichst schnell zu handeln, was das Personal unter Druck setzt und insbesondere bei Autist:innen zu einem hohen Stresslevel führt. Viele berufliche Umfelder sind zudem nicht mit der sensorischen Sensibilität von Autist:innen in Bezug auf Licht, Temperatur, Lärm und Gerüche vereinbar. Die Interviewpartnerinnen sprachen auch davon, dass bestimmte Branchen bestimmte Personengruppen anziehen, deren Werte möglicherweise nicht mit ihren eigenen übereinstimmen. Umgekehrt berichteten zwei Personen, dass z.B. im künstlerischen Bereich eine höhere Flexibilität ermöglicht werden kann und eine größere Offenheit gegenüber vielfältigen Menschen besteht. Besonders relevant ist diesbezüglich, wie im vorherigen Abschnitt erläutert, die Autismus-Diagnose: Viele der befragten Autistinnen gaben an, dass ihnen vor ihrer offiziellen Diagnose nicht bewusst war, welcher Beruf zu ihnen passt. Eine Person sagte dazu: *„Es war eigentlich immer sehr viel Stress dabei, aber ich glaube, das ist auch ein Arbeitsumfeld, in dem man als [diagnostizierter] Autist oder als [diagnostizierte] Autistin nicht unbedingt arbeiten würde. [...] Also ich würde jetzt in ganz andere Umfelder gehen."* (IP6, Pos. 49). Die aktive Auseinandersetzung, d.h. auch das Erkennen und Akzeptieren der eigenen Bedürfnisse, wird bei Menschen im Autismus-Spektrum häufig erst durch die Diagnose veranlasst, und erst dann erkennt die betroffene Person, welcher Beruf zu ihr passt.

Der Fähigkeiten-Interessen-Organisation-Fit beschreibt die Übereinstimmung der persönlichen Fähigkeiten und Interessen einer Autist:in mit den Tätigkeiten in der Organisation. In den Interviews wurde mehrfach der Wunsch geäußert, einer Arbeit nachzugehen, die die Person gut kann und gerne macht. Eine autistische Interviewpartnerin erwähnte hierbei einen Vorteil für Organisationen: *„Vor allem, wenn [...] die Arbeit mit dem Spezialinteresse zu tun hat, was ja bei jedem auch wieder anders ist, dann kann das eine wirkliche Bereicherung sein für das Unternehmen."* (IP6, Pos. 47). Im Gegensatz dazu meinte eine der neurotypischen Expertinnen, dass sich das Spezialinteresse *„aber oftmals [...] nicht mit dem Beruflichen vereinbaren [lässt]"* (IP13, Pos. 29). Bei dieser Aussage ist anzumerken, dass sie im Zusammenhang mit dem Irrglauben von Organisationen gemacht wurde, dass jede Autist:in eine Hochbegabung habe. Ferner stellte eine Autistin fest, dass sie bei der Ausübung ihres Traumberufs auch belastbarer gegenüber sensorischen Reizen wäre. Eine andere Befragte gab wiederum an, dass trotz der Übereinstimmung zwischen ihrem Spezialinteresse und ihrer früheren Tätigkeit die Überlastung durch die Umstände in der Branche zu groß war. Schließlich ist es für den Großteil der befragten Autistinnen grundlegend, sich produktiv und nützlich zu fühlen. Sie assoziieren Zufriedenheit im Beruf daher mit Sinnhaftigkeit. Sinnvolle Tätigkeiten werden individuell definiert, bedeuten aber für die meisten *„[das] Gefühl, dass man etwas Positives zur Gesellschaft beiträgt"* (IP7, Pos. 105) und *„eine gewisse Erfüllung im Leben [zu haben]"* (IP6, Pos. 11). Demnach muss für Autist:innen ein Fit zwischen den für sie sinnvollen Tätigkeiten und den beruflichen Tätigkeiten gegeben sein.

Hat sich der/die autistische Arbeitssuchende für eine passende Branche und eine Organisation entschieden, in der die eigenen Interessen und Fähigkeiten eingebracht werden können, geht es um den Person-Organisation-Fit, also um die Kompatibilität der persönlichen Voraussetzungen und Eigenschaften mit der jeweiligen Organisation. Organisationen können hier viel bewirken, indem sie eine Organisationskultur leben, die den in Abschnitt 5.1.1 beschriebenen Prinzipien entspricht. Die befragten Autistinnen wünschen sich in diesem Zusammenhang ein stressfreies, wertschätzendes und *„gutes Miteinander"* (IP4, Pos. 5) sowie einen Arbeitsplatz, an dem *„die eigenen Voraussetzungen respektiert werden"* (IP6, Pos. 11) und *„auf [die eigenen] Bedürfnisse eingegangen wird"* (IP1, Pos. 9). Ist der Fit zwischen Person und Organisation gegeben, hoffen die meisten, diesen Arbeitsplatz langfristig behalten zu können. Ist dies nicht der Fall, kann dies, wie bereits im vorherigen Abschnitt beschrieben, stark negative Folgen haben.

In einigen Fällen waren die befragten Autistinnen trotz des Bewusstseins um die schädigenden Umstände aus finanziellen Gründen auf eine Arbeit angewiesen, in der keiner der Fits gegeben war. Eine Person war auch von Unterbeschäftigung betroffen, d.h. sie war trotz erfolgreich abgeschlossener Ausbildung nicht in der Lage, über eine geringfügige Be-

---

[2] An dieser Stelle muss nochmals betont werden, dass Autismus aus medizinischer Sicht keine Behinderung, sondern eine neurologische Entwicklungsstörung ist. Rechtlich wird Autismus in Österreich jedoch als Behinderung eingestuft.

schäftigung hinaus eine existenzsichernde Arbeit zu finden. Somit werden einerseits die Auswirkungen eines nicht inklusiven Arbeitsmarktes und andererseits die Notwendigkeit eines Umdenkens im ersten Arbeitsmarkt verdeutlicht.

5.2. Aufklärungs- und Anpassungsbedarf in der Recruiting-Phase

In der Phase der Rekrutierung besteht in vier Themengebieten Aufklärungs- und Anpassungsbedarf. Diese sind autismusspezifische Unterstützungsangebote für Organisationen und Arbeitnehmer:innen im Autismus-Spektrum, Stellenanzeigen, Auswahlverfahren und insbesondere Bewerbungsgespräche, sowie Kommunikation vor und nach Selektionsverfahren. Zur Übersicht werden die Ergebnisse aus der Phase der Personalbeschaffung in Tabelle 6 dargestellt.

5.2.1. Autismusspezifische Unterstützung

Externe Hilfe durch eine Autismus-Expert:in kann sowohl für die Organisation, in der eine Autist:in beschäftigt ist oder werden soll, als auch für Autist:innen selbst hilfreich sein. Organisationen können besonders in Bezug darauf, welche Fragen in Bewerbungsgesprächen sinnvoll sind und welche nicht, nützliche Informationen von autismusspezifischen Beratungsstellen erhalten. Beispielsweise wird dabei vermittelt, dass vage Fragen wie ‚Wo sehen Sie sich in fünf Jahren?‘ oder ‚Können Sie sich vorstellen, in diesem Bereich zu arbeiten?‘ vermieden werden sollten, da die Antwort für autistische Bewerber:innen möglicherweise nicht realistisch vorstellbar ist, wenn die Person noch nie in dem Bereich gearbeitet hat, oder unklar ist, welche Erwartungen die Fragende hat. Eine der neurotypischen Expertinnen meinte dazu: *„Das sind alles Dinge, wo in den meisten Fällen überhaupt keine sinnvolle Antwort kommt, und deswegen kann man sie auch gleich weglassen.“* (IP9, Pos. 21). Dieselbe Person betonte, dass in Situationen, in denen die betroffene Person eine Frage nicht angemessen oder gar nicht beantwortet, die Interviewer nicht davon ausgehen sollten, dass die Antwort nicht bekannt ist. Stattdessen sollte die Frage umformuliert bzw. konkretisiert werden. Diese Thematik wird in Kapitel 5.2.3 vertieft. Dort wird auf die Auswahlverfahren bzw. Vorstellungsgespräche näher eingegangen.

Was das Angebot solcher Hilfestellungen in Österreich betrifft, nannten die neurotypischen Interviewteilnehmerinnen unterschiedliche, vereinzelt auch kostenlose, Beratungsorganisationen und -projekte. Unter der Prämisse, dass betriebliche Inklusions-Maßnahmen für eine Gruppe von Menschen mit Behinderungen auch andere Gruppen von Beeinträchtigten zugutekommen, berichtete eine Expertin über das Netzwerk beruflicher Assistenz (NEBA Betriebsservice[3]). Das kostenlose Angebot des österreichischen Sozialministeriums bietet Organisationen in allen Phasen der Beschäftigung Informationen und individuelle Unterstützung zum Thema Arbeit und Behinderung (*Netzwerk Betrieblicher Assistenz [NEBA Betriebsservice]*, o. J.).

Autist:innen profitieren von professioneller Hilfe in der Bewerbungsphase insofern, als sie u.a. beim Verfassen von Bewerbungsunterlagen unterstützt werden können. Außerdem wird die Begleitung durch eine Autismus-Expert:in zum Bewerbungsgespräch von manchen Befragten begrüßt, unter der Voraussetzung, dass Arbeitgeber:innen dies nicht vorschnell verurteilen. Hierbei lenken Expert:innen bei Bedarf, d.h. bei unklaren Fragen oder wenn die Bewerber:innen keine Antwort finden, ein und fungieren als ‚Übersetzer:innen‘. Dies bietet Autist:innen Sicherheit und Organisationen die Möglichkeit, die Fähigkeiten der Person richtig einzuschätzen.

5.2.2. Stellenanzeigen

Stellenanzeigen betreffend zeigen die Ergebnisse im Wesentlichen, dass erstens eine Veränderung der Qualifikationsanforderungen erforderlich ist, zweitens ein erhöhter Informationsbedarf besteht und drittens die Werte der Organisation authentisch dargestellt werden sollten.

Auf Autist:innen wirken Stellenausschreibungen oftmals abschreckend aufgrund der hohen und vielfältigen Anforderungen, die die Bewerber:innen erfüllen sollen: *„Ich [nehme] das für bare Münze [. . .], was da drinnen steht. Also ich gehe davon aus, ich muss alle Punkte erfüllen und bewerbe mich dann oft erst gar nicht.“* (IP1, Pos. 51). Ähnlich erzählte eine Autistin, dass sie eine Ausschreibung für eine Podcast-Interviewer:in im Autismus-Spektrum gesehen hatte, bei der die Überschrift zu ungenau formuliert war: *„Ich [würde] wahrscheinlich denken ‚Ich bin ja noch gar kein Interviewer, also bewerbe ich mich nicht.‘. Also das war nicht genau genug formuliert. Eigentlich hätten sie schreiben sollen „Wir suchen jemandem im Autismus-Spektrum, der bereit wäre, als Podcast-Interviewer zu arbeiten‘.“* (IP10, Pos. 43). Häufig werden diverse Anforderungen gestellt, die nicht primär für die Ausführung der täglichen Tätigkeiten relevant sind. Dabei kann es sich um persönliche Eigenschaften wie hohe Belastbarkeit und ausgeprägte soziale Kommunikationsfähigkeit handeln, aber auch um Anforderungen wie eine abgeschlossene Ausbildung, langjährige Berufserfahrung, Führerschein und Auto trotz öffentlicher Anbindung. Um dem Verlust des Potenzials von Autist:innen in der Bewerbungsphase entgegenzuwirken, sollten unnötige Qualifikationsanforderungen vermieden werden und zumindest eine klare Trennung zwischen unbedingt zu erfüllenden und zusätzlich erwünschten Anforderungen erfolgen. Auch sollte es möglich sein, ohne formalen Abschluss einer Ausbildung und mit einem teilweise lückenhaften Lebenslauf als Bewerber:in akzeptiert zu werden. Gerade im Bereich der Spezialinteressen wiesen einige Interviewpartnerinnen darauf hin, dass häufig ein Expert:innenwissen vorhanden ist, das zwar nicht durch Ausbildung oder Berufserfahrung fundiert ist, aber dennoch eine große Bereicherung für Organisationen darstellen kann. Insofern sollte in Stellenausschreibungen angemerkt werden, dass auch autodidaktisch erworbene Qualifikationen berücksichtigt werden. Um den Personalverantwortlichen dennoch eine effiziente Auswahl zu ermöglichen, kann eine aussagekräftige Aufgabenstellung zur Beurteilung der Kompetenzen

---

[3]   https://betriebsservice.info

Recruiting-Phase
Unterstützung durch Expert:in für Organisation & für Autist:in (z.B. Begleitung zum Vorstellungsgespräch)
Stellenausschreibungen: - Übersichtliches Layout - Ohne unnötige Qualifikationsanforderungen - Präzise Informationen zu Anforderungen & Aufgabenbereichen - Informationen zu Arbeitszeiten & -umfeld, Möglichkeiten zu Arbeitsplatzanpassungen & Home-Office, Vertragsform - Inklusion wird betont
Informationen über Ablauf beim Auswahlverfahren, grobe Gesprächsthemen, idealerweise Fragen; Möglichkeit zur Vorabbeantwortung von Fragen
Auswahlverfahren: - Angenehme Atmosphäre - Hohe Struktur - Kurze, präzise fachliche Fragen/Anweisungen ohne Abstraktion/Ambiguität - Alternative zum Gespräch (z.B. Arbeitsprobe); relevante Aufgabenstellung zur Einschätzung der Fähigkeiten & Selektion nach bester Lösung - Klare Zeitrahmen
Bekanntgabe bei Absage

Tabelle 6: Aufklärungs- und Anpassungsbedarf in der Recruiting-Phase für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum

vorgegeben werden. Da es sich hierbei um eine Methode im Rahmen des Auswahlverfahrens handelt, wird dieser Punkt im nächsten Abschnitt ausführlicher behandelt.

Es ist ferner darauf zu achten, dass Stellenanzeigen genügend Informationen enthalten, damit sich autistische Bewerber:innen ein realistisches Bild davon machen können, ob ein Person-Organisation-Fit gegeben ist. In Bezug auf Anfragen von Personalvermittler:innen wurde erwähnt, dass nur in wenigen Fällen der Name des beworbenen Unternehmens angegeben wird, so dass eine eigene Recherche nicht möglich ist. Dies kann von Organisationsseite bewusst gewählt worden sein, allerdings hindert diese Vorgehensweise Autist:innen daran, ein solches Angebot anzunehmen. Die Interviewteilnehmerinnen wünschten sich, mehr über das Arbeitsumfeld lesen zu können. D.h. es sollten die Eigenschaften der Räumlichkeiten angegeben werden, also z.B., wie viele Personen in derselben Umgebung arbeiten. Hier sind die Informationen möglichst eindeutig zu formulieren, da beispielsweise der Begriff 'Großraumbüro' unterschiedlich definiert wird. Zudem sollten Möglichkeiten zur Anpassung des Umfeldes angegeben werden, *„zum Beispiel, dass man auf Wunsch einen Arbeitsplatz haben kann, der nicht so stark frequentiert ist"* (IP5, Pos. 45). Des Weiteren sollten in Stellenausschreibungen die Vertragsform, also beispielsweise, ob es sich um einen All-In-Vertrag handelt und welche Zusatzleistungen es gibt; die Arbeitszeiten inkl. der Information, ob es Gleitzeit mit oder ohne Kernzeiten gibt; und die Möglichkeiten zum Home-Office bekannt gegeben werden. Das nachstehende Zitat hebt hervor, dass die Bereitstellung ausführlicher und präziser Informationen den Stress im weiteren Rekrutierungsprozess verringern kann: *„Wenn man das vorher schon einmal weiß, dann muss man das nicht im Interview ansprechen und das wäre eine große Hilfe."* (IP7, Pos. 31)

Der letzte Anpassungsbedarf bei Stelleninseraten betrifft die Betonung eines inklusiven Umfelds. Laut den Befragten reicht es nicht aus, Leistungen wie die Bereitstellung von Obstkörben zu bewerben, um als inklusive Arbeitgeber:in akzeptiert zu werden. Stattdessen sollte sowohl die Stellenbezeichnung '(W/M/D)' für 'weiblich, männlich, divers' beinhalten als auch explizit erwähnt werden, dass Bewerber:innen aller Diversitätsdimensionen willkommen sind. Eine Autistin sagte, dass man dies natürlich nicht von allen Arbeitgeber:innen verlangen könne, jedoch zumindest in Organisationen, in denen Vorwissen über Autismus besteht, sollte dies auch in der Stellenbeschreibung erklärt werden. Schon durch die ausdrückliche Offenheit gegenüber Arbeitnehmer:innen mit Autismus können die im Folgenden beschriebenen Probleme vermieden werden:

> *Da [im Bewerbungsgespräch] wüsste ich wahrscheinlich nie, ob ich jetzt als 'ich' hingehe oder ob ich mir meine Maske aufsetze und dann als jemand angestellt werde, der ich nicht bin, [die] ich aber dann immer aufrechterhalten muss und wo ich dann, nach wie lange auch immer und wie groß diese Maske ist, irgendwann ausbrenne.* (IP6, Pos. 35)

Darüber hinaus wäre es laut einer autistischen Befragten hilfreich, wenn es transparente Informationen über ein Netzwerk von Organisationen gäbe, die für die Einstellung von Menschen im Autismus-Spektrum offen sind.

Schließlich wurde dies zwar lediglich im theoretischen Modell, das für die Datenanalyse herangezogen wurde, dargelegt und nicht durch die empirische Forschung dieser Arbeit bestätigt, allerdings ist es angesichts der sensorischen Sensibilität von Menschen im Autismus-Spektrum sinnvoll, Stellenanzeigen übersichtlich zu gestalten und unwichtige, ablenkende Grafikelemente zu vermeiden.

5.2.3. Auswahlverfahren

Die in diesem Abschnitt angeführten Maßnahmen für ein möglichst autismusfreundliches Auswahlverfahren lassen sich in drei Phasen unterteilen: die Phase vor, die Phase während und die Phase nach dem Vorstellungsgespräch. Vor und nach dem Vorstellungsgespräch geht es erneut darum, Informationen bereitzustellen.

Der Einladung zum Bewerbungsgespräch sollten möglichst genaue Informationen über den Ablauf am Tag des Gesprächs und während des Gesprächs beigefügt werden, damit sich Autist:innen besser vorbereiten können. Im Idealfall sollten die Fragen oder zumindest grobe, strukturierte Gesprächsthemen vorab kommuniziert werden. Werden solche Informationen nicht bereitgestellt, müssen Autist:innen eigenständig reflektieren und sich auf mögliche Fragen vorbereiten, was für viele Betroffene eine große Herausforderung darstellt. Eine autistische Teilnehmerin gab an, dass sie weiter gefasste Fragen bevorzugt, um vorgefertigte Antworten geben zu können. Da dies nach Meinung der Teilnehmer:innen autistischen Frauen in der Regel leichter fällt als autistischen Männern, wäre eine einheitliche Lösung für alle Menschen im Autismus-Spektrum, Informationen und Fragen im Vorfeld zur Verfügung zu stellen. Eine neurotypische Expertin hielt es darüber hinaus für eine praktikable Lösung, die Möglichkeit zu bieten, bestimmte Fragen vor dem Vorstellungsgespräch schriftlich zu beantworten. Für den Fall, dass Bewerber:innen nicht akzeptiert werden, sollte die Absage bekanntgegeben werden, bestenfalls mit einer kurzen und ehrlichen Begründung. Insbesondere, wenn erklärt wurde, dass die Person eine Antwort erhalten wird, warten Autist:innen auf diese.

Die Autistinnen betonten in der Studie, dass sie in Situationen, in denen sie beobachtet und überprüft werden, grundsätzlich starken Stress empfinden. Durch den hohen Druck können sie nicht ihre volle Leistung erbringen und es kann passieren, dass sie durch unpassende Antworten Reaktionen erhalten, die sie weiter verunsichern. Aus diesem Grund sollten Vorstellungsgespräche in einer ruhigen Atmosphäre stattfinden und es sollte betont werden, dass es sich nicht um eine Prüfungssituation, sondern um ein Kennenlernen handelt. Es gilt auch, das Auftreten einer Autist:in nicht zu verurteilen. Zwei Autistinnen erläuterten dazu: *„Mir kommt vor, in den Gesprächen wird so auf dieses Soziale geachtet, was ich nicht so in mir drin habe, so spontan. Und dadurch wird Vieles für mich verbaut, glaube ich."* (IP1, Pos. 53); *„Ich fühle mich [. . .] immer beim Bewerbungsgespräch unter Druck gesetzt, weil ich diesen gesellschaftlichen Regeln folgen muss, die ich teilweise weder verstehe noch ausführen kann und habe immer permanent Angst, dass ich etwas falsch mache."* (IP3, Pos. 33). Eine weitere Autistin argumentierte in diesem Zusammenhang, dass eine hohe Sozialkompetenz in vielen Berufsfeldern kein Indikator für eine hohe Fachkompetenz oder eine gute Arbeitsleistung ist, weshalb – nach neurotypischem Verständnis – sympathisches Auftreten oder die korrekte Mimik weniger relevant sein sollten.

Einer der wichtigsten Punkte bei Auswahlverfahren, aber auch in der allgemeinen Kommunikation, ist die richtige Formulierung der Fragen und Anweisungen. Organisationen sollten sich dessen bewusst sein, wie Sprache konventionell verwendet wird und wie sie von Autist:innen verstanden wird. So sollten Metaphern, Redewendungen, Ironie und Sarkasmus vermieden werden, da diese von Menschen im Autismus-Spektrum oft wörtlich verstanden werden. Werden sie unabsichtlich verwendet und von der neurodivergenten Gesprächspartner:in nicht verstanden, sollte mit anderen Worten erklärt werden, was gemeint ist. Fragen und Anweisungen sollten möglichst prägnant und präzise sein, so dass kein Zweifel darüber besteht, auf welche Aspekte die befragte Person eingehen soll. Anstatt zu fragen, ob die Bewerber:in in der Lage ist, mit Excel umzugehen, sollte z.B. gefragt werden, ob diese oder jene Funktion oder Formel bekannt ist. Grundsätzlich wünschten sich die autistischen Teilnehmerinnen auch, dass nur fachliche und keine persönlichen Fragen gestellt werden, da sie Schwierigkeiten haben, sich über Privates entsprechend zu äußern. Eine Autistin gab das folgende Beispiel:

> *Ich bin nicht so der spontane Mensch und tue mir vor allem schwer mit der ersten Frage, die häufig gestellt wird: ‚Erzählen Sie uns einmal etwas von sich'. Das ist für mich so ziemlich das Schlimmste und ich habe erst durch verschiedene Reha-Maßnahmen überhaupt gelernt, was die Arbeitgeber sich erwarten auf die Frage.* (IP1, Pos. 41)

Die Autismus-Expertinnen stimmten der Fokussierung auf fachliche Themen zu, meinten jedoch, dass im Falle eines Interesses an persönlichen Fragen zumindest deutlich gemacht werden sollte, welche Aspekte beleuchtet werden sollten. Darüber hinaus sollte von Gruppeninterviews abgesehen werden. Eine autistische Befragte hatte bei einer solchen Erfahrung nicht das Gefühl, Anliegen offen ansprechen zu können. Eine neurotypische Expertin erklärte dazu Folgendes:

> *Bei Menschen im Autismus-Spektrum beginnt eine Gruppe bei +1. Das heißt, wir zwei zusammen wären für manche Personen schon eine Gruppe [. . .]. Es gibt Personen, für die ist das einfach sehr anstrengend, umso mehr Personen dazukommen und natürlich umso unstrukturierter das auch ist. [. . .] Manchmal ist es auch die Art und Weise, wie jemand anders spricht. Und schon alleine die Tatsache, dass ich einfach viel mehr Leute deuten muss und viel mehr Acht geben muss: ‚Mit wem wird jetzt eigentlich gerade gesprochen und wann bin ich an der Reihe?'.* (IP13, Pos. 19)

Auch Alternativen von Selektionsverfahren wurden in der vorliegenden Studie thematisiert. Dabei war sowohl den neurotypischen als auch den neurodiversen Befragten bewusst, dass der gänzliche Verzicht auf Vorstellungsgespräche nicht

umsetzbar ist. Allerdings ist es möglich, die Relevanz eines solchen Gesprächs zu relativieren. So schlug eine neurotypische Expertin vor, Arbeitsproben oder praktische Eignungstests vor oder nach dem Kennenlernen einzuführen. Arbeitsproben mit organisationsrelevanten Aufgaben können von externen Autismus-Expert:innen begleitet werden. Bei den Tests ist wiederum darauf zu achten, dass sich die Bewerber:innen nicht unter Druck gesetzt fühlen. Und obwohl dies nur aus den für diese Arbeit verwendeten Modellen und nicht aus der gegenständlichen Studie hervorgeht, kann es sinnvoll sein, einen klaren Zeitrahmen für die Ausführung von Anweisungen zu geben. Unbegleitete Arbeitsproben sollten laut der Expertin möglichst vor Bewerbungsgesprächen stattfinden, damit die beurteilenden Personen die Kompetenzen der Bewerber:in sehen können. Danach kann ein kurzes, strukturiertes und fachbezogenes Interview geführt werden, bei dem die Fragen im Voraus vorbereitet werden können. Eine andere Option ist, wie bereits oben erwähnt, die Erstellung einer spezifischen schriftlichen Aufgabenstellung oder eines Fragebogens zur Beurteilung arbeitsrelevanter Qualitäten, der zusammen mit den Bewerbungsunterlagen zurückgeschickt wird. Eine Autistin hielt diesbezüglich fest: *„Ich bin davon überzeugt, dass Autisten mehr aufgrund ihrer Taten beurteilt werden sollen und nicht aufgrund dessen, wie sie sich präsentieren können, weil das kann einfach nicht jeder und das geht nicht bei jedem."* (IP5, Pos. 52).

Im Allgemeinen ist in Verbindung mit einer offenen und inklusiven Organisationskultur beim Auswahlverfahren darauf zu achten, dass die Selektion der Bewerber:innen ohne Vorurteile passiert. Obwohl die befragten Autistinnen mittlerweile davon absehen, ihre Diagnose in Bewerbungsunterlagen offenzulegen, wurde dieser Punkt auch in Bezug auf andere Diversitätsdimensionen wie Gender, Herkunft, Ausbildung, Alter und Krankheit erwähnt. Eine Interviewpartnerin äußerte sich dahingehend folgendermaßen:

> *Dann habe ich wirklich das Gefühl gehabt, dass mich Leute nur einladen, weil ich einen österreichischen Nachnamen habe. Und wenn sie [...] sehen, dass ich da zur Schule gegangen bin, dann aus rassistischen Gründen sagen ‚Nein, das interessiert uns nicht.'. Mir ist permanent in Österreich meine Bildung entwertet worden.* (IP11, Pos. 27)

Demnach sollten eigene Stereotype laufend hinterfragt werden und eine unvoreingenommene Beurteilung vorgenommen werden.

5.3. Aufklärungs- und Anpassungsbedarf in der Onboarding-Phase

Von den Teilnehmerinnen der Studie wurden verschiedene Elemente aus den Bereichen der Unterstützung, der Struktur und der Kommunikation als wichtig für eine erfolgreiche Einarbeitung von Menschen mit Autismus in Organisationen erachtet. Diese werden im Folgenden erläutert und in Tabelle 7 zusammengefasst.

5.3.1. Unterstützung

Laut den Befragten ist eine angemessene Unterstützung für das Erlernen von Aufgaben und für eine gelungene Integration fundamental. Eine Mitarbeiter:in sollte dabei als Mentor:in und Ansprechperson für Unklarheiten fungieren. In Unternehmen, in denen es üblich ist, viele Informationen per E-Mail zu versenden, kann eine solche Person beispielsweise auch kommunizieren, welche Mitteilungen wichtig sind und welche ignoriert werden können. Angemessene Unterstützung beinhaltet aber auch die rechtzeitige Bereitstellung von Arbeitsmitteln und -kleidung, ohne dass die Arbeitnehmer:in mit Autismus selbst darum bitten muss.

Wenn Fehler passieren, ist es wichtig, Verständnis zu zeigen und, sofern dies möglich ist, gemeinsam mit der betroffenen Person an der Lösung des Problems zu arbeiten. Durch positiven Zuspruch kann Autist:innen die Angst vor zukünftigen negativen Reaktionen genommen werden und verhindern, dass sie in eine Negativspirale geraten, in der sie aufgrund von Stress immer mehr Fehler machen. Auch in Bezug auf Verspätungen oder Krankheitsfälle meinte eine Interviewpartnerin, dass es für sie als Autistin hilfreich und beruhigend ist, wenn nicht von beabsichtigtem oder unehrlichem Verhalten ausgegangen wird, da Abwesenheiten bei verständnisvollem Umgang trotzdem nicht häufiger vorkommen würden. Dahingehend wurde von den Studienteilnehmerinnen erklärt, dass Menschen im Autismus-Spektrum überdurchschnittlich ehrlich und zuverlässig sind sowie ein hohes Verantwortungsbewusstsein haben.

Falls ein größerer autismusspezifischer Unterstützungsbedarf besteht, kann eine professionelle Assistenz die Einarbeitungsphase zusätzlich erleichtern. Insbesondere während der ersten zwei Monate in einer neuen Organisation würde eine Expert:in die autistische Einsteiger:in regelmäßig am Arbeitsplatz begleiten, um zu sehen, wie der Prozess voranschreitet und wo Verbesserungspotenzial besteht. Diese kann Vorgesetzte und Kolleg:innen über die individuellen Facetten und den richtigen Umgang mit der Autist:in aufklären sowie über notwendige Anpassungen informieren. Darüber hinaus kann eine Expert:in sowohl für die Organisation als auch für die Autist:in als Vertrauensperson fungieren, so dass Sorgen getrennt von der anderen Partei angesprochen und im weiteren Verlauf geklärt werden können. Gibt es keine professionelle Assistenz für die Autist:in, wäre es nach Meinung einer Expertin bereits hilfreich, wenn die eventuelle Therapeut:in der betroffenen Person sich mit der Organisation austauscht und die Gegebenheiten am Arbeitsplatz persönlich begutachtet.

5.3.2. Struktur

Für Menschen im Autismus-Spektrum ist Vorhersehbarkeit im Alltag ein wichtiges Kriterium. So ist es auch bei dem Onboarding von autistischen Mitarbeiter:innen wichtig, strukturiert vorzugehen und dies zu kommunizieren. Es ist gleichermaßen bedeutsam, ausreichend Zeit für die Einarbeitung zu kalkulieren, da das Einfinden in eine Organisation und die Verarbeitung von Informationen bei Menschen im

Onboarding-Phase
Unterstützung durch Expert:in für Organisation & für Autist:in; Mitarbeiter:in als Mentor:in
Struktur: - Ausreichend Zeit - Klar kommunizierter Ablauf - Frühe, schrittweise Aufgabenzuteilung (nicht nur Zusehen); Online-Plattform zur weiteren Einschulung - Dezidierte Zeit für Fragen - Geregeltes, schrittweises Kennenlernen der Kolleg:innen

Kommunikation:
- Schriftliche Informationen über Aufgaben
- Klärung der Arbeitszeiten nach 1-2 wöchiger Einfindungsphase
- Ermutigung, nach Hilfe zu bitten, Fragen zu stellen & eigene Bedürfnisse darzulegen
  (z.B. mit Hilfe von Checklisten)
- Ermutigung zum Feedback
- Schriftliche & mündliche Erklärung des Organisationsleitbildes & der ungeschriebenen sozialen Regeln
  (z.B. mit Hilfe von Sozialgeschichten)

Tabelle 7: Aufklärungs- und Anpassungsbedarf in der Onboarding-Phase für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum

Autismus-Spektrum länger dauert als beim Durschnitt. Daher sollten unrealistische Erwartungen, z.B. bezüglich des Einprägens komplexer Informationen innerhalb einer Woche, vermieden und Autist:innen Geduld entgegengebracht werden. In Bezug auf den Lernprozess und das Übernehmen von Arbeitsaufgaben gilt es allerdings, möglichst rasch mit der Zuweisung von Tätigkeiten zu beginnen. Eine der neurotypischen Expertinnen schlug vor, neuen Mitarbeiter:innen mit Autismus ab Tag zwei kleinteilige Aufgaben zuzuteilen, die leicht zu bewältigen sind und auch unterfordernd sein können, damit die Person eine produktive Beschäftigung hat und ein Gefühl von Sicherheit bekommt. Diese anfangs unterfordernden Tätigkeiten können in einer logischen Abfolge rasch gesteigert werden. Solch eine Strategie ist einem gut gemeinten, aber für Autist:innen sehr stressreichen Ansatz gegenübergestellt, bei dem die ersten Tage und Wochen in der Organisation mit Zusehen und theoretischen Erklärungen verbracht werden. Es ist ebenso wenig förderlich, von Beginn an alle Zusammenhänge zu erklären. Stattdessen sollte sich die betroffene Person ein bis zwei Wochen mit einem Teilbereich beschäftigen, bevor ihr der nächste Teilbereich nähergebracht wird. Dieselbe Interviewpartnerin erklärte, dass viele Menschen aus dem Autismus-Spektrum einen hohen Perfektionsanspruch haben und deshalb häufig Fragen stellen. Damit das einschulende Personal nicht mit den Fragen überfordert ist, hilft es, einen täglich gleichbleibenden Zeitrahmen festzulegen, in dem Fragen und Unklarheiten der autistischen Arbeitnehmer:in besprochen werden können. Autistinnen bewerteten auch die Erfahrung mit einer Online-Lernplattform zur weiteren Einschulung als positiv. So können neue Mitarbeiter:innen ihr Wissen vertiefen, ohne dass die Zeit eines Vorgesetzten o.ä. in Anspruch genommen wird.

Auch wenn manche der Befragten keine besonderen Ansprüche an das Kennenlernen der Arbeitskolleg:innen hatten, sollte dieses geregelt und schrittweise ablaufen, insbesondere in größeren Organisationen mit vielen Mitarbeiter:innen. Auf keinen Fall sollte das Kennenlernen den Autist:innen eigenständig überlassen werden oder bei informellen Veranstaltungen wie Firmenfeiern stattfinden. Zunächst sollten die Einsteiger:innen mit Autismus dem Kernteam vorgestellt werden und dieses gut kennen lernen, dann schrittweise die anderen Kolleg:innen. Wenn die Diagnose der Autist:in beim Eintritt in die Organisation bekannt ist und die betroffene Person sich dazu bereit fühlt, könnte anstelle einer Autismus-Schulung neurotypischen Vorgesetzten und Kolleg:innen die Möglichkeit gegeben werden, autismusspezifische Fragen zu stellen. Das kann im Rahmen eines moderierten Workshops oder eines Einzelgesprächs stattfinden. Jedenfalls hat eine solche strukturierte Form des Fragestellens den Vorteil, dass Unsicherheiten auf Seiten der neurotypischen Beschäftigten wie *„mit der Person darf ich jetzt nicht reden oder die darf ich zum Essen nicht einladen, weil das mag die Person nicht"* (IP9, Pos. 19) beseitigt werden.

5.3.3. Kommunikation

Eine klare Kommunikation ist, wie in allen Phasen des Beschäftigungszyklus, grundlegend für ein funktionierendes Arbeitsverhältnis zwischen neurotypischen und neurodivergenten Personen. Klärungs- und Anpassungsbedarf besteht in Bezug auf die Arbeitsaufgaben, die Zeitstrukturierung, die soziale Unterstützung bzw. Ermutigung und die Erklärung ungeschriebener Regeln.

Die Einführung in die Arbeitsaufgaben sollte nicht nur mündlich, sondern auch schriftlich erfolgen. Gleiches gilt für Rechte und Pflichten in Berufen, in denen es entsprechende Regelungen gibt. Eine Teilnehmerin mit Autismus begründete den Vorteil der schriftlichen Kommunikation wie folgt:

> *Schriftlich ist für Autisten meiner Meinung nach immer besser als irgendwelche mündlichen Anweisungen. [. . .] Wenn ich irgendwen neu kennenlerne, der mir etwas erklärt, dann achte ich darauf, nett zu kucken oder die korrekte Mimik anzuwenden und nichts falsch zu machen. Und das lenkt*

mich so viel davon ab, den Kern der Sache zu ver-
stehen, dass ich den Kern der Sache nicht verstehe.
(IP10, Pos. 53)

Schriftliche Erklärungen sind aber nicht nur dann sinn-
voll, wenn Menschen im Autismus-Spektrum stark auf ange-
messenes Verhalten in sozialen Interaktionen fokussiert sind,
sondern auch, weil viele Autist:innen Informationen leichter
über den visuellen als über den akustischen Kanal aufnehmen
können.

Bezüglich der Arbeitszeiten sollten laut einer der neu-
rotypischen Expertinnen die ersten ein bis zwei Wochen
von der Arbeitgeber:in zeitlich strukturiert und eindeutig
kommuniziert werden, damit keine Energie mit der Frage
verschwendet wird, wann man am Arbeitsplatz erscheinen
soll. Nach dieser Eingewöhnungsphase sollte ein Gespräch
zwischen der vorgesetzten Person und der autistischen Ar-
beitnehmer:in geführt werden, um für beide Parteien pas-
sende Arbeitszeiten zu vereinbaren. Es wurde empfohlen,
fixe Arbeitszeiten oder klare Gleitzeitregelungen zu verein-
baren und einzuhalten, da es nach Erfahrung der Expertin
für die meisten Betroffenen belastend ist, den Autist:innen
eine völlig flexible Arbeitszeitgestaltung zu überlassen oder
von den Vereinbarungen abzuweichen. Eine autistische Inter-
viewpartnerin befürwortete jedoch eine eigenständige Ein-
teilung der Arbeitszeit. Eine tragbare Lösung ist daher, sich
diesbezüglich mit den Arbeitnehmer:innen auszutauschen.
Darüber hinaus sollte nach der Einarbeitung ein regelmäßi-
ger Austausch stattfinden, um den Umgang mit Überstunden
zu besprechen.

Einige Autistinnen berichteten aus ihrer Arbeitserfah-
rung, dass sie vor allem in der Einarbeitungszeit gerne öfter
nachgefragt oder um Hilfe gebeten hätten, als dies erwünscht
war. Andere befürworteten, wenn sich Vorgesetzte und Kol-
leg:innen über mögliche Probleme bei der Arbeit oder negati-
ve Befindlichkeiten der autistischen Mitarbeiterin erkundigt
haben. Auf die Frage, inwieweit die eigenen Bedürfnisse am
Arbeitsplatz während des Onboardings geklärt wurden, ant-
worteten die Befragten außerdem häufig, dass sie sich dies
mehr gewünscht hätten. Folglich sollten autistische Arbeit-
nehmer:innen dazu ermutigt werden, bei Bedarf um Hilfe zu
bitten und Fragen zu stellen sowie die eigenen Bedürfnisse
darzulegen. Eine Teilnehmerin erläuterte dazu folgendes:

> *Dann ist nicht der ganze Druck auf mir, um selbst*
> *die Initiative zu ergreifen und zu sagen ‚nein, ich*
> *brauche jetzt das und das und das und das‘, was*
> *ohnehin meistens Kleinigkeiten sind und für den*
> *Arbeitgeber ja meistens kein Problem sind, aber es*
> *ist halt eine gewisse Barriere, wenn man da selbst*
> *auf den Arbeitgeber zugehen muss. Aber wenn*
> *es umgekehrt wäre, wenn der Arbeitgeber gleich*
> *sagt ‚Ok, bezüglich des Arbeitsplatzes an sich, der*
> *Schreibtisch, was können wir da noch machen,*
> *damit es dir besser gefällt? Steht der richtig für*
> *dich?‘ zum Beispiel, solche Sachen. Das wäre hilf-*
> *reich, absolut.* (IP7, Pos. 53)

Für eine andere Teilnehmerin besteht die Schwierigkeit
darin, für sie akzeptable Bedingungen so festzulegen, dass sie
im machbaren Rahmen der Arbeitgeber:innen liegen, ohne
zu viel zu verlangen:

> *Ich glaube halt, dass meine größte Herausforde-*
> *rung eigentlich das ist, dass ich meine Bedürfnisse*
> *äußere, dass ich meine Grenzen so setze, dass ich*
> *mich wohlfühle, [. . .] ohne dass man dann von der*
> *anderen Seite eine Grenze überschreitet. [. . .] Die-*
> *ses Kommunizieren davon, was man halt braucht*
> *oder auch nicht braucht und in einem Ausmaß, das*
> *noch vertretbar ist, das ist, glaube ich, schwierig.*
> (IP6, Pos. 57)

Bezüglich der Bedürfniskommunikation war der konkre-
te Vorschlag einer Autistin, Arbeitnehmer:innen mit Autis-
mus Checklisten anzubieten, in denen Arbeitsplatzfaktoren
markiert werden können, die eine produktive Arbeit beein-
trächtigen bzw. ermöglichen. Solche Checklisten könnten
auch als Einschätzungen auf Skalen formuliert werden, da
eine Einschätzung anhand von Zahlen für viele Menschen
im Autismus-Spektrum zugänglicher ist, so die Befragte.
Auf diese Weise können Autist:innen ihre Einschätzungen
schriftlich mitteilen und es können realistische Lösungen
vereinbart werden. Darüber hinaus sollten Vorgesetzte of-
fen für Vorschläge zur Veränderung der Einarbeitungsphasen
sein. In Hinblick darauf ist nochmals auf die Notwendigkeit
eines offenen Klimas hinzuweisen, in dem sich die betroffene
Person sicher fühlt, ihre Anliegen vorzubringen.

Eine weitere relevante Maßnahme beim Onboarding von
autistischen Arbeitnehmer:innen ist die Erklärung der un-
geschriebenen sozialen Regeln des Arbeitsplatzes. Befragte
Autistinnen schilderten, dass ihnen auch im Erwachsenenal-
ter Dinge in Bezug auf Sitten und Gebräuche erklärt werden
müssen, da sie diese nicht intuitiv wahrnehmen und erler-
nen. Eine Befragte beschrieb z.B., dass sie sich etwa Floskeln
für Smalltalk einprägte, weil sie gelernt hatte, dass neuroty-
pische Menschen dies als wichtig erachten:

> *Es ist für mich eigentlich mehr eine Art Formel.*
> *Ja, also Gesprächsformel. Und als solches sehe ich*
> *das auch und ich messe ihr eigentlich keine große*
> *Bedeutung bei, weil wenn man fragt ‚Wie geht es*
> *dir?‘, dann wird der andere natürlich ‚gut‘ sagen,*
> *obwohl es ihm natürlich nicht gut geht. Also das*
> *weiß ich in der Zwischenzeit. Aber ich habe gelernt,*
> *dass man das machen muss, um als höflich anzu-*
> *kommen.* (IP5, Pos. 102)

Nach Ansicht der Teilnehmerinnen ist es also erforderlich,
ungeschriebene Regeln zu verschriftlichen und zu erklären.
So sollte Autist:innen beispielsweise dargelegt werden, ob
und welche Kleiderordnung es gibt oder welches Verhalten
bei Verspätungen erwünscht ist. Die Notwendigkeit, laten-
te Dinge zu verdeutlichen, besteht auch in Bezug auf grup-
pendynamische Besonderheiten. Eine Autistin empfindet es

z.B. als schwierig zu erkennen, dass *„man bestimmte Mitarbeiter:innen nicht mit gewissen Problemen belasten darf"*. Eine Mentor:in könnte hier eine nützliche Hilfestellung darstellen. Eine neurotypische Interviewpartnerin wies zudem darauf hin, dass neben den ungeschriebenen Regeln auch das Leitbild der Organisation, also die Vision, Mission und Werte der Organisation, vermittelt werden sollten. Vor allem in kleineren Organisationen, in denen das Personal nach einer bestimmten Philosophie lebt, sollte anhand konkreter Beispiele erklärt werden, was diese bedeutet und wie sie sich in der Organisation widerspiegelt. Nichtsdestotrotz sollte Mitarbeiter:innen im Autismus-Spektrum grundsätzlich eine gewisse Flexibilität entgegengebracht werden. Eine Autistin merkte z.B. an, dass sie nur bestimmte Kleidungsstücke tragen kann, da manche Stoffe Unbehagen auslösen. Ein anderes Beispiel ist, dass Autistinnen manchmal Ruhe brauchen und deshalb nicht gezwungen werden sollten, gemeinsam zu Mittag zu essen.

Letztlich können für Autist:innen schwierige Sachverhalte und Kommunikationsprobleme mit Hilfe sog. Sozialgeschichten dargestellt werden. Sozialgeschichten kommen insbesondere bei autistischen Kindern, Jugendlichen und Erwachsenen mit Lernschwierigkeiten zum Einsatz. Sie wurden von einer Expertin als Handlungsanleitungen für soziale Situationen beschrieben, bei denen die erklärende Person gemeinsam mit der autistischen Person eine Geschichte zum Thema schreibt und malt. Durch diese Form der Erklärung können Autist:innen besser verstehen, warum sich Menschen auf eine bestimmte Art und Weise verhalten und wie sich die betroffene Person einfinden und verhalten kann.

5.4. Aufklärungs- und Anpassungsbedarf nach der Integrationsphase

In Bezug auf die Retention von Arbeitnehmer:innen im Autismus-Spektrum wurde von den Befragten Aufklärungs- und Anpassungsbedarf in sieben Handlungsfeldern identifiziert. Dabei handelt es sich um Unterstützung, Routine und Struktur, Aufgaben, Kommunikation, sensorische Sensibilität, Stress sowie Arbeitszeit und Arbeitsort. Die zentralen Erkenntnisse zu diesen Bereichen lassen sich Tabelle 8 entnehmen.

5.4.1. Unterstützung

Für den langfristigen Verbleib von Autist:innen auf dem Arbeitsmarkt ist es nach wie vor wichtig, die notwendige Unterstützung bereitzustellen. Hierbei handelt es sich in erster Linie um Unterstützung seitens der Kolleg:innen, Vorgesetzten und Autismus-Expert:innen für autistische Arbeitnehmer:innen. Professionelle Unterstützung kann jedoch in der Retention auch für Organisationen wichtig sein. Einige Teilnehmerinnen betrachten darüber hinaus das Angebot einer Vertrauensperson als förderlich.

Die autistischen Befragten begrüßen kollegiales Verhalten und gegenseitige Hilfsbereitschaft unter Arbeitskolleg:innen. Dies bezieht sie auf fachliche Probleme, die bei Bedarf im Team besprochen und gelöst werden können.

In stressreichen Situationen können Kolleg:innen ebenfalls die notwendige mentale, emotionale und praktische Unterstützung bieten. Zudem können neue, unbekannte Tätigkeiten von Kolleg:innen oder ernannten Mentor:innen gezeigt bzw. vorgemacht werden. Arbeitskolleg:innen sollten es auch ernst nehmen, wenn sich eine autistische Person über negative Befindlichkeiten wie Panikzustände äußert. Sowohl eine neurotypische als auch eine neurodiverse Expertin betonte, dass eine langfristig festgelegte Mentor:in, eine befreundete Mitarbeiter:in oder eine Vertrauensperson hilfreich ist, um sich auf Aktivitäten und Veranstaltungen der Organisation vorzubereiten. So kann die unterstützende Person konsultiert werden, um einerseits zu erfahren, ob die Teilnahme an einer bestimmten Veranstaltung notwendig ist, und andererseits, um sich über eine mögliche Kleiderordnung und den geeigneten Zeitpunkt für das Erscheinen zu informieren. Diese Person kann sich außerdem im Voraus mit der autistischen Arbeitnehmer:in treffen, um gemeinsam bei der Veranstaltung zu erscheinen. Die Befragten mit Autismus sprachen im Allgemeinen den Wunsch aus, sich an eine Vertrauensperson wenden zu können, wenn sie sich informell austauschen möchten, Schwierigkeiten im Arbeitsalltag haben oder eine Anpassung der Arbeitssituation benötigen. Wie von einer Autistin erwähnt, ist eine solche Person in Unternehmen mit mindestens fünf begünstigt behinderten Arbeitnehmer:innen verpflichtend und sollte Anliegen, falls notwendig, anonym weiterleiten (*Portal der Arbeiterkammern [AK] (n. d.)*).

Für Vorgesetzte gelten grundsätzlich dieselben Aspekte wie für die Kolleg:innen von Autist:innen. Sie sollten autistische Mitarbeitende daher insofern unterstützen, als dass sowohl Schwierigkeiten bei den Arbeitsaufgaben als auch persönliche Belange ernst genommen werden. Eine Autistin berichtete aus ihrem derzeitigen Berufsverhältnis, dass Vorgesetzte eine Coaching-Funktion für die ihnen unterstellten Mitarbeiter:innen einnehmen. Vorgesetzte sind demnach offen für Gespräche und erarbeiten gemeinsam Lösungen für Probleme.

Durch die Hilfe von Autismus-Expert:innen werden, wie bereits beschrieben, die Arbeitsumstände optimiert und der Kommunikationsprozess zwischen neurotypischen und neurodivergenten Personen erleichtert. Eine Person, die sich gut mit Autismus auskennt, kann Kommunikationsschwierigkeiten und akute Probleme oft innerhalb weniger Minuten aufklären. Auch hier kann die etwaige Therapeut:in der autistischen Arbeitnehmer:in und der Organisation vereinzelt Hilfestellung geben. Eine der neurotypischen Expertinnen betonte allerdings, dass es notwendig ist, die Sichtweisen und Bedürfnisse der Organisation ebenso wie die der Autist:in nachzuvollziehen, damit das Arbeitsverhältnis für beide Parteien funktioniert.

5.4.2. Routine und Struktur

Wie bereits im vorherigen Kapitel erwähnt, benötigen Menschen im Autismus-Spektrum ein hohes Maß an Routine und Struktur. So assoziieren die befragten autistischen Frauen Zufriedenheit mit Planbarkeit. Für die Teilnehmerinnen der Studie bedeutet dies, die Arbeitsstruktur der Organisati-

Retention
Unterstützung durch Expert:in für Organisation (z.B. für Job-Matching); Unterstützung & Supervision durch Expert:in (falls erforderlich Einzelbetreuung), Kolleg:innen & Vorgesetzte für Autist:in; Vertrauensperson für Anliegen & organisationale Veranstaltungen
Routine und Struktur: - Transparente Arbeitsstruktur, klare Kommunikationswege - Ein:e Vorgesetzte, kleine Teamgröße - Schriftlicher Arbeitsplan für Tag/Woche/Monat - (Interaktive) To-Do-Listen, Kalender, Benachrichtigungen - Vorbereitung auf neue Aufgaben & Veränderungen
Aufgaben: - Fordernde, qualifikationsgerechte Aufgaben mit klar abgegrenztem Verantwortungsbereich - Ggf. Umstrukturierung der Arbeitsrolle - (Unterstützung bei) Aufgabenpriorisierung & -sequenzierung - Geregelte Abwechslung; kein Multitasking, wenige Unterbrechungen, (selbstbestimmte) Pausen - Selbstständigkeit & Unabhängigkeit - Weiterentwicklungsmöglichkeiten (z.B. Schulungen)
Kommunikation: - Klarer & präziser mündlicher & schriftlicher Kontakt & (Schritt-für-Schritt-) Anweisungen, ggf. mit visuellen Darstellungen - Schriftliche Agenden & Protokolle für Besprechungen - Klarheit über Erwartungen & Formulierung von Zielen - Regelmäßige & offene (informelle) Kommunikation mit Vorgesetzten & Kolleg:innen, Art & Häufigkeit nach individuellen Bedürfnissen - Flexible Kommunikation ohne persönlichen Kontakt (z.B. E-Mails, Chats) - Direktes, konstruktives, einfühlsames Feedback mit Vorbereitungszeit; Stärkung des positiven Verhaltens & Ermutigung
Sensorische Sensibilität: - Vermeiden von großen, offenen Büroräumen; festgelegte Arbeitsplätze & -büros, ggf. Einzelarbeitsplätze; Ruhe, genug Platz - Individuelle Gestaltung des Arbeitsumfeldes - (Dynamische) Anpassung der Umgebung (z.B. durch Jalousien & Temperaturregler) - Kopfhörer mit Möglichkeit zum Musikhören
Stress: - Vereinbarte Kommunikation zur Vermittlung des Stressniveaus (z.B. Emoticons, Schlüsselwörter) - Entwicklung individueller Stressbewältigungs- & Problemlösungsstrategien - Ruheraum bzw. Entspannungsbereich
Arbeitszeit und Arbeitsort: - Flexibilität bei Arbeitszeitpräferenzen; Möglichkeit zur Teilzeitarbeit; fixe Arbeits-/ Gleitzeitregelungen; wenig/keine Überstunden - Hybrid-Arbeit, Home-Office-Arbeit & Sicherstellung der Erreichbarkeit der Ansprechperson

Tabelle 8: Aufklärungs- und Anpassungsbedarf in der Retention für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum

on genau zu kennen. Die Abläufe der Organisation sowie die Kommunikationswege, d.h. wer in welchen Angelegenheiten zu kontaktieren ist oder wer bestimmte Arbeitsfortschritte überprüft, sollten also für autistische Arbeitnehmer:innen transparent sein. Mit Hilfe von schriftlichen Arbeitsplänen für die nächsten Tage, Wochen und bestenfalls Monate sollte genau festgelegt werden, welche Aufgaben bis zu welchen Deadlines zu erledigen sind. In den Interviews wurde auch der Einsatz von Online-Tools zur Zeitstrukturierung und Aufgabenverwaltung wie Trello[4] genannt. In solchen Programmen können die zu erledigenden Aufgaben erklärt, priorisiert, mit konkreten Deadlines versehen und bestimmten Mitarbeiter:innen bzw. Arbeitsteams zugeteilt werden. So können Arbeitsaufträge sukzessive abgearbeitet und bei Unklarheiten nachgelesen werden.

Etablierte Strukturen sollten nicht willkürlich verändert werden. Arbeitsmittel sollten z.B. einen zugewiesenen Platz haben, der unverändert bleibt. Selbstverständlich sind kurzfristige Änderungen oder Krankenstände nicht planbar, jedoch sollten sich Arbeitgeber:innen von Menschen mit Autismus bewusst sein, dass die Anpassung an Veränderungen viel Kraft kostet. Damit sich autistische Arbeitnehmer:innen darauf einstellen können, sollten sie daher mit möglichst langer Vorlaufzeit auf bekannte Veränderungen und neue Aufgaben vorbereitet werden.

Wenngleich dies nicht explizit in den Interviews, sondern nur im Theoriemodell erwähnt wurde, ist es sinnvoll, wenn Autist:innen nur eine bzw. möglichst wenige direkte Vorgesetzte haben, um Unklarheiten zu vermeiden. Ähnlich dazu befürworteten die Autistinnen eine geringe Zahl an direkten Arbeitskolleg:innen. Eine Expertin erklärte, dass es für die meisten Menschen aus dem Autismus-Spektrum umso besser ist, je weniger Teamfähigkeit für die Erledigung der Aufgaben benötigt wird. Dies ist allerdings individuell zu klären.

---

4 https://trello.com/home

5.4.3. Aufgaben

Die in diesem Abschnitt dargestellten Punkte ergaben sich hauptsächlich aus dem empirischen Teil dieser Arbeit und behandeln den richtigen Umgang mit Arbeitsaufgaben von Beschäftigten im Autismus-Spektrum.

Der Großteil der befragten Autistinnen betonte die Wichtigkeit fordernder, qualifikationsgerechter Aufgaben. Gerade für Menschen mit Autismus und ADHS ist dies wichtig, um konzentriert bleiben zu können. Dies war in den Berufserfahrung der Studienteilnehmerinnen nicht immer der Fall. Auf der einen Seite wurde das Fehlen anspruchsvoller Aufgaben damit begründet, dass es im Arbeitsalltag nicht immer möglich ist, alle Fähigkeiten einzubringen. In solchen Schilderungen wurde die Aussage relativiert, wenn die Arbeitsaufgaben z.B. je nach Projekt wechseln und das Gefühl der Unterforderung nur manchmal auftritt. Auf der anderen Seite sprachen die Teilnehmerinnen davon, dass sie in manchen Positionen unterschätzt wurden bzw. werden. Eine Autistin sagte dazu:

> *Man hat mir nicht so viel zugemutet, man hat mich immer gleich als schwach eingestuft und mich präsumtiv von irgendwelcher Verantwortung entbunden, wo ich mir gedacht habe ‚um Gottes Willen, das braucht es jetzt eigentlich überhaupt nicht'. Weil es ist in der Tat so, dass sehr Vieles, was für andere Leute, sagen wir [...] Neurotypische, schwer zu erfüllen ist, für mich einfach ein Klacks ist.* (IP5, Pos. 90)

Unabhängig von den Gründen, warum die Arbeit als unterfordernd empfunden wurde, gaben die Befragten in solchen Fällen häufig ihre Arbeit auf. Um zu verhindern, dass eine Fehleinschätzung der Grund für die Beendigung eines ansonsten zufriedenstellenden Arbeitsverhältnisses ist, sollte die vorgesetzte Person mit der betroffenen Person ein Gespräch darüber führen, wo die Schwierigkeiten und wo die besonderen Fähigkeiten und Vorlieben liegen. Auf Anfragen, herausfordernde Aufgaben zu erhalten, sollte ebenso reagiert werden.

Im weiteren Verlauf kann es notwendig sein, die Arbeitsrolle an die Fähigkeiten und Bedürfnisse der autistischen Arbeitnehmer:in im Sinne einer stärkenbasierten Arbeitsverteilung anzupassen. So schlugen sowohl autistische als auch neurotypische Befragte vor, beispielsweise den Kund:innenkontakt und andere soziale Interaktionen zu reduzieren und die Verantwortung für ein bestimmtes Kund:innensegment zu verändern. Auch Aufgaben, die nicht in Verbindung mit der eigentlichen Tätigkeit stehen, wie z.B. die Koordination eines Termins für ein gesamtes Team, sollten Mitarbeiter:innen mit Autismus abgenommen werden. Stattdessen können den Personen vermehrt Aufgaben übertragen werden, die sie gerne und gut ausführen. Ein Vorschlag in diesem Zusammenhang war, ein sog. Tandem mit Arbeitskolleg:innen zu bilden, die gerne organisatorische Tätigkeiten und andere Dinge übernehmen, die für Autist:innen belastend sind. Wenn eine Umstrukturierung der Arbeitsrolle erfolgreich umgesetzt werden kann, sind

autistische Arbeitnehmer:innen meist langfristig zufrieden und ihren Arbeitgeber:innen gegenüber sehr loyal, so eine Expertin. Dabei ist jedoch folgendes unbedingt zu beachten:

> *Es gibt selbst diese Teams, die aufgeklärt werden und dann werden trotzdem Dinge erwartet [...], weil sie denken ‚mit der Zeit sollten sie [die Autist:innen] es aber erlernen'. Und das ist ganz wichtig, dass man sagt, dass viele Dinge trotzdem nie erlernt werden, das heißt, man muss gewisse Dinge akzeptieren lernen, dass die Person anders ist. Also hat es viel mit Akzeptanz zu tun.* (IP13, Pos. 29)

Darüber hinaus ist es hilfreich, Arbeitsaufgaben zu priorisieren und zu sequenzieren, da dies zu einer höheren Struktur führt. Fällt dies den angestellten Autist:innen schwer, so sollten sie hierbei unterstützt werden. Dies kann schriftlich oder mit Hilfe der oben genannten Online-Tools zur Aufgabenstrukturierung erfolgen. Größere Aufgaben sollten am besten in Paketen strukturiert werden, so dass sie jeweils an einem Tag oder in absehbarer Zeit erledigt werden können.

Neben dem Ausüben fordernder Tätigkeiten war für die befragten Autistinnen ein wesentlicher Punkt, konzentriert und ungestört arbeiten zu können. Unterbrechungen und Multitasking sollten daher möglichst vermieden werden. Beispielsweise sollten nicht mehrere Kolleg:innen gleichzeitig um Informationen oder Unterstützung bitten. Sind Unterbrechungen der Routine unvermeidbar, sollten autistische Arbeitnehmer:innen so weit wie möglich darauf vorbereitet werden. Dies steht im Gegensatz zum Wunsch der Befragten nach geregelter Abwechslung, also dem Anliegen, dass die Aufgaben unterschiedliche Elemente enthalten. Eine neurotypische Expertin stimmte dem zu, fügte aber hinzu, dass ein kleiner Teil der Betroffenen gerne monotone Arbeiten ausführt. Auf jeden Fall muss der Verantwortungsbereich klar abgegrenzt sein, damit Autist:innen keine unerwarteten Aufgaben zugewiesen werden, für die jemand anderes verantwortlich ist. Zusätzlich befürworteten die autistischen Interviewpartnerinnen Autonomie und Unabhängigkeit, d.h. sie bevorzugen selbständiges Arbeiten. Ebenso mögen sie es nicht, unter ständiger Beobachtung zu stehen. Außerdem wünschten sich die Autistinnen, selbstbestimmt Pausen machen zu können, damit sie sich regelmäßig erholen können. Wie bereits erwähnt, sollte ihnen hierbei Ruhe gewährt werden.

In Verbindung mit Weiterentwicklungsmöglichkeiten gaben die Studienteilnehmerinnen an, dass sie gerne ihr Wissen vertiefen und neue Fähigkeiten erlernen, da dies ein bedeutender Faktor für die Arbeitsmotivation ist. Die meisten Personen aus dem Autismus-Spektrum möchten dabei Expert:innenrollen einnehmen und keine hohen Positionen mit großer Verantwortung. Drei Autistinnen bewerteten es allerdings als positiv, zeitweise Verantwortung zu übernehmen, indem sie beispielsweise ein Projekt leiten oder andere Mitarbeiter:innen über ihr Fachgebiet aufklären. Eine Autistin erwähnte in diesem Kontext, dass sie trotz bestätigter An-

fragen nach Entwicklungsmöglichkeiten nie unterstützt wurde. Arbeitgeber:innen sollten daher bemüht sein, die gesamte Belegschaft zu fördern und insbesondere auf Anfragen nach fachrelevanten Kursen oder Schulungen zu reagieren, um faire Chancen zu gewährleisten.

5.4.4. Kommunikation

Wie bereits mehrfach angeführt, stehen in der Kommunikation mit Menschen aus dem Autismus-Spektrum Klarheit und Präzision an erster Stelle. So müssen regelmäßig konkrete Ziele zwischen Vorgesetzten und autistischen Mitarbeiter:innen vereinbart und verschriftlicht werden, damit die Betroffenen genau wissen, welche Erwartungen bestehen und diese auch nachlesen können. Ebenso sollten Anweisungen eindeutig formuliert und direkt sein, d.h. *„kein ‚durch die Blume reden‘"* (IP3, Pos. 101), da Autist:innen diesen sonst nicht folgen und sie später nicht ausführen können. Sie sollten außerdem eine genaue Deadline enthalten, *„‚dringend‘ ist [z.B.] zu wenig konkret"* (IP13, Pos. 25). Eine der befragten Frauen erklärte, dass ihre Kolleg:innen des Öfteren erwähnen, dass bestimmte Aufträge ohnehin klar sind, diese jedoch für die Autistin mehrdeutig sind. In diesem Sinne muss betont werden, dass das Klarheitsverständnis neurotypischer Personen nicht als Maßstab herangezogen werden sollte.

Ein weiterer zentraler Punkt für angemessene Anweisungen ist, dass sie, wie Erwartungen, nicht nur mündlich, sondern auch schriftlich gegeben werden. Der Grund dafür ist, dass es Autist:innen in Gesprächen schwerfällt, alle Informationen zu verarbeiten. Schriftliche Instruktionen sollten daher zumindest stichwortartig formuliert sein. Es kann aber auch notwendig sein, Aufgaben Schritt für Schritt aufzuschreiben. Im Idealfall sollten Anweisungen auch mit visuellen Darstellungen wie Ablaufdiagrammen versehen sein. Analog schilderte eine autistische Frau, dass in ihrem Beruf häufig in Besprechungen Aufträge erteilt werden. Da dort ebenso viele andere Themen besprochen werden, ist es für sie trotz Notizen schwierig, die ihr zugewiesenen Aufgaben richtig herauszufiltern. Folglich sollten sowohl Agenden vor Meetings als auch Protokolle mit konkreten Informationen über Anweisungen und Verantwortlichkeiten nach Meetings an die jeweiligen Mitarbeiter:innen versendet werden. Ebenso bespricht die befragte Person ihre Notizen und ‚Key Messages‘ am Ende von Meetings mit dem Team, um Unklarheiten zu vermeiden. Auch diese Strategie könnte von Organisationen umgesetzt werden. Insgesamt hat schriftliche Kommunikation laut den Befragten den Vorteil, dass sich Autist:innen in Ruhe organisieren und vorbereiten können.

Eine Teilnehmerin beschrieb, dass sie sich überanstrengt und Angst hat, ihre Aufgaben nicht richtig zu erfüllen oder nicht genug zum Team beizutragen, wenn die Erwartungen der Vorgesetzten nicht offengelegt werden und sie kein Feedback zu ihren Arbeitsfortschritten erhält. Eine andere Befragte bestätigte dies. Neben konkreten Zielen und Erwartungen sollten Autist:innen daher regelmäßig Feedback erhalten. Das Feedback sollte ehrlich, aber sensibel und konstruktiv sein, da es für Menschen im Autismus-Spektrum schwierig ist, mit harscher Kritik umzugehen. Insbesondere wenn

das Feedback negativ ausfällt, möchten Autist:innen darauf vorbereitet sein. So wäre es hilfreich, die wichtigsten Punkte mindestens einen Tag im Voraus schriftlich zu kommunizieren und diese dann in einem vereinbarten Gespräch ohne die Anwesenheit anderer Personen zu behandeln. Eine neurotypische Befragte empfahl grundsätzlich, dass Vorgesetzte ihren autistischen Unterstellten täglich fünf- bis zehnminütige mündliche ‚Check-Ins‘ anbieten, damit die Autist:innen Feedback einholen und Fragen stellen können. Ihrer Erfahrung nach erleichtert dies den Arbeitsalltag des neurodiversen Personals erheblich. Ähnlich stehen eine befragte Autistin und ihr Vorgesetzter einmal pro Woche in schriftlichem Kontakt per Chat, um sich über die vergangene Woche auszutauschen. Nachdem sich die Bedürfnisse der Betroffenen nach der Art und der Häufigkeit des Kontakts zu Vorgesetzten unterscheiden, sollten diese vorab besprochen und berücksichtigt werden.

Bezüglich des Kontakts zu Arbeitskolleg:innen sei erneut erwähnt, dass manche der Teilnehmerinnen mehr Möglichkeiten des formellen und informellen Austauschs begrüßen würden. Falls Missverständnisse mit Kolleg:innen oder Vorgesetzten entstehen, so ist es nach Meinung der Autistinnen leichter, diese in Chats aufzulösen. Eine Frau äußerte sich dazu wie folgt:

> *Da schreibe ich einfach in konkreten Worten, wie das ausschaut und wie das ist und dass ich mich entschuldige, wenn ein Missverständnis entstanden ist. Das ist für mich einfacher. [. . .] Wenn irgendetwas Wichtiges ist, dann schreibe ich lieber. Das war in früheren Berufserfahrungen einfach nicht möglich teilweise. Ich bin dann oft als derjenige dagestanden, der sich nicht wirklich artikulieren kann und nicht das, was ihn eigentlich bewegt, ausdrücken kann, und das war für mich sehr belastend teilweise, wirklich. Dieser Mix aus direkter Kommunikation und schriftlicher Kommunikation, den empfinde ich eigentlich als ziemlich gut. Also das kommt mir sehr entgegen.* (IP5, Pos. 60, 62)

Ähnlich dem Erklärungsbedarf bei ungeschriebenen Regeln sollten autistische Arbeitnehmer:innen in ihrem positiven Verhalten bestärkt und gegebenenfalls auf ungeschicktes Verhalten aufmerksam gemacht werden. Eine Autistin erläuterte hierzu ein wesentliches Argument:

> *Da müssten halt auch wieder die ganzen Arbeitgeber so eine Glaskugel haben und wissen ‚Was könnte der Autist [. . .] falsch machen, was uns aber wichtig ist?‘. Schwierig, wirklich. Aber es ist auf jeden Fall wichtig, dass wenn jemand in Fettnäpfchen tritt ständig, dass man das anspricht und nicht einfach nur aus Höflichkeit das nicht erwähnt. Weil auf Dauer führt das eigentlich eher dazu, dass man die Person, die da ständig in Fettnäpfchen tritt, nicht mag und das will der Autist ja nicht. Der will ja eigentlich gemocht werden. Also die Regeln erklären.* (IP10, Pos. 87)

Darüber hinaus erklärte sie, dass ihr durch die soziale Bestätigung von Vorgesetzten und Kolleg:innen ein Gefühl der Sicherheit vermittelt wird. Die Gepflogenheiten und Werte der Organisation sollten daher nicht nur während der Integrationsphase, sondern auch während der gesamten Dauer des Beschäftigungsverhältnisses offengelegt und bei Bedarf erklärt werden.

5.4.5. Sensorische Sensibilität

Aus den Interviews ging hervor, dass zwar viele Menschen im Autismus-Spektrum bestimmte Bedürfnisse hinsichtlich sensorischer Reize haben, diese allerdings sehr unterschiedlich sein können. Am Häufigsten klärten die Teilnehmerinnen der Studie darüber auf, dass sie sich schnell von Lärm beeinträchtigt fühlen und deshalb Ruhe im Arbeitsumfeld benötigen. Lärm kann sein, wenn Kolleg:innen telefonieren, miteinander reden oder gleichzeitig sprechen. Auch Radiomusik, plötzliche Geräusche wie das Einschalten einer Maschine und Hintergrundgeräusche, die andere möglicherweise gar nicht wahrnehmen, sind akustisch anstrengend und kosten Energie. Große, offene Büroräume sollten darum unbedingt vermieden und Störquellen wie Drucker möglichst weit von der autistischen Person entfernt aufgestellt werden. Einige der autistischen Frauen wiesen darauf hin, dass sie gerne ein eigenes Büro hätten. Eine Autistin, die im Laufe ihres derzeitigen Arbeitsverhältnisses ein eigenes Büro eingefordert hat, gab jedoch zu bedenken, dass selbst in ein Einzelbüro Reize eindringen, die ein konzentriertes Arbeiten negativ beeinflussen. So wird sie jedes Mal aus der Ruhe gebracht, wenn Kolleg:innen durch den Flur gehen, weil sie sich dann fragt, ob die Person etwas von ihr benötigt oder nur zur Kaffeemaschine geht. Eine neurotypische Befragte sprach sich gegen Einzelarbeitsplätze und -büros aus und erklärte, dass Mitarbeiter:innen mit Autismus durch die räumliche Trennung teilweise nicht in ihre Arbeitsgruppen integriert werden und sich einsam fühlen. Sie schlug deshalb vor, Autist:innen innerhalb eines kleinen Teams zu platzieren, das die gleichen oder ähnliche Tätigkeiten ausführt wie die betroffene Person. Ähnlich merkte eine autistische Teilnehmerin an, dass sie gerne in einem Büro mit maximal vier Kolleg:innen arbeiten würde, bei dem die Tür geschlossen werden kann, so dass ungestörtes Arbeiten möglich ist. Da äußere akustische Reize nicht immer reduziert oder eliminiert werden können, sollte Autist:innen auch die Möglichkeit geboten werden, Kopfhörer zu tragen. Befragte Autistinnen machen hierbei Gebrauch von Ohrstöpseln, Baustellenkopfhörern und Kopfhörern mit einer Funktion zur elektronischen Geräuschunterdrückung. Zusätzlich sollte das Hören von Musik über Kopfhörer ermöglicht werden, da dies nach Meinung einiger befragter Autistinnen die Konzentrationsfähigkeit erhöht.

Unabhängig von der Größe des Raumes, in dem autistische Arbeitnehmer:innen arbeiten, sollten die Arbeitsplätze festgelegt sein und nicht verändert werden. Auch in Organisationen, in denen es freie Sitzplatzwahl gibt und möglicherweise nicht genügend Sitzplätze für alle Beschäftigten vorhanden sind, sollten Autist:innen nicht nur aufgrund der sensorischen Ansprüche, sondern auch wegen der hohen Anforderungen an Planbarkeit feste Plätze erhalten.

Die zweithäufigste Anmerkung der Autistinnen bezog sich auf visuelle Reize. Diese betreffen vor allem die Lichtverhältnisse. Beispielsweise erwähnte eine der befragten Autistinnen, dass es ihr selbst zu hell ist, wenn es bewölkt ist. Eine andere Teilnehmerin erklärte, dass sie sich überfordert fühlt, wenn in Innenräumen Lichter brennen, obwohl die Sonne hell genug in den Raum scheint. Grundsätzlich sollte darauf geachtet werden, dass die Arbeitsumgebung nicht zu hell ist und bei Bedarf angepasst werden kann, z.B. durch Jalousien. Außerdem sollte auf grelle Beleuchtung verzichtet und stattdessen dimmbares Licht verwendet werden. Flackerndes Licht sollte rechtzeitig repariert oder ausgetauscht werden. Auch die Bewegungen anderer Menschen können visuell anspruchsvoll sein. So berichtete eine Autistin, dass sie gestresst ist, wenn sie in Räumen arbeiten muss, die stark frequentiert sind und in denen viele Menschen ein- und ausgehen. Zeitweise stört jedoch bereits die Anwesenheit anderer Menschen. Daher sollte es möglich sein, die sozialen Interaktionen bei Bedarf zu reduzieren und beispielsweise den Arbeitstag in einem separaten Raum zu verbringen. Fühlt sich eine Person mit Autismus dauerhaft durch die Anwesenheit von Kolleg:innen eingeschränkt, sollte die Einrichtung eines Einzelarbeitsplatzes in Erwägung gezogen werden.

Weitere Anmerkungen zur sensorischen Sensibilität bezogen sich auf Temperatur, Gerüche und Berührung. Auch hier sollte es autistischen Arbeitnehmer:innen möglich sein, die Arbeitsumgebung dynamisch anzupassen, beispielsweise mit Hilfe von Temperaturreglern, oder das Fenster zu öffnen, wenn Gerüche zu penetrant sind. Sowohl in Arbeitszimmern als auch in Pausenräumen sollten Arbeitnehmer:innen im Autismus-Spektrum ausreichend Platz haben, sodass genügend Abstand zu anderen Personen gehalten werden kann.

Da zu viele Sinneseindrücke zu Reizüberflutung und Überforderung führen können, werden im nächsten Abschnitt mögliche Strategien zur Stressreduktion vorgestellt.

5.4.6. Stress

Nach Angaben der neurotypischen Expertinnen reduzieren alle Maßnahmen, die in diesem Modell vorgeschlagen werden, bereits stark den empfundenen Stress von Menschen im Autismus-Spektrum. In diesem Abschnitt werden daher vor allem Möglichkeiten zur akuten Stressreduktion vorgestellt.

Im Zusammenhang mit Meltdowns waren die neurotypischen Befragten der Meinung, dass Strategien zur Stressbewältigung und Problemlösung individuell vereinbart werden sollten, da Menschen im Autismus-Spektrum unterschiedliche Bedürfnisse in Stresssituationen haben. So können Hilfsmittel wie bestimmte Gerüche oder Kopfhörer unterstützend wirken und griffbereit im Arbeitsumfeld platziert werden. Vor allem aber sollte geklärt werden, ob die Arbeitnehmer:in mit Autismus angesprochen werden möchte, wenn sie unter Stress steht. Eine Autistin gab an, dass sie gerade in Situationen, in denen sie sich überfordert fühlt, keine Energie

aufbringen kann, um anderen die Situation oder ihre Bedürfnisse zu erklären. Das Arbeitsteam sollte deshalb über solche Umstände informiert sein. Insofern könnte es eine sinnvolle Lösung sein, den Teammitgliedern bzw. direkten Kolleg:innen und Vorgesetzten ihren Stresszustand mit Hilfe kurzer, vorab vereinbarter Kommunikation mitzuteilen. Wenn es das Arbeitsumfeld erlaubt, könnten Autist:innen z.B. Emoticons oder Schlüsselwörter in einen Chat senden, um andere darüber zu informieren, dass sie Ruhe benötigen und nicht gestört werden möchten. Auch die Übereinkunft, mündliche Bitten nach Ruhe tatsächlich zu respektieren, kann bereits den Zweck erfüllen. Ist es für Autist:innen kein Problem, angesprochen zu werden, kann es hilfreich sein, der Person Hinweise zu geben und zu fragen, ob sie z.B. schon darüber nachgedacht hat, Kopfhörer aufzusetzen oder eine Pause zu machen. Wenn es bei der autistischen Arbeitnehmer:in noch nicht zu einem Meltdown gekommen ist und es sich um arbeitsbedingten Stress handelt, kann die Vorgesetzte außerdem versuchen, gemeinsam mit der betroffenen Person alle Aufgaben des aktuellen Arbeitstages durchzugehen, zu sortieren und zu strukturieren. Überfordernde Aufgaben sollten der Autist:in abgenommen werden. Resultiert Stress aus Kommunikationsschwierigkeiten zwischen dem neurotypischen und dem neurodiversen Personal, so sollten diese in einem ruhigen Moment aufgeklärt werden, und es sollten der Autist:in die Perspektiven und Erwartungen der anderen Personen verständlich gemacht werden. Unter Umständen kann es sinnvoll sein, dafür autismusspezifische Methoden (z.B. Sozialgeschichten) einzusetzen und externe Expert:innen beizuziehen.

Eine Maßnahme, die von allen Befragten durchweg befürwortet wurde, war die Möglichkeit eines Ruhebereichs. Ein zentraler Anpassungsbedarf in Organisationen ist daher die Einrichtung eines Ruheraumes bzw. einer Entspannungszone. Wenn das Überlastungsgefühl nicht auf die Arbeitsaufgaben oder auflösbare Kommunikationsprobleme zurückzuführen ist, kann der Rückzugsort angeboten und gefragt werden, ob die Person etwas Bestimmtes braucht. Möglicherweise ist es notwendig, die Betroffene in die ungestörte Umgebung zu begleiten und abzuwarten, bis sich die Situation beruhigt hat. Außer wenn die Autist:in es wünscht, sollte sie dann nicht angesprochen oder berührt werden, um keine zusätzlichen Reize auszulösen. Eine Autistin entdeckte Meditation und Yoga als gute Ausgleichsstrategien für sich. Sie erläuterte, wie sich Reizüberflutung anfühlt und wie Beruhigungstechniken wirken:

> *Dieses Reizüberflutungsgefühl, das ist irgendwie so, als hätte man so ein Grieseln oder diesen Schnee vom Fernseher, so dieses Rauschen im Kopf. Und das geht vom Meditieren weg, also wenn man so eine Schneekugel schüttelt und die hinstellt, dann fällt ja der Schnee so hinunter. Und wenn man meditiert mit Reizüberflutung, dann ist das so, wie wenn der Schnee einfach langsam hinunterfällt und das Wasser wird wieder klar. Deswegen meditieren. Und Yoga ist auch gut als Ausgleich.* (IP10, Pos. 61)

Diese Möglichkeit könnte Autist:innen auch am Arbeitsplatz bzw. im besagten Ruhebereich gewährt werden, damit sie ihre Emotionen eigenständig kontrollieren und eine vollkommene Überlastung vermeiden können. Auch in Pausen sollten Autist:innen Rückzugsorte angeboten werden. Manche erklärten, dass sie nur so das Maximale leisten können.

5.4.7. Arbeitszeit und Arbeitsort

Schließlich wurde in den Interviews ein Aufklärungs- und Anpassungsbedarf hinsichtlich der Arbeitszeiten und des Arbeitsortes festgestellt.

Schon im Bereich der Kommunikation in der Onboarding-Phase wurde erwähnt, dass Autist:innen eine zeitliche Struktur benötigen und deshalb genau bekannt sein sollte, zu welchen Zeiten sie arbeiten. Sofern es das Arbeitsumfeld zulässt, sollten diese Zeiten, unabhängig von Gleitzeitregelungen, zusammen mit der vorgesetzten Person vereinbart werden und dann langfristig konstant bleiben. Arbeitgeber:innen sollten also nicht erwarten, dass Autist:innen Spontanität beweisen. Sie sollten genauso wenig fordern, dass autistische Arbeitnehmer:innen früher am Arbeitsplatz erscheinen, ohne akuten Mehrstundenbedarf länger arbeiten oder außerhalb der geregelten Arbeitszeiten verfügbar sind, da dies zum einen Unklarheiten auslöst und zum anderen negative Auswirkungen auf eine routinierte Freizeitgestaltung und sonstige Verpflichtungen hat.

In den Interviews wurde auch erwähnt, dass die autistischen Frauen ihr Stressniveau vor allem durch die Reduktion von Arbeitszeiten, das Vermeiden von Überstunden und ausgleichende Freizeitaktivitäten regulieren. Dem kann hinzugefügt werden, dass es laut einer neurotypischen Teilnehmerin nur wenige autistische Personen gibt, die eine Vollzeitarbeit problemlos bewältigen. Um einer – manchmal unbemerkten – Überlastung von Menschen im Autismus-Spektrum entgegenzuwirken, sollten daher Teilzeitvereinbarungen gewährt werden und wenig bis keine Überstunden anfallen. Hierfür spricht das Argument, dass Autist:innen hochgradig zuverlässig, engagiert und fokussiert sind. Bevor sie also durch Burnouts arbeitsunfähig werden, weil sie aufgrund des Arbeitskräftemangels häufig viele Überstunden machen müssen, sollten Organisationen die zeitlichen Grenzen der autistischen Arbeitnehmer:innen respektieren. Um dem Personalbedarf von Organisationen entgegenzukommen, ist ein Mittelweg, dass Vorgesetzte und Autist:innen regelmäßige Treffen vereinbaren, in denen der Umgang mit Überstunden besprochen und ein Kompromiss gefunden wird. Eine Interviewpartnerin argumentierte darüber hinaus, dass es in manchen Berufen sinnvoll wäre, nicht die Arbeitsstunden, sondern die erbrachte Leistung zu honorieren. So erledige sie häufig vor Ende der Arbeitszeit alle Aufgaben und müsse dann warten, bis sie nach Hause gehen dürfe. Da andere Autistinnen in der durchgeführten Studie berichteten, dass das Gefühl von Untätigkeit großen Stress und Unbehagen auslöst, könnte Autist:innen in solchen Fällen die Möglichkeit eingeräumt werden, den Arbeitstag vorzeitig zu beenden, bzw. sollte ihnen gesagt werden, dass sie ohne

Bedenken nach Hause gehen dürfen. Andernfalls könnten ihnen zusätzliche Arbeitsaufgaben angeboten werden.

Im Zusammenhang mit dem Arbeitsort äußerten die Autistinnen häufig den Wunsch nach Home-Office-Möglichkeiten bzw. hybriden Arbeitsmodellen. Manche möchten diese Option selbstbestimmt in Anspruch nehmen, d.h. die Befragten gaben an, dass sie an Tagen, an denen soziale Interaktionen zu belastend sind, selbst entscheiden möchten, dass sie von zu Hause arbeiten. Andere bevorzugen eine vorstrukturierte Aufteilung von Home-Office und Präsenzarbeit durch die vorgesetzte Person. Dies wurde begründet mit der Aussage, dass es hilfreich wäre, soziale Interaktionen grundsätzlich durch die Arbeit im Home-Office zu reduzieren, wenn keine Gruppenarbeiten oder Besprechungen stattfinden, die einen persönlichen Austausch erfordern. Dem wurde hinzugefügt, dass gerade durch die Corona-Pandemie ohnehin viel Arbeit online erledigt wird, Vorgesetzte dennoch verlangen, dass die Arbeitnehmer:innen im Büro erscheinen. Aus diesem Grund schlug eine Autistin vor, *„eine klare Struktur zu haben: ‚Ok, heute sind wir alle da, weil wir brauchen den persönlichen Austausch und morgen arbeiten wir alle an unserem Projekt alleine zu Hause.‘ zum Beispiel."* (IP7, Pos. 83). Eine neurotypische Befragte sprach sich für eine Strukturierung der Home-Office-Vereinbarungen aus und fügte hinzu, dass zumindest ein Teil der Arbeitszeit im Büro verbracht werden sollte, um Isolation zu vermeiden. Auch hier sollten also die Möglichkeiten und Bedürfnisse sowohl der Organisation als auch der autistischen Arbeitnehmer:innen individuell besprochen werden. Zusätzlich gab die andere neurotypische Expertin an, dass die vorgesetzte Person bzw. die Ansprechperson für Fragen bei Home-Office-Arbeit jederzeit per Chat oder Mail erreichbar sein sollte, da viele Autist:innen ungern telefonieren und bei Unklarheiten sonst unproduktiv werden.

5.5. Zusammenfassende Betrachtung

Die Ergebnisse der vorliegenden Masterarbeit sind in Tabelle 9 in ihrer Gesamtheit zusammengefasst. Die farblich unterlegten Inhalte des Modells ergaben sich aus den durchgeführten Interviews und stellen somit eine induktive Erweiterung der theoretischen Grundlage dar.

Wie eingangs erläutert, sind nach wie vor viele undiagnostizierte Autist:innen am Arbeitsmarkt beschäftigt. Auch die Offenlegung der Autismus-Diagnose im Arbeitsumfeld ist für Betroffene ein sensibles Thema und die meisten autistischen Befragten würden – außerhalb von autismusspezifischen Stellenvermittlungen – davon absehen, zu Beginn eines neuen Arbeitsverhältnisses über ihre Diagnose zu sprechen. Aus diesem Grund sollten Arbeitgeber:innen des allgemeinen Arbeitsmarktes in Österreich Autismus-inklusive Praktiken unabhängig von einer offiziellen und bekannten Beschäftigung einer autistischen Arbeitnehmer:in einführen. Hierfür sprechen vor allem drei Argumente. Erstens handelt es sich laut den Interviewpartnerinnen bei Menschen im Autismus-Spektrum um Arbeitnehmer:innen mit Fähigkeiten und Stärken, die für Arbeitgeber:innen von großem Vorteil sein können, wenn sie richtig eingesetzt werden. Auf die Frage, wel-

che ihrer Fähigkeiten im Arbeitsleben nützlich sein könnten, nannten die Autistinnen u.a. ihr logisch-analytisches Denken, ihre strukturierte Arbeitsweise, ihre Detailorientierung und die damit verbundene Problemlösungsfähigkeit, ihre Konzentrationsfähigkeit sowie ihr hohes Engagement und Verantwortungsbewusstsein. Entgegen fälschlicher Stereotype berichteten einige der autistischen Frauen zudem, sich gut in andere Menschen hineinversetzen zu können und ein Gespür für die Bedürfnisse anderer zu haben. Eine weitere Qualität von Autist:innen ist, dass sie sich nicht mit Mikropolitik oder Intrigen befassen, wodurch die Leistung von Arbeitsgruppen potenziell erhöht wird. Die neurotypischen Befragten fügten hinzu, dass autistische Beschäftigte eine große Loyalität gegenüber guten Arbeitgeber:innen empfinden *„und das ist in heutiger Zeit ein wirkliches Asset"* (IP9, Pos. 53). Von Menschen mit Autismus als attraktive Arbeitgeber:in bewertet zu werden, bedeutet also, wertvolle Arbeitskräfte anzuziehen.

Zweitens betonten sowohl die neurodivergenten als auch die neurotypischen Expertinnen, dass nicht nur eine kleine Minderheit in Organisationen von den in dieser Arbeit vorgeschlagenen Veränderungen profitiert, sondern die gesamte Belegschaft, da sich die Bedürfnisse verschiedener Personengruppen in vielen Punkten ähneln. *„Grundsätzlich wäre das für jeden Menschen besser, wenn das Onboarding viel Zeit hätte"* (IP9, Pos. 53). Das folgende Zitat ist ein weiteres Beispiel:

> *Einen Arbeitsplatz [so] zu gestalten, dass sich jemand wie ich wohlfühlt, das kann für alle von Vorteil sein. Also dass ein Arbeitsplatz ruhig ist, dass die Atmosphäre angenehm ist, dass das Licht nicht flackert und nicht extrem hell ist, dass Gerüche nicht unbedingt penetrant sind, [...] das hilft ja nicht nur neurodivergenten, sondern auch neurotypischen Menschen dabei, produktiver zu sein.* (IP6, Pos. 45)

Drittens handelt es sich bei dem Großteil des Aufklärungs- und Anpassungsbedarfs um kostenlose Maßnahmen ohne Kapitalbindung. Diese können zwar anfangs zeitaufwändiger sein als herkömmliche Methoden, erweisen sich aber als lohnenswert aufgrund der ersten beiden Argumente. Selbst Autismus-Schulungen, die mit einem höheren organisatorischen Aufwand einhergehen, zahlen sich nach den Erfahrungen der neurotypischen Expertinnen unter Berücksichtigung der individuellen Merkmale der beschäftigten Autist:innen meist langfristig aus und können vereinzelt kostenlos durchgeführt werden. Außerdem treten Schwierigkeiten mit autistischen Arbeitnehmer:innen laut den Befragten bei adäquaten Arbeitsbedingungen signifikant seltener auf.

Abschließend ist darauf hinzuweisen, dass die befragten Autistinnen einerseits unterschiedlich alt sind und über unterschiedliche formale Bildungsniveaus verfügen sowie andererseits Berufserfahrungen in verschiedenen Branchen und Arbeitsumfeldern vorweisen können. Dazu gehören u.a. der Bildungs- und Forschungssektor, der Gesundheitssektor und verschiedene Bereiche des Dienstleistungssektors. Durch die Beleuchtung ihrer Perspektiven stellte sich heraus, dass der

Rahmenbedingungen		
- Authentische Organisationskultur geprägt von Inklusion, Offenheit, Lern- & Hilfsbereitschaft, Empathie, Wertschätzung, Respekt & ohne sozialen Zwang, unabhängig von der Offenlegung einer Diagnose - Schulungen für Führungskräfte & Mitarbeiter:innen zur Aufklärung über Autismus & Entstigmatisierung - Individualisierte Unterstützungen wie Jobcoaching für Menschen im Autismus-Spektrum für Arbeitsplatzsuche & -vermittlung, Kompetenzerweiterung, verbesserte Kommunikation, Erklärung über angemessenes Verhalten/ungeschriebene soziale Regeln - Fit zwischen Person & Branche; Fähigkeiten, Interessen & Organisation; sowie Person & Organisation		

Recruiting-Phase	Onboarding-Phase	Retention
Unterstützung durch Expert:in für Organisation & für Autist:in (z.B. Begleitung zum Vorstellungsgespräch)	Unterstützung durch Expert:in für Organisation & für Autist:in; Mitarbeiter:in als Mentor:in	Unterstützung durch Expert:in für Organisation (z.B. für Job-Matching); Unterstützung & Supervision durch Expert:in (falls erforderlich Einzelbetreuung), Kolleg:innen & Vorgesetzte für Autist:in; Vertrauensperson für Anliegen & organisationale Veranstaltungen
Stellenausschreibungen: - Übersichtliches Layout - Ohne unnötige Qualifikations-anforderungen - Präzise Informationen zu Anforderungen & Aufgabenbereichen - Informationen zu Arbeitszeiten & -umfeld, Möglichkeiten zu Arbeitsplatzanpassungen & Home-Office, Vertragsform - Inklusion wird betont	Struktur: - Ausreichend Zeit - Klar kommunizierter Ablauf - Frühe, schrittweise Aufgabenzuteilung (nicht nur Zusehen); Online-Plattform zur weiteren Einschulung - Dezidierte Zeit für Fragen - Geregeltes, schrittweises Kennenlernen der Kolleg:innen	Routine und Struktur: - Transparente Arbeitsstruktur, klare Kommunikationswege - Ein:e Vorgesetzte, kleine Teamgröße - Schriftlicher Arbeitsplan für Tag/Woche/Monat - (Interaktive) To-Do-Listen, Kalender, Benachrichtigungen - Vorbereitung auf neue Aufgaben & Veränderungen
Informationen über Ablauf beim Auswahlverfahren, grobe Gesprächsthemen, idealerweise Fragen; Möglichkeit zur Vorab-beantwortung von Fragen	Kommunikation: - Schriftliche Informationen über Aufgaben - Klärung der Arbeitszeiten nach 1-2 wöchiger Einfindungsphase - Ermutigung, nach Hilfe zu bitten, Fragen zu stellen & eigene Bedürfnisse darzulegen (z.B. mit Hilfe von Checklisten) - Ermutigung zum Feedback - Schriftliche & mündliche Erklärung des Organisationsleitbildes & der ungeschriebenen sozialen Regeln (z.B. mit Hilfe von Sozial-geschichten)	Aufgaben: - Fordernde, qualifikationsgerechte Aufgaben mit klar abgegrenztem Verantwortungsbereich - Ggf. Umstrukturierung der Arbeitsrolle - (Unterstützung bei) Aufgabenpriorisierung & -sequenzierung - Geregelte Abwechslung; kein Multitasking, wenige Unterbrechungen, (selbstbestimmte) Pausen - Selbstständigkeit & Unabhängigkeit - Weiterentwicklungsmöglichkeiten (z.B. Schulungen)
Auswahlverfahren: - Angenehme Atmosphäre - Hohe Struktur - Kurze, präzise fachliche Fragen/Anweisungen ohne Abstraktion/Ambiguität - Alternative zum Gespräch (z.B. Arbeitsprobe); relevante Aufgabenstellung zur Einschätzung der Fähigkeiten & Selektion nach bester Lösung - Klare Zeitrahmen		Kommunikation: - Klarer & präziser mündlicher & schriftlicher Kontakt & (Schritt-für-Schritt-) Anweisungen, ggf. mit visuellen Darstellungen - Schriftliche Agenden & Protokolle für Besprechungen - Klarheit über Erwartungen & Formulierung von Zielen - Regelmäßige & offene (informelle) Kommunikation mit Vorgesetzten & Kolleg:innen, Art & Häufigkeit nach individuellen Bedürfnissen - Flexible Kommunikation ohne persönlichen Kontakt (z.B. E-Mails, Chats) - Direktes, konstruktives, einfühlsames Feedback mit Vorbereitungszeit; Stärkung des positiven Verhaltens & Ermutigung
Bekanntgabe bei Absage		Sensorische Sensibilität: - Vermeiden von großen, offenen Büroräumen; festgelegte Arbeitsplätze & -büros, ggf. Einzelarbeitsplätze; Ruhe, genug Platz - Individuelle Gestaltung des Arbeitsumfeldes - (Dynamische) Anpassung der Umgebung (z.B. durch Jalousien & Temperaturregler) - Kopfhörer mit Möglichkeit zum Musikhören
		Stress: - Vereinbarte Kommunikation zur Vermittlung des Stressniveaus (z.B. Emoticons, Schlüsselwörter) - Entwicklung individueller Stressbewältigungs- & Problemlösungsstrategien - Ruheraum bzw. Entspannungsbereich
		Arbeitszeit und Arbeitsort: - Flexibilität bei Arbeitszeitpräferenzen; Möglichkeit zur Teilzeitarbeit; fixe Arbeits-/Gleitzeitregelungen; wenig/keine Überstunden - Hybrid-Arbeit, Home-Office-Arbeit & Sicherstellung der Erreichbarkeit der Ansprechperson

Tabelle 9: Rahmenbedingungen und Aufklärungs- und Anpassungsbedarf für eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum am regulären Arbeitsmarkt

identifizierte Aufklärungs- und Anpassungsbedarf am ersten Arbeitsmarkt in Österreich unabhängig von Alters- und Bildungsgruppen oder Branchen konstant ist. Trotz der Tatsache, dass das hier vorgestellte Modell nicht vollständig auf alle Berufssparten anwendbar ist – eine Autistin mit Berufs-erfahrung in der Gastronomie meinte dazu: *„Ich kann mein Schnitzel nicht von zu Hause kochen.“* (IP6, Pos. 63) – ist die Relevanz und der Nutzen der Umsetzung dieser Veränderungsbedarfe österreichweit gegeben.

6. Diskussion

Nach der Darstellung der Ergebnisse der vorliegenden qualitativen Forschungsarbeit werden diese nun mit den Modellen der Literaturgrundlage verglichen. Dabei werden vor allem Gemeinsamkeiten und Unterschiede zu den Studien von Dreaver et al. (2020), Tomczak (2022) und Tomczak et al. (2021) herausgearbeitet. Dies wird durch Erkenntnisse aus weiterer relevanter Literatur ergänzt. Abschließend werden die Limitationen und Implikationen dieser Studie aufgezeigt.

Die Ergebnisse im Bereich der Rahmenbedingungen stehen in klarem Zusammenhang mit den übergreifenden Themen ‚Wissen über und Verständnis für Autismus', ,Arbeitsumfeld' und ,Job Match' für eine erfolgreiche Beschäftigung von Autist:innen, die von Dreaver et al. (2020, S. 1660) herausgearbeitet wurden. Ersteres bezieht sich auf eine offene Haltung gegenüber Arbeitnehmer:innen im Autismus-Spektrum, die u.a. durch Autismus-Schulungen erzielt werden kann (Dreaver et al., 2020, S. 1660f. Tomczak et al., 2021, S. 6). Auch in der vorliegenden Studie sahen die Befragten eine inklusive Organisationskultur sowie die Sensibilisierung für die Bedürfnisse und Besonderheiten von Autist:innen als Grundlage für den Beschäftigungserfolg. Gleichermaßen wurde die Bewusstseinsförderung über Autismus am Arbeitsmarkt von Romualdez et al. (2021, S. 163f.), Hayward et al. (2019b, S. 56) und Khalifa et al. (2019, S. 12) als grundlegend für eine erfolgreiche Unterstützung autistischer Arbeitnehmer:innen durch neurotypische Vorgesetzte und Kolleg:innen erkannt. Sarrett (2017) schlägt konkrete Inhalte für Autismus-Trainings am Arbeitsplatz vor. Tomczak et al. (2021, S. 6) schreiben, dass Schulungen vor der ersten Einstellung einer autistischen Person durchgeführt werden sollten. Die Empirie der vorliegenden Arbeit hat jedoch gezeigt, dass viele Betroffene ihre Diagnose aus verschiedenen Gründen, z.B. aus Angst vor Stigmatisierung, nicht preisgeben wollen. Verschiedene Forschungsarbeiten unterstreichen diese Tatsache (Lindsay et al., 2021, S. 607; Romualdez et al., 2021, S. 163; Khalifa et al., 2019, S. 14; Fielden et al., 2020, S. 335; Tomas et al., 2022, S. 12; Sarrett, 2017). Ein ebenso wichtiger Faktor, der in der bisherigen Forschung oftmals unberücksichtigt bleibt, ist, dass viele Autist:innen erst im Erwachsenenalter diagnostiziert werden. Entgegen dem Vorschlag von Tomczak et al. (2021, S. 6) wird es deshalb in dieser Arbeit als notwendig erachtet, zumindest allgemeine Diversitätstrainings am Arbeitsplatz, die u.a. auch unsichtbare Beeinträchtigungen thematisieren, unabhängig von einer bekannten Beschäftigung einer Autist:in durchzuführen. Ähnlich zur Aussage einer autistischen Interviewpartnerin erwähnt Sarrett (2017), dass Seminare zum Thema Behinderung für alle Akteur:innen des Arbeitsmarktes verpflichtend sein sollten. Romualdez et al. (2021, S. 163f.) argumentieren überdies, dass Organisationen mehr Verantwortung in Bezug auf günstige Bedingungen für die Offenlegung übernehmen sollten.

Für Dreaver et al. (2020, S. 1661f.) beinhaltet das ‚Arbeitsumfeld' nicht nur die Beachtung der physischen Umgebung und sensorischer Sensibilitäten, sondern auch professionelle Unterstützung für Organisationen und autistische Arbeitnehmer:innen; klare Kommunikationsstile; die Einführung bzw. Aufrechterhaltung von Routine und Struktur; sowie eventuelle Änderungen der Arbeitsrolle. Tomczak et al. (2021) und Tomczak (2022) behandeln die meisten dieser Maßnahmen und gehen näher auf die Art der Kommunikation ein, die das Stresslevel von Autist:innen reduzieren kann. Die Beachtung dieser Aspekte konnte jedenfalls durch die Befragungen der neurodivergenten und neurotypischen Teilnehmerinnen der aktuellen Forschung bestätigt werden. Diverse andere Forschungsarbeiten behandeln die von Dreaver et al. (2020, S. 1661f.) genannten Faktoren: Waisman-Nitzan et al. (2021, S. 6), Hurley-Hanson et al. (2020, S. 245, 248f.) und Lindsay et al. (2021, S. 605f.) thematisieren z.B. die Anpassung an sensorische Sensibilität durch Veränderung der Arbeitsumgebung sowie die Relevanz von Vorhersehbarkeit im Arbeitsalltag; u.a. Raymaker et al. (2023, S. 11), Waisman-Nitzan et al. (2021, S. 6), Hurley-Hanson et al. (2020, S. 245) und Khalifa et al. (2019, S. 11) nennen klar definierte Aufgaben und präzise Kommunikation; Veränderungen der Arbeitsrolle wie die Vermeidung von direktem Kund:innenkontakt werden z.B. von Khalifa et al. (2019, S. 11) angeführt.

Zusätzlich beleuchten Dreaver et al. (2020, S. 1663) im Zusammenhang mit dem ‚Arbeitsumfeld' die Vorbereitung von Autist:innen auf die Arbeitswelt durch Trainings über Arbeitsplatzgrundlagen, Geschäftssprache und Transport. Dabei blieb erneut unberücksichtigt, dass eine hohe Zahl nicht diagnostizierter Betroffener ohne Wissen über ihren Autismus in die Arbeitswelt eintritt. In der vorliegenden Arbeit erfolgte diesbezüglich eine differenziertere Betrachtung. Weiters gaben zwar einige österreichische Autistinnen an, von autismusspezifischer Unterstützung profitieren zu können, allerdings bezogen sich gewünschte Leistungen auf andere und zumeist komplexere Problemstellungen wie z.B. die Arbeitsplatzsuche. Ein möglicher Grund für diese Diskrepanz sind Unterschiede im Unterstützungsbedarf bedingt durch die Symptomausprägung der Personen im Fokus unterschiedlicher Studien. In Bezug auf Unterstützungsangebote haben Micai et al. (2022, S. 1) in einer quantitativen Studie im Rahmen des Projekts ‚Autism Spectrum Disorder in the European Union' untersucht, inwieweit Menschen im Autismus-Spektrum mit unterschiedlichen Symptomausprägungen über autismusspezifische Angebote informiert sind und welche Verbesserungsmöglichkeiten diesbezüglich bestehen. Die Ergebnisse deuten darauf hin, dass weniger als zehn Prozent der befragten Autist:innen und ihrer Erziehungsberechtigten über gute und lokale berufliche Unterstützungen Bescheid wissen, und dass der Bedarf an diesen Dienstleistungen im Vergleich zu anderen autismusspezifischen Angeboten an zweiter Stelle steht (Micai et al., 2022, S. 2, 13). Außerdem zeigte die Literaturrecherche der Autor:innen, dass eine generelle Unzufriedenheit über die Inhalte von Berufstrainingangeboten besteht (Micai et al., 2022, S. 2). Dies steht im Zusammenhang mit der Erkenntnis der vorliegenden Arbeit, dass die Informationsbereitstellung über autismusspezifische berufliche Integrationsmaßnahmen

für Betroffene transparenter gestaltet werden sollte.

Der ‚Job Match' von Dreaver et al. (2020, S. 1663) ähnelt dem hier identifizierten ‚Fit', wobei sich die Begriffe in ihrer Definition unterscheiden. Dreaver et al. (2020, S. 1663) definieren den Job Match nicht nur als Übereinstimmung zwischen der Arbeitsrolle und den Fähigkeiten und Interessen der autistischen Beschäftigten, sondern sie schließen hierbei auch fordernde Arbeitsaufgaben und Möglichkeiten zur Weiterentwicklung ein. In der vorliegenden Arbeit werden letztere Punkte separat in der Kategorie Retention dargelegt. Griffiths et al. (2020, S. 18) schreiben ebenso über Entwicklungschancen und betonen die Wichtigkeit gleicher Möglichkeiten für die gesamte Belegschaft, sowohl für neurotypische als auch für neurodivergente Mitarbeiter:innen. Ähnlich wie Dreaver et al. (2020, S. 1663) stellten Hayward et al. (2019b, S. 53f.) fest, dass ein Person-Organisation-Fit für Menschen mit Autismus gegeben sein muss, und sie assoziieren den Fit mit Entwicklungsmöglichkeiten und angemessener Bezahlung sowie mit sonstigen geeigneten Arbeitsbedingungen. Hayward et al. (2019a, S. 301) stellen in einer zweiten Arbeit, in der die Sichtweisen autistischer Frauen mit denen neurotypischer Frauen und autistischer Männer verglichen wurden, fest, dass autistische Frauen in der Arbeitswelt einerseits nach einem Fit bzw. einer Passung zwischen der Person und der Arbeit und andererseits nach einem Fit zwischen der Person und der Umgebung suchen. Somit kann eine Übereinstimmung zwischen den Erkenntnissen von Hayward et al. (2019a, S. 301) und denen aus der vorliegenden Arbeit hinsichtlich der Erfahrungen von Frauen mit Autismus auf dem allgemeinen Arbeitsmarkt festgehalten werden. So berichteten neurodiverse Frauen in beiden Erhebungen zudem, von Unterbeschäftigung betroffen zu sein oder inadäquaten beruflichen Tätigkeiten nachzugehen (Hayward et al., 2019a, S. 302). Obwohl in der Literaturrecherche von Khalifa et al. (2019, S. 11) keine geschlechtsspezifischen Unterschiede gemacht wurden, gaben die Autor:innen gleichermaßen an, dass knapp die Hälfte der Menschen im Autismus-Spektrum für ihren Beruf überqualifiziert ist, verglichen mit ca. 20 Prozent bei neurotypischen Menschen. Fordernde und qualifikationsgerechte Aufgaben für autistische Arbeitnehmer:innen werden demnach in verschiedenen wissenschaftlichen Arbeiten als wichtig eingestuft. In Verbindung mit dem Person-Organisation-Fit ist außerdem anzumerken, dass Hayward et al. (2019b, S. 56) vermuten, dass eine späte Diagnose von Autismus und das damit verbundene fehlende Bewusstsein für die eigenen Bedürfnisse ein Grund dafür sein kann, dass Betroffene inkompatible Karrierewege wählen. Diese Annahme konnte durch die Teilnehmerinnen der vorliegenden Studie bestätigt werden.

Auch der in der Masterarbeit aufgezeigte Aufklärungs- und Anpassungsbedarf der Rekrutierungsprozesse von Organisationen entspricht grundsätzlich der theoretischen Grundlage und ergänzt diese. So deckt sich die vorliegende Studie mit jener von Tomczak et al. (2021, S. 5) in Bezug auf die neurodiversitätsgerechte Gestaltung von Stellenanzeigen, wobei die Ergebnisse der Masterarbeit darauf hindeuten, dass einerseits ein höherer Informationsbedarf besteht als in

der Theorie thematisiert wird, und andererseits Autist:innen weniger Wert auf die Vermeidung von Fachjargon und eine einfache Gestaltung der Anzeige legen. Die Forschung in Österreich hat weiters erstmals gezeigt, dass Personalverantwortliche bei der Einladung zu Auswahlverfahren wie Vorstellungsgesprächen oder Arbeitsproben möglichst viele Informationen über den Ablauf und die Gesprächsthemen zur Verfügung stellen sollten. Griffiths et al. (2020, S. 18) schreiben z.B. lediglich, dass Arbeitgeber:innen für einen unterstützenden Rekrutierungsprozess sorgen sollten und es für Autist:innen nicht ausreicht, nur darauf hingewiesen zu werden, dass das Vorstellungsgespräch autismusfreundlich ablaufen wird. Darüber hinaus wünschten sich die autistischen Studienteilnehmerinnen, über eine etwaige Absage informiert zu werden, was nach Kenntnis der Autorin in der bisherigen Forschung nicht genannt wurde.

Im Allgemeinen betonen Tomczak et al. (2021, S. 5), dass eine kompetenzbasierte Personalauswahl erfolgen sollte anstatt einer Auswahl, die auf den bisherigen Erfolgen der potenziellen Arbeitnehmer:innen basiert. Ähnlich beschreibt Sarrett (2017), dass Menschen aus dem Autismus-Spektrum eine Fokussierung auf fachliche Qualifikationen bevorzugen. Krzeminska und Hawse (2020, S. 247) listen beispielhaft ‚Autism at Work'-Programme und Auswahlverfahren von vier Best-Practice-Unternehmen auf, die auf den Fähigkeiten der Arbeitssuchenden basieren und größtenteils Alternativen zu Bewerbungsgesprächen darstellen. Die Erkenntnisse von Dreaver et al. (2020, S. 1661) und Tomczak et al. (2021, S. 5), aber ebenso von anderen Forscher:innen wie Sarrett (2017) und Raymaker et al. (2023, S. 11) deuten auf die Vorteile und Möglichkeiten alternativer Selektionsverfahren hin. Diese Ergebnisse decken sich mit den Aussagen der autistischen Interviewpartnerinnen dieser Studie. Im Gegensatz zu Tomczak et al. (2021, S. 6) wiesen die Teilnehmerinnen der vorliegenden Studie jedoch nicht darauf hin, dass ein vorgegebener Zeitrahmen für die Ausführung von Anweisungen bei Selektionsverfahren sinnvoll wäre. Manche der autistischen Frauen erwähnten lediglich, dass sie aufgrund von zusätzlich zum Autismus vorliegenden ADHS von der zuvor gestellten Interviewfrage abgelenkt waren. Ob eine zeitliche Vorgabe in der Praxis für die Betroffenen hilfreich oder belastend ist, erläuterten die von Tomczak et al. (2021) befragten neurotypischen Autismus-Expert:innen und Vorgesetzten von Autist:innen nicht. Vor dem Hintergrund, dass die Maßnahmen autismusspezifischer beruflicher Unterstützungsdienstleistungen von Menschen mit Autismus schlechter bewertet werden als von dem Personal solcher Dienste, wird deutlich, dass Betroffene in die entsprechende Forschung einbezogen werden sollten (Nicholas, Zwaigenbaum et al., 2018, S. 8).

Beim Vergleich verschiedener wissenschaftlicher Untersuchungen muss außerdem auf Unterschiede in der Thematisierung ähnlicher Aspekte geachtet werden. Während die vorliegende Studie zum Schluss kommt, dass von Gruppeninterviews abzuraten ist, schreiben Tomczak et al. (2021, S. 6), dass praktische Kompetenztests in einer Gruppe von Menschen mit Autismus zielführend sein können. Im Unterschied

zur vorliegenden Arbeit wird dabei jedoch die gezielte Rekrutierung potentieller autistischer Mitarbeiter:innen und daher die gemeinsame Beurteilung dieser Personen in einer Gruppe behandelt. Da die meisten autistischen Befragten aus der aktuellen Forschung vielmehr die Erfahrung gemacht haben, dass Arbeitgeber:innen in Österreich gegenüber Autist:innen grundsätzlich verschlossen sind, wurde die gezielte Rekrutierung von Autist:innen nur am Rande behandelt. Die vorliegenden Ergebnisse deuten jedenfalls darauf hin, dass Interviews mit neurotypischen und neurodiversen Arbeitssuchenden in einer Gruppe vermieden werden sollten.

Insbesondere im Bereich des autismusfreundlichen Onboardings ergaben sich aus den Befragungen der autistischen Frauen in Österreich notwendige Maßnahmen, die von den Autor:innen des theoretischen Rahmens nicht behandelt werden. Diese Maßnahmen beziehen sich vorwiegend auf die Strukturierung des Onboarding-Prozesses und die Kommunikation in der Einarbeitungsphase. Martin et al. (2022, S. 6f.) stellen in ihrer Untersuchung fest, dass eine konstruktive Kommunikation in der Einarbeitungsphase, die oftmals erst durch den Einsatz von Job Coaches bzw. Autismus-Expert:innen gelingt, grundlegend für positive Beziehungen zwischen Vorgesetzten, Kolleg:innen und autistischen Mitarbeiter:innen ist. Laut den Forscher:innen können so Missverständnisse und Unsicherheiten seitens neurotypischer Vorgesetzter beseitigt werden, wie es ebenso in dieser Arbeit dargelegt wird (Martin et al., 2022, S. 7). Des Weiteren stellt die Bereitstellung einer Online-Plattform zur ergänzenden Einschulung eine Erweiterung der Theorie, insbesondere von Tomczak (2022), bezüglich technologischer Lösungen zur Verbesserung der Arbeitsmarktsituation von Menschen mit Autismus dar. Hinsichtlich des Einsatzes einer Mentor:in, der Ermutigung zur Bedürfniskommunikation und der Erklärung ungeschriebener Regeln stimmen die Erkenntnisse der vorliegenden Untersuchung mit denen der theoretischen Grundlage überein (Tomczak et al., 2021, S. 6). Auch Petty et al. (2022, S. 2) betonen die Bedeutung der Darlegung ungeschriebener Regeln zur Vermeidung von Kommunikationsschwierigkeiten. Zudem steht der hier identifizierte Bedarf nach der Erklärung des Organisationsleitbildes, d.h. der Philosophie, nach der die Beschäftigten arbeiten, in Einklang mit den Ergebnissen der Literaturrecherche von Khalifa et al. (2019, S. 11). Insgesamt sind keine Widersprüche erkennbar.

Der Großteil des Aufklärungs- und Anpassungsbedarfs von Arbeitgeber:innen in Österreich zugunsten eines Autismusinklusiven Arbeitsmarktes besteht bei der Retention von autistischen Mitarbeiter:innen. Der Aufklärungs- und Anpassungsbedarf, der induktiv identifiziert wurde und somit nicht durch den theoretischen Rahmen gegeben war, betrifft vor allem die Arbeitsaufgaben von Autist:innen und Aspekte des Arbeitslebens, die nicht direkt mit den Arbeitsaufgaben zusammenhängen, wie z.B. der Umgang mit informellen Veranstaltungen der Organisation und Pausen. So wünschten sich die meisten Autistinnen, Pausen selbstbestimmt und regelmäßig einlegen zu können. Darüber hinaus schreiben Khalifa et al. (2019, S. 11), dass Vorgesetzte oder Autismus-Coaches mit Vorschlägen bei der Strukturierung ansonsten

unstrukturierter Zeit helfen können, wenn dies für Beschäftigte im Autismus-Spektrum eine Schwierigkeit darstellt. Ähnlich schlagen Wehman et al. (2016, S. 69) Strategien u.a. zur Handhabung von Pausen vor, die die Unabhängigkeit von autistischen Arbeitnehmer:innen fördern.

Die meisten der von Dreaver et al. (2020), Tomczak (2022) und Tomczak et al. (2021) vorgeschlagenen Maßnahmen nach der Integrationsphase konnten durch die qualitative Datenerhebung bestätigt werden. So wird in allen drei Arbeiten empfohlen, Arbeitnehmer:innen mit Autismus regelmäßig ehrliche, einfühlsame Rückmeldungen über die Ausführung von Aufgaben zu geben und sie durch Ermutigung in ihrem positiven Verhalten zu bestärken, was laut den autistischen Frauen in Österreich ein Gefühl der Sicherheit vermittelt (Dreaver et al., 2020, S. 1661; Tomczak, 2022, S. 1472; Tomczak et al., 2021, S. 7). Parr und Hunter (2014, S. 551) beschreiben ebenfalls, dass die Arbeitsleistung von Autist:innen durch Ermutigung gesteigert werden kann, wie es beim ‚transformational Leadership‘ praktiziert wird.

Insbesondere Tomczak (2022, S. 1475), aber auch Dreaver et al. (2020, S. 1661) beschäftigen sich mit dem Umgang von hoher Stressbelastung autistischer Arbeitnehmer:innen. Tomczak (2022, S. 1475) schreibt dabei, dass Mitarbeiter:innen mit Autismus ein Stressmanagementtraining am Arbeitsplatz durchführen könnten, um Problemlösungsstrategien zu entwickeln. An dieser Stelle soll die Aussage einer der neurotypischen Expertinnen erwähnt werden. Sie sagte, dass für eine erfolgreiche Integration von Autist:innen in den Arbeitsmarkt die Perspektive der Organisationen bezüglich Kosten-Nutzen-Analysen bei der Implementierung etwaiger Maßnahmen berücksichtigt werden muss. Obwohl professionelle Stressmanagement-Trainings eine sinnvolle Lösung zur Reduktion des Stressniveaus von autistischen Arbeitnehmer:innen darstellen können, muss auch hier der organisatorische und finanzielle Aufwand beachtet werden. Der in dieser Arbeit vorgeschlagene Umgang mit Stresssituationen stellt im Vergleich dazu eine ressourcenschonende Alternative dar, die ebenso tragfähig sein kann. Darüber hinaus konnte der Vorschlag, Smartwatches zur Echtzeitmessung des Stresslevels im Arbeitsalltag einzusetzen, nicht bestätigt werden (Tomczak, 2022, S. 1475). Dies könnte daran liegen, dass solche Anwendungen in der Praxis nur selten eingesetzt werden.

Eine Diskrepanz der Ergebnisse besteht zwischen einem von Tomczak (2022, S. 1475) genannten Aspekt und der Mehrheit der diesbezüglichen Sichtweisen der neurotypischen und neurodiversen Interviewpartnerinnen. Tomczak (2022, S. 1475) argumentiert, dass eine Flexibilität hinsichtlich der Arbeitszeiten von autistischen Mitarbeiter:innen notwendig ist, wobei nicht die bei der Arbeit verbrachte Zeit, sondern die erledigten Aufgaben bewertet werden sollten. Flexible Arbeitszeiten werden auch von Khalifa et al. (2019, S. 11 f., 14) als Anpassung an die Bedürfnisse autistischer Arbeitnehmer:innen erwähnt, wobei keine Definition oder Erklärung des Begriffs erfolgt und an anderer Stelle dargelegt wird, dass sich Arbeitgeber:innen professionelle Unterstützung bei Veränderungen von Arbeitszeiten wünschen. Wäh-

rend eine befragte Autistin eine zeitliche Flexibilität befürwortete, wurde in der vorliegenden Forschung vorwiegend festgestellt, dass Menschen im Autismus-Spektrum ein hohes Bedürfnis nach Struktur und Vorhersehbarkeit haben, was durch flexible Arbeitszeiten gestört würde. Eine neurotypische Befragte war der Ansicht, dass Gleitzeitvereinbarungen von Autist:innen zwar häufig geschätzt werden, getroffene Vereinbarungen über Arbeitszeiten aber möglichst langfristig eingehalten werden sollten. Ein solcher Widerspruch zwischen Forschungsergebnissen deutet auf unterschiedliche Bedürfnisse von Menschen im Autismus-Spektrum hin und sollte näher untersucht werden, um keine fälschlichen Implikationen für die Praxis zu formulieren. Unabhängig von dieser Darstellung gilt die Erkenntnis der vorliegenden Arbeit, dass die meisten Autist:innen mit Teilzeitarbeit und maximal 32 Stunden pro Woche ihr volles Potenzial ausschöpfen können, wie auch andere Untersuchungen zeigen (Khalifa et al., 2019, S. 14).

Die empirischen Erkenntnisse der vorliegenden Masterarbeit wurden in Form eines umfassenden Rahmenwerks vorgestellt, das nicht nur konkrete Maßnahmen für Arbeitgeber:innen beinhaltet, sondern den gesamten österreichischen Arbeitsmarkt inklusive rechtlicher Bestimmungen und Unterstützungsangebote für Organisationen und Autist:innen betrachtet. Dennoch identifizierten die Autistinnen weitere Faktoren, die ihren Beschäftigungserfolg beeinflussen. So bestimmen familiäre Beziehungen und allgemeine Voraussetzungen, wie die finanzielle Situation und der kulturelle Hintergrund, aus dem eine Person kommt, aber auch Erfahrungen während der Schulzeit die Erfolgschancen im Erwachsenenleben. Autist:innen aus einkommensschwachen Familien; aus Gemeinschaften, in denen Behinderungen tabuisiert werden; aus Generationen, in denen noch wenig Wissen über Autismus vorhanden war und es deshalb keine adäquaten Diagnose- und Behandlungsmöglichkeiten gab; und mit stark negativen Erfahrungen wie Mobbing und Diskriminierung haben demnach schlechtere Voraussetzungen als Personen, bei denen diese Faktoren nicht zutreffen. Diese Aspekte wurden aufgrund der Forschungsfrage und der Zielsetzung der Arbeit nicht in das Modell aufgenommen. Es sei allerdings auf die Forschungsarbeiten von Nicholas, Mitchell et al. (2018) und Johnson et al. (2020) verwiesen. Beide Studien verfolgen einen ‚Ökosystem-Ansatz', der die Faktoren, die den Übergang und den Erfolg von Menschen mit Autismus in der Arbeitswelt unterstützen oder behindern, ganzheitlich betrachtet.

Abseits von konkret erforderlichen Veränderungen des regulären Arbeitsmarktes nennen Forscher:innen Argumente für die Schaffung eines Autismus-inklusiven Arbeitsmarktes. Hayward et al. (2019b, S. 56) stellen beispielsweise fest, dass es für Menschen mit und ohne Autismus gleichermaßen wichtig ist, einen Arbeitsplatz zu haben, an dem sie akzeptiert und unterstützt werden und an dem eine klare Kommunikation herrscht. Die Autor:innen argumentieren daher, dass die Berücksichtigung der Bedürfnisse von Mitarbeiter:innen mit Autismus am Arbeitsplatz als gute Praxis für alle Mitarbeiter:innen gesehen werden kann (Hayward et

al., 2019b, S. 56). Zu ähnlichen Ergebnissen kommen Krzeminska et al. (2020, S. 60f.). Auch Tomczak (2022, S. 1478) vertritt diese Ansicht. Analog dazu betonten einige Interviewpartnerinnen der vorliegenden Studie, dass neurotypische Mitarbeiter:innen genauso von einer autismusfreundlichen Praxis profitieren. Die Befragten von Petty et al. (2022, S. 5ff.) sind zudem der Meinung, dass gleiche Chancen für die gesamte Belegschaft das Gefühl von Fairness fördern. Umgekehrt schreiben Hurley-Hanson et al. (2020, S. 246), dass Autismus-inklusive Initiativen scheitern können, wenn nicht alle Mitarbeiter:innen einbezogen werden. Lindsay et al. (2021, S. 607), Khalifa et al. (2019, S. 14), Romualdez et al. (2021, S. 164) und Petty et al. (2022, S. 7) verbinden diese Thematik wiederum mit der Offenlegung von Autismus am Arbeitsplatz und stellen zum einen fest, dass die meisten autistischen Mitarbeiter:innen keine notwendigen Anpassungen erhalten, bevor sie ihre Diagnose offenlegen. Zum anderen merken die Forscher:innen an, dass ein Outing in einem grundsätzlich akzeptierenden und flexiblen Arbeitsumfeld nicht zwingend erforderlich ist, was den Druck von Autist:innen nehmen kann (Khalifa et al., 2019; Lindsay et al., 2021, S. 607; Romualdez et al., 2021, S. 164; Petty et al., 2022, S. 7). Spezielle Anpassungen sollten jedoch, wie auch in dieser Arbeit dargelegt, individualisiert und von Zeit zu Zeit mit der betroffenen Person – nicht notwendigerweise in Form eines persönlichen Gesprächs – evaluiert werden (Sarrett, 2017; Tomczak, 2022, S. 1476).

Entsprechend der Limitation verschiedener Studien wurden in der vorliegenden Arbeit Faktoren untersucht, die eine erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum auf dem allgemeinen Arbeitsmarkt begünstigen, und zwar aus Sicht der Betroffenen. Dennoch weist auch diese Masterarbeit Limitationen auf. Zunächst ist darauf hinzuweisen, dass für die Datenerhebung gezielt Frauen aus dem Autismus-Spektrum rekrutiert wurden, da diese Gruppe in der Literatur bisher wenig Beachtung findet. Dadurch blieben jedoch die Sichtweisen autistischer Männern und autistischer Menschen mit anderen Geschlechtsidentitäten unberücksichtigt. Auch die Fokussierung auf weibliche Betroffene mit geringer Symptomausprägung führte dazu, dass die Perspektiven von Personen mit höherem Unterstützungsbedarf nicht untersucht wurden. Des Weiteren handelt es sich um eine qualitative Studie mit einer relativ kleinen Stichprobe. Insgesamt sind die Ergebnisse also nicht repräsentativ für die Gesamtheit der Menschen im Autismus-Spektrum. Zukünftige Forschungsarbeiten mit einer größeren Anzahl von Teilnehmer:innen könnten daher überprüfen, inwiefern die hier identifizierten Lösungen für ein breiteres Spektrum von Autist:innen adäquat sind. Dabei könnten Dimensionen wie Alter, biologisches/soziales Geschlecht, Komorbiditäten, formales Bildungsniveau, Herkunft und familiäre Verhältnisse der befragten Autist:innen gezielt erfasst werden, um Gemeinsamkeiten und Unterschiede zwischen verschiedenen Personengruppen hinsichtlich ihrer Bedürfnisse festzustellen. So könnte das entwickelte Modell z.B. für autistische Arbeitnehmer:innen mit höherem Unterstützungsbedarf weiterentwickelt und ausgebaut werden. Weitere Studien soll-

ten den identifizierten Aufklärungs- und Anpassungsbedarf außerdem unter realen Arbeitsbedingungen in verschiedenen Branchen und Ländern testen und die Wirksamkeit der Maßnahmen messen. Da die vorliegende Untersuchung auch gezeigt hat, dass viele Arbeitgeber:innen nach wie vor verschlossen gegenüber vielfältigen Arbeitnehmer:innen sind, könnten neue Studien untersuchen, mit welchen Methoden der Arbeitsmarkt von den positiven Seiten einer vielfältigen Belegschaft überzeugt und zu positiven Veränderungen angeregt werden kann. Schließlich wird weder in der bestehenden Literatur noch in dieser Arbeit darauf eingegangen, wie die Beendigung von Arbeitsverhältnissen autismusfreundlich gestaltet werden kann (Scott et al., 2019, S. 6, 14). Zukünftige Modelle sollten auch diese Phase des Beschäftigungszyklus einbeziehen.

7. Conclusio

Durch die vorliegende Masterarbeit sollten neurotypische Personen für die Bedürfnisse von Menschen aus dem Autismus-Spektrum sensibilisiert werden. Dazu wurden autistische Frauen sowie zwei neurotypische Expertinnen befragt, um den notwendigen Aufklärungs- und Anpassungsbedarf am ersten Arbeitsmarkt in Österreich zu identifizieren. Ziel war es, inklusive berufliche Umfelder zu schaffen, damit Autist:innen der Zugang zum ersten Arbeitsmarkt erleichtert wird und sie langfristig einer erfüllenden beruflichen Tätigkeit nachgehen können. Die Erhöhung der Lebensqualität und Zufriedenheit von Menschen mit Autismus wurde als sekundäres Ziel der Arbeit gesehen.

In der Einleitung wurde die Bedeutung einer solchen wissenschaftlichen Untersuchung dargelegt. Hervorzuheben sind insbesondere die hohen Arbeitslosenquoten von Autist:innen, die auf verschiedene Barrieren des regulären Arbeitsmarktes zurückzuführen sind, sowie die erheblichen Folgen für die Betroffenen und die Gesellschaft im Allgemeinen. Umgekehrt bringen autismusfreundliche Praktiken Vorteile mit sich, die den Aufwand ihrer Umsetzung langfristig rechtfertigen. In Kapitel zwei wurden die für diese Arbeit zentralen Begriffe erläutert, um ein allgemeines Verständnis der Thematik zu erlangen. Zum einen wurden die Diagnosekriterien für Autismus, dessen Prävalenz und bekannte Komorbiditäten beschrieben. Zum anderen wurde Diversitätsmanagement definiert und dessen Ziele und Vorteile aufgezeigt. Der folgende Abschnitt behandelte den theoretischen Rahmen der Masterarbeit, bestehend aus drei aktuellen Modellen zur Beschäftigung von Menschen im Autismus-Spektrum. Die zugrunde liegenden wissenschaftlichen Untersuchungen befassen sich vorwiegend mit Formen der Aufklärung und Anpassung, die von Seiten der Arbeitgeber:innen vorgenommen werden können. Als Grundlage für die Analyse der erhobenen Daten wurden die Handlungsmaßnahmen der Forscher:innen zusammengefasst. Kapitel vier beinhaltet die Darstellung der Methodik der Masterarbeit einschließlich der relevanten forschungsethischen Aspekte. Es wurden sowohl die Stichprobenlogik, die Methode der Datenerhebung und -analyse als auch wichtige Informationen über die Studienteilnehmerinnen und die Datenerhebung dargelegt. Anschließend wurden die Ergebnisse des empirischen Teils der Masterarbeit präsentiert. Die detaillierte Darstellung der Sichtweisen der Expertinnen zu notwendigen Veränderungen am ersten Arbeitsmarkt erfolgte entsprechend der Phasen im Beschäftigungszyklus. D.h. es wurde anfangs auf die Rahmenbedingungen für ein funktionierendes Beschäftigungsverhältnis zwischen Arbeitgeber:innen und autistischen Mitarbeiter:innen eingegangen. Im Anschluss daran wurde der Aufklärungs- und Anpassungsbedarf in der Rekrutierungsphase, in der Einarbeitungsphase und nach der Integrationsphase von Organisationen beschrieben. In einer abschließenden Darstellung wurden die aus der Empirie abgeleiteten Argumente für die Umsetzung des Modells beleuchtet. In der Diskussion wurden die Ergebnisse dieser Arbeit mit Erkenntnissen aus der einschlägigen Literatur verglichen. Darüber hinaus wurden Limitationen und Implikationen der Forschung aufgezeigt.

Die Forschungsfrage „Berufstätigkeit mit Autismus: Welchen Aufklärungs- und Anpassungsbedarf haben Arbeitgeber:innen in Österreich aus Sicht von Frauen mit Autismus mit geringer Symptomausprägung?" kann nach dieser Ausführung folgendermaßen beantwortet werden: Menschen im Autismus-Spektrum brauchen mehr Klarheit in der Kommunikation, sie haben ein höheres Bedürfnis nach Struktur und Vorhersehbarkeit und sie benötigen in manchen Bereichen des Arbeitsalltags mehr Unterstützung als neurotypische Menschen. Arbeitgeber:innen des ersten Arbeitsmarktes sollten daher Maßnahmen setzen, um auf diese Bedürfnisse einzugehen und ein inklusives und verständnisvolles Arbeitsklima zu schaffen, das authentisch vertreten wird. Die Arbeitsverhältnisse sind dabei individuell an die beschäftigten Autist:innen anzupassen.

Die Perspektiven der autistischen Expertinnen sowie die Einblicke der neurotypischen Autismus-und-Arbeit-Expertinnen haben wesentlich zur Entwicklung eines umfassenden Modells für die erfolgreiche Beschäftigung von Menschen im Autismus-Spektrum am ersten Arbeitsmarkt in Österreich beigetragen. Die vorgestellten Maßnahmen können aber nicht nur das Wohlbefinden und die Produktivität von Arbeitnehmer:innen im Autismus-Spektrum fördern, sondern das Wohlbefinden und die Produktivität aller Mitarbeiter:innen.

Literatur

Abdul-Hussain, S., & Hofmann, R. (2013). Diversitätsmanagement. Verfügbar 14. Juli 2023 unter https://erwachsenenbildung.at/themen/diversitymanagement/

Bendl, R., & Hanappi-Egger, E. (2015). Kontextueller Rahmen. In W. Mayrhofer, G. Furtmüller & H. Kasper (Hrsg.), *Personalmanagement—Führung—Organisation* (5., aktualisierte Auflage). Linde.

Buckup, S. (2009). The price of exclusion: The economic consequences of excluding people with disabilities from the world of work.

Courchesne, V., Langlois, V., Gregoire, P., St-Denis, A., Bouvet, L., Ostrolenk, A., & Mottron, L. (2020). Interests and Strengths in Autism, Useful but Misunderstood: A Pragmatic Case-Study. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.569339

Dreaver, J., Thompson, C., Girdler, S., Adolfsson, M., Black, M. H., & Falkmer, M. (2020). Success Factors Enabling Employment for Adults on the Autism Spectrum from Employers' Perspective. *Journal of Autism and Developmental Disorders*, *50*, 1657–1667. https://doi.org/10.1007/s10803-019-03923-3

Dresing, T., & Pehl, T. (2011). Praxisbuch Transkription. Regelsysteme, Software und praktische Anleitungen für qualitative ForscherInnen. In *Praxisbuch Transkription. Regelsysteme, Software und praktische Anleitungen für qualitative ForscherInnen* (1., 15 ff.). Eigenverlag.

Dudley, C., Nicholas, D. B., & Zwicker, J. D. (2015). What do we know About Improving Employment Outcomes for Individuals with Autism Spectrum Disorder? *The School of Public Policy, University of Calgary*, *8*(32). https://doi.org/10.11575/sppp.v8i0.42538

Fielden, S. L., Moore, M. E., & Bend, G. L. (Hrsg.). (2020). *The Palgrave handbook of disability at work*. Palgrave Macmillan.

Flick, U. (2019). Gütekriterien qualitativer Sozialforschung. In N. Baur & J. Blasius (Hrsg.), *Handbuch Methoden der empirischen Sozialforschung* (2., vollständig überarbeitete und erweiterte Auflage). Springer VS.

Franken, S. (2015). *Personal: Diversity Management*. Springer Fachmedien. https://doi.org/10.1007/978-3-658-06797-7

Griffiths, A. J., Hanson, A. H., Giannantonio, C. M., Mathur, S. K., Hyde, K., & Linstead, E. (2020). Developing Employment Environments Where Individuals with ASD Thrive: Using Machine Learning to Explore Employer Policies and Practices. *Brain Sciences*, *10*(9), 632. https://doi.org/10.3390/brainsci10090632

Hayward, S. M., McVilly, K. R., & Stokes, M. A. (2019a). „I Would Love to Just Be Myself": What Autistic Women Want at Work. *Autism in adulthood: challenges and management*, *1*(4), 297–305. https://doi.org/10.1089/aut.2019.0020

Hayward, S. M., McVilly, K. R., & Stokes, M. A. (2019b). Autism and employment: What works. *Research in Autism Spectrum Disorders*, *60*, 48–58. https://doi.org/10.1016/j.rasd.2019.01.006

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hurley-Hanson, A. E., Giannantonio, C. M., & Griffiths, A. J. (2020). *Autism in the Workplace. Creating Positive Employment and Career Outcomes for Generation A*. Palgrave Macmillan.

Interagency Autism Coordinating Committee. (2017). Interagency Autism Coordinating Committee Strategic Plan For Autism Spectrum Disorder. *U.S. Department of HealthHuman Services Interagency Autism Coordinating Committee*. https://iacc.hhs.gov/publications/strategic-plan/2017/

Johnson, K. R., Ennis-Cole, D., & Bonhamgregory, M. (2020). Workplace Success Strategies for Employees With Autism Spectrum Disorder: A New Frontier for Human Resource Development. *Human Resource Development Review*, *19*(2), 122–151. https://doi.org/10.1177/1534484320905910

Khalifa, G., Sharif, Z., Sultan, M., & Di Rezze, B. (2019). Workplace accommodations for adults with autism spectrum disorder: A scoping review. *Disability and Rehabilitation*. https://doi.org/10.1080/09638288.2018.1527952

Kirchner, J. C., & Dziobek, I. (2014). Toward the Successful Employment of Adults with Autism: A First Analysis of Special Interests and Factors Deemed Important for Vocational Performance. *Scandinavian Journal of Child and Adolescent Psychiatry and Psychology*, *2*(2). https://doi.org/10.21307/sjcapp-2014-011

Krzeminska, A., Härtel, C. E. J., Carrero, J., & Samayoa Herrera, X. (2020). Autism @ Work: New insights on effective autism employment practices from a world-first global study. *AutismCRC*.

Krzeminska, A., & Hawse, S. (2020). Mainstreaming Neurodiversity for an Inclusive and Sustainable Future Workforce: Autism-Spectrum Employees. In L. Wood, L. Tan, Y. Breyer & S. Hawse (Hrsg.), *Industry and Higher Education, Case Studies for Sustainable Futures* (S. 229–261). Springer.

Kyriaki, S., & Syriopoulou-Delli, C. K. (2022). Tech-Aided Interventions for Vocational Skills in Adolescents and Young Adults with Autism Spectrum Disorder. *SHS Web of Conferences*, *139*(05001). https://doi.org/10.1051/shsconf/202213905001

Lindsay, S., Osten, V., Rezai, M., & Bui, S. (2021). Disclosure and workplace accommodations for people with autism: A systematic review. *Disability and Rehabilitation*, *43*(5), 597–610. https://doi.org/10.1080/09638288.2019.1635658

Littin, S. L., & Haspel, M. (2021). School-Based Social Skills Programming to Increase Employment for Individuals with ASD. *International Electronic Journal of Elementary Education*, *13*(3), 333–340. https://doi.org/10.26822/iejee.2021.194

Loomes, R., Hull, L., & Mandy, W. P. L. (2017). What Is the Male-to-Female Ratio in Autism Spectrum Disorder? A Systematic Review and Meta-Analysis. *Journal of the American Academy of Child and Adolescent Psychiatry*, *56*(6), 466–474. https://doi.org/10.1016/j.jaac.2017.03.013

Lord, C., Brugha, T. S., Charman, T., Cusack, J., Dumas, G., Frazier, T., Jones, E. J. H., Jones, R. M., Pickles, A., State, M. W., Taylor, J. L., & Veenstra-VanderWeele, J. (2020). Autism spectrum disorder. *Nature Reviews Disease Primers*, *6*(1). https://doi.org/10.1038/s41572-019-0138-4

Lorenz, T., Frischling, C., Cuadros, R., & Heinitz, K. (2016). Autism and Overcoming Job Barriers: Comparing Job-Related Barriers and Possible Solutions in and outside of Autism-Specific Employment. *PLoS ONE*, *11*(1). https://doi.org/10.1371/journal.pone.0147040

Lorenzo, R. (2017). How diversity makes teams more innovative. Verfügbar 14. Juli 2023 unter https://www.ted.com/talks/rocio_lorenzo_how_diversity_makes_teams_more_innovative/transcript?referrer=playlist-a_blueprint_for_diversity_in_the_workplace

Mantzalas, J., Richdale, A. L., & Dissanayake, C. (2022). A conceptual model of risk and protective factors for autistic burnout. *Autism Research*, *15*, 976–987. https://doi.org/10.1002/aur.2722

Martin, V., Flanagan, T. D., Vogus, T. J., & Chênevert, D. (2022). Sustainable employment depends on quality relationships between supervisors and their employees on the autism spectrum. *Disability and Rehabilitation*. https://doi.org/10.1080/09638288.2022.2074550

Mayring, P. (2010). Qualitative Inhaltsanalyse. In G. Mey & K. Mruck (Hrsg.), *Handbuch Qualitative Forschung in der Psychologie* (S. 601–613). VS Verlag für Sozialwissenschaften.

Micai, M., Fulceri, F., Salvitti, T., Romano, G., Poustka, L., Diehm, R., Iskrov, G., Stefanov, R., Guillon, Q., Rogé, B., Staines, A., Sweeney, M. R., Boilson, A. M., Leósdóttir, T., Saemundsen, E., Moilanen, I., Ebeling, H., Yliherva, A., Gissler, M., & Scattoni, M. L. (2022). Autistic Adult Services Availability, Preferences, and User Experiences: Results From the Autism Spectrum Disorder in the European Union Survey. *Frontiers in Psychiatry*, *13*, 919234. https://doi.org/10.3389/fpsyt.2022.919234

Mitglieder der Hochschulkonferenz Arbeitsgruppe „Research Ethics / Research Integrity". (2020). Praxisleitfaden für Integrität und Ethik in der Wissenschaft. *Bundesministerium für Bildung, Wissenschaft und Forschung (BMBWF)*.

Nicholas, D. B., Mitchell, W., Dudley, C., Clarke, M., & Zulla, R. (2018). An Ecosystem Approach to Employment and Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *48*, 264–275. https://doi.org/10.1007/s10803-017-3351-6

Nicholas, D. B., Zwaigenbaum, L., Zwicker, J., Clarke, M. E., Lamsal, R., Stoddart, K. P, Carroll, C., Muskat, B., Spoelstra, M., & Lowe, K. (2018). Evaluation of employment-support services for adults with autism spectrum disorder. *Autism*, *22*(6), 693–702. https://doi.org/10.1177/1362361317702507

Oliver, M. (1983). *Social Work with Disabled People*. Macmillan Education UK. https://doi.org/10.1007/978-1-349-86058-6

Parr, A. D., & Hunter, S. T. (2014). Enhancing work outcomes of employees with autism spectrum disorder through leadership: Leadership for employees with autism spectrum disorder. *Autism*, *18*(5), 545–554. https://doi.org/10.1177/1362361313483020

Pellicano, E., Dinsmore, A., & Charman, T. (2014). What should autism research focus upon? Community views and priorities from the United Kingdom. *Autism*, *18*(7), 756–770. https://doi.org/10.1177/1362361314529627

Petty, S., Tunstall, L., Richardson, H., & Eccles, N. (2022). Workplace Adjustments for Autistic Employees: What is 'Reasonable'? *Journal*

of Autism and Developmental Disorders. https://doi.org/10.1007/s10803-021-05413-x

Portal der Arbeiterkammern [AK]. (n. d.). Behindertenvertrauensperson. Verfügbar 14. Juli 2023 unter https://www.arbeiterkammer.at/beratung/arbeitundrecht/arbeitundbehinderung/Behindertenvertrauensperson.html#:~:text=Bei%20Bestehen%20eines%20Zentralbetriebsrats%20m%C3%BCssen,ein%2Fe%20StellvertreterIn%20gew%C3%A4hlt%20werden

Ratto, A. B., & Mesibov, G. B. (2015). Autism spectrum disorders in adolescence and adulthood: Long-term outcomes and relevant issues for treatment and research. *Science China, Life Sciences*, *58*(10), 1010–1015. https://doi.org/10.1007/s11427-012-4295-x

Raymaker, D. M., Sharer, M., Maslak, J., Powers, L. E., McDonaled, K. E., Kapp, S. K., Moura, I., Wallington, A. F., & Nicolaidis, C. (2023). „[I] don't wanna just be like a cog in the machine": Narratives of autism and skilled employment. *Autism: the international journal of research and practice*, *27*(1), 65–75. https://doi.org/10.1177/13623613221080813

Romualdez, A. M., Heasman, B., Walker, Z., Davies, J., & Remington, A. (2021). "People Might Understand Me Better": Diagnostic Disclosure Experiences of Autistic Individuals in the Workplace. *Autism in Adulthood*, *3*(2), 157–167. https://doi.org/10.1089/aut.2020.0063

Salzburger Nachrichten. (2016). 80 Prozent der Autisten in Österreich sind arbeitslos. Verfügbar 14. Juli 2023 unter https://www.sn.at/panorama/oesterreich/80-prozent-der-autisten-in-oesterreich-sind-arbeitslos-1691170

Sarrett, J. (2017). Interviews, Disclosures, and Misperceptions: Autistic Adults' Perspectives on Employment Related Challenges. *Disability Studies Quarterly*, *37*(2). https://doi.org/10.18061/dsq.v37i2.5524

Scott, M., Jacob, A., Hendrie, D., Parsons, R., Girdler, S., Falkmer, T., & Falkmer, M. (2017). Employers' perception of the costs and the benefits of hiring individuals with autism spectrum disorder in open employment in Australia. *PLoS ONE*, *12*(5). https://doi.org/10.1371/journal.pone.0177607

Scott, M., Milbourn, B., Falkmer, M., Black, M., Bölte, S., Halladay, A., Lerner, M., Taylor, J. L., & Girdler, S. (2019). Factors impacting employment for people with autism spectrum disorder: A scoping review. *Autism*, *23*(4), 869–901. https://doi.org/10.1177/1362361318787789

Solomon, C. (2020). Autism and Employment: Implications for Employers and Adults with ASD. *Journal of Autism and Developmental Disorders*, *50*, 4209–4217. https://doi.org/10.1007/s10803-020-04537-w

Stankova, T., & Trajkovski, V. (2010). Attitudes and Opinions of Employers, Employees and Parents about the Employment of People with Autism in the Republic of Macedonia. *Journal of Special Education and Rehabilitation*, *11*(3–4), 16–29. https://doi.org/10.5281/zenodo.28302

Thavapalan, B., Remington, A., Myles, L. A. M., & Merlo, E. M. (2021). Teachers' Views on Preparation for Employment of Young Autistic People. *Journal of Mind & Medical Sciences*, *8*(2), 229–236. https://doi.org/10.22543/7674.82.P229236

Tomas, V., Kingsnorth, S., Kirsh, B., Anagnostou, E., & Lindsay, S. (2022). Using the COM-B Model and Theoretical Domains Framework to Understand Workplace Disclosure Experiences, Influencers, and Needs Among Autistic Young Adults. *Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s10803-022-05766-x

Tomczak, M. T. (2022). How can the work environment be redesigned to enhance the well-being of individuals with autism? *Employee Relations*, *44*(6), 1467–1484. https://doi.org/10.1108/ER-12-2021-0535

Tomczak, M. T., Szulc, J. M., & Szczerska, M. (2021). Inclusive Communication Model Supporting the Employment Cycle of Individuals with Autism Spectrum Disorders. *International Journal of Environmental Research and Public Health*, *18*(4696). https://doi.org/10.3390/ijerph18094696

Vereinte Nationen. (1948). Resolution der Generalversammlung: 217 A (III). Allgemeine Erklärung der Menschenrechte. https://www.un.org/depts/german/menschenrechte/aemr.pdf

Vereinte Nationen. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement

Waisman-Nitzan, M., Gal, E., & Schreuer, N. (2021). "It's like a ramp for a person in a wheelchair": Workplace accessibility for employees with autism. *Research in Developmental Disabilities*, *114*, 103959. https://doi.org/10.1016/j.ridd.2021.103959

Waisman-Nitzan, M., Schreuer, N., & Gal, E. (2020). Person, environment, and occupation characteristics: What predicts work performance of employees with autism? *Research in Autism Spectrum Disorders*, *78*, 101643. https://doi.org/10.1016/j.rasd.2020.101643

Wehman, P., Brooke, V., Molinelli Brooke, A., Ham, W., Schall, C., McDonough, J., Lau, S., Seward, H., & Avellone, L. (2016). Employment for adults with autism spectrum disorders: A retrospective review of a customized employment approach. *Research in Developmental Disabilities*, *53-54*, 61–72. https://doi.org/10.1016/j.ridd.2016.01.015

Weld-Blundell, I., Shields, M., Devine, A., Dickinson, H., Kavanagh, H., & Marck, C. (2021). Vocational Interventions to Improve Employment Participation of People with Psychosocial Disability, Autism and/or Intellectual Disability: A Systematic Review. *International Journal of Environmental Research and Public Health*, *18*(12), 12083. https://doi.org/10.3390/ijerph182212083

Westbrook, J. D., Fong, C. J., Nye, C., Williams, A., Wendt, O., & Cortopassi, T. (2013). Pre-Graduation Transition Services for Improving Employment Outcomes among Persons with Autism Spectrum Disorders: A Systematic Review. *Campbell Systematic Reviews*, *9*(1), 1–70. https://doi.org/10.4073/csr.2013.11

Westbrook, J. D., Nye, C., Fong, C. J., Wan, J. T., Cortopassi, T., & Martin, F. H. (2012). Adult Employment Assistance Services for Persons with Autism Spectrum Disorders: Effects on Employment Outcomes. *Campbell Systematic Reviews*, *5*. https://doi.org/10.4073/csr.2012.5

Wolf, K. (2020). Worauf es Menschen im Autismus-Spektrum am Arbeitsplatz ankommt. Verfügbar 14. Juli 2023 unter https://www.zeit.de/zett/2020-08/worauf-es-menschen-im-autismus-spektrum-am-arbeitsplatz-ankommt

Wong, P. S., Donelly, M., Boyd, B., & Neck, P. A. (2021). Beyond Adaptations and Accommodations: Management Practice that Matters as the Key to Retention of Employees with Autism (Part 1). *Review of International Comparative Management*, *22*(5), 636–658. https://doi.org/10.24818/RMCI.2021.5.636

World Health Organization [WHO]. (2022). 6A02 Autism spectrum disorder. ICD-11 for Mortality and Morbidity Statistics. Verfügbar 14. Juli 2023 unter https://icd.who.int/browse11/l-m/en#/http%3a%2f%2fid.who.int%2ficd%2fentity%2f437815624

Zeidan, J., Fombonne, E., Scorah, J., Ibrahim, A., Durkin, M. S., Saxena, S., Yusuf, A., Shih, A., & Elsabbagh, M. (2022). Global prevalence of autism: A systematic review update. *Autism Research*, *15*, 778–790. https://doi.org/10.1002/aur.2696

Junior Management Science

"Well, Now They Know": How Mental Illness Identity Management Strategies Influence Leaders' Responses

Paula Bao Quiero

Technical University of Munich

Abstract

The high prevalence of mental illnesses and their significant social and economic impact highlight the need for organizations to provide resources to support employee well-being. Given that leaders are key in connecting employees to such resources, understanding their responses to employees with mental health issues is crucial. Using vignettes and semi-structured interviewing, we explored how 15 leaders responded to employees with mental health issues depending on the identity management (IM) strategies they used. Through an inductive approach, we identified the emotional and cognitive processes behind leaders' intentions to behave in three scenarios: when an employee shows warning signs of mental health issues, when they disclose their condition, and when they cover it up by using a personal problem as an excuse. Our findings show that a strategy that denotes transparency and active coping is more likely to lead to positive interpersonal outcomes and a higher level of social support. However, unintended stigma can turn this support into a double-edged sword, leading to negative professional outcomes. We further identified leaders' training needs regarding mental health management in the workplace. We conclude by discussing theoretical and practical implications of our findings.

Keywords: disclosure; diversity; identity management; mental illness; stigma

1. Introduction

"The worst part about having a mental illness is people expect you to behave as if you don't." So wrote Arthur Fleck in his notebook, smiling ironically as his mental health continued to deteriorate. Although he is merely a fictional character in Todd Phillips' (2019) film *Joker*, his remark portrays the plight of many individuals struggling with mental illnesses and the stigma these carry. In fact, this stigma, which can be perceived from society or through self-stigma, remains a significant barrier not only to recovery but also to employment and promotion opportunities (Follmer & Jones, 2018; B. Hogg et al., 2022).

Furthermore, mental illnesses are not uncommon. They annually affect over one billion individuals worldwide and are considered a leading cause of disability (Arias et al., 2022). In Germany alone, it has been estimated that more than 1 in 4 adults experience a mental illness each year (Jacobi et al., 2014, 2016). Among these, the most frequent disorders include anxiety and affective (e.g., depression) disorders, with prevalence rates of 15.4% and 9.8%, respectively. Mental illness shapes individuals' emotions, cognitions, and behaviors and, if left untreated, can significantly impair their ability to navigate social and work environments (American Psychiatric Association, 2013; Follmer & Jones, 2018).

Apart from its influence on individuals, mental illness also has a significant economic impact on organizations and society, with total costs estimated at 147 billion euros

per year nationwide (Deutsche Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde, 2023). This includes both direct costs, arising from healthcare and social benefits, and indirect costs, such as losses in productivity due to impaired performance, absenteeism, and *presenteeism* (i.e., attending work while ill) (Arias et al., 2022; Deutsche Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde, 2023; B. Hogg et al., 2022; Martin et al., 2015). Furthermore, mental illness is currently the leading reason for early retirement and the second most common cause of sick leave in Germany, accounting for 17% of days of disability in 2020 (Deutsche Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde, 2023).

These significant costs highlight the need for organizations to develop sustainable strategies, policies, and initiatives to protect and appropriately manage mental health in the workplace. In this regard, leaders play a crucial role in the success of such policies, as they are the bridges between the organization and its employees. They have a substantial impact on the health and well-being of their teams, and their attitudes towards mental health issues can further influence the duration of employees' sick leave, their successful return to work, their willingness to use available organizational resources, and metrics such as productivity, engagement, and job satisfaction (Dimoff & Kelloway, 2019b; Martin et al., 2015; Rudolph et al., 2020). However, to appropriately manage and address employees dealing with mental illnesses, leaders must first be aware of their condition, which is not an easy task.

On the one hand, employees themselves may be unaware of their own mental health issues or may not recognize them as such (Dimoff & Kelloway, 2019b). Moreover, even if an employee displays warning signs of a mental health condition, these can often be ambiguous or inconclusive, and leaders may not adequately assess them as a health risk (Pischel et al., 2022). In this respect, approaches such as health-oriented leadership particularly emphasize the need for leaders to learn to recognize and address early warning signs in order to take appropriate health-promoting actions within their teams (Dimoff & Kelloway, 2019b; Pischel et al., 2022).

On the other hand, the highly stigmatizing nature of mental illnesses makes it difficult for employees to disclose them. For example, they may experience negative interpersonal outcomes, such as exclusion and mistreatment, and even economic consequences, such as decreased hiring, limited promotion and career development opportunities, and lower salary expectations, if their condition is known (Colella & Santuzzi, 2022; Follmer & Jones, 2017; Hennekam et al., 2020). To minimize these risks, employees must decide whether and how to disclose their condition by enacting specific identity management (IM) strategies (Follmer & Jones, 2022). These strategies may involve behaviors meant to reveal, conceal, or even hint at the existence of a mental health issue (K. P. Jones & King, 2014), and leaders need to know how to navigate them to provide help for their teams in a timely manner.

Although mental illness IM in the workplace has been recognized as a relevant subject for leaders and organizations, this area of research is still lagging behind that of other stigmatized identities, such as gender or race, and several gaps have been identified (Colella et al., 2017). First, extant research has mostly been conducted outside of the fields of management and organizational psychology, with workplace experiences and processes remaining under-researched (Elraz, 2018; Follmer & Jones, 2018). Second, many studies in the field have been carried out without a guiding theoretical framework, which has resulted in a relatively surface-level understanding of employees with mental illness (Follmer & Jones, 2018). Third, previous studies have primarily focused on the experiences and outcomes for the stigmatized employee, neglecting to account for the interpersonal consequences that IM strategies may have (Lynch & Rodell, 2018). Indeed, IM is an inherently social process, and previous studies in the area of concealable stigmatized identities suggest that the reactions and responses from the recipients of disclosure (i.e., confidants) matter greatly (Barth & Wessel, 2022; Johnson et al., 2020; K. P. Jones & King, 2014). In particular, the perspective of leaders has been underrepresented and is sorely needed to further understand how employees can effectively manage their stigmatized identities in the workplace and achieve their desired outcomes (Follmer & Jones, 2018). Finally, although other qualitative studies have investigated leaders' experiences regarding employees with mental health issues (see, for example, Jimmieson et al. (2021), Kirsh et al. (2018), Ladegaard et al. (2017), Martin et al. (2015, 2018), Porter et al. (2019), Suter et al. (2023), and Tengelin et al. (2022)), none have, to our knowledge, explicitly explored how the use of specific IM strategies can influence their responses.

Drawing on IM theories and semi-structured interviewing, this exploratory study aims to address these gaps by investigating the effects of mental illness IM strategies on leaders' perceptions. In doing so, we hope to provide insights to management research and HR practitioners to better prepare and support leaders in dealing with these challenges as they emerge. Specifically, we formulate the following overarching research question:

> **RQ1.** How do leaders respond to employees with mental health issues depending on the IM strategies they use?

2. Theoretical Background

2.1. Understanding mental illness

Mental illness is an umbrella term used to refer to all diagnosable mental health disorders that involve a "clinically significant disturbance in an individual's cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning" (American Psychiatric Association,

2013, p. 20) and is usually coupled with distress or difficulties navigating social, work, or other life domains (American Psychiatric Association, 2013). Different types of mental disorders exist, with the *Diagnostic and Statistical Manual of Mental Disorders*, DSM-5, listing more than 150 conditions organized into 22 diagnostic categories (Marty & Segal, 2015; McCarron, 2013).

Depending on the severity of the symptoms, the National Institute of Mental Health (NIMH) further categorizes mental illness into *any mental illness* (AMI) and *serious mental illness* (SMI). The former refers to disorders that have no interference to moderate or even severe interference in everyday life, while the latter encompasses only conditions that result in severe impairments in an individual's normal functioning (National Institute of Mental Health, 2023). In Germany, the overall 12-month prevalence of AMIs among the adult population is estimated at 27.8%, with anxiety disorders (e.g., panic disorder, generalized anxiety disorder) and unipolar depression being the most frequent, at prevalence rates of 15.4% and 8.2%, respectively (Jacobi et al., 2014, 2016).

Although each mental disorder has its own unique set of symptoms, they can be broadly classified based on how they affect individuals into physical, emotional, cognitive, and behavioral symptoms (Follmer & Jones, 2018). *Physical symptoms* affect the body and its physiological responses and could manifest, for example, as sleep disturbances, appetite changes, or muscle pain (Greden, 2003). *Emotional symptoms* affect moods and emotion regulation and could manifest as extreme mood changes, excessive nervousness, or increased irritability, among others. *Cognitive symptoms* affect mental processes of learning, reasoning, and communication. Examples include problems concentrating, difficulty understanding others, and deficits in working memory (Harvey & Bowie, 2016). Finally, *behavioral symptoms* affect how one acts and might manifest as fidgeting, pacing, avoidance of social activities, or procrastination (American Psychiatric Association, 2013; Follmer & Jones, 2018).

Even though mental illness can hinder an individual's ability to fully meet workplace demands, most conditions can be treated and managed with the assistance of a trained professional (American Psychiatric Association, 2015; Follmer & Jones, 2018). In this regard, numerous options are available and may involve a combination of psychotherapy ("talk therapy"), medication, and/or other techniques (American Psychiatric Association, 2015). However, as the specific symptoms and needs vary across disorders and individuals, there is no single answer to treating and accommodating mental illness, and each case should be analyzed on its own.

2.2. The role of the leader

Leaders play a critical role in the experiences of employees in the workplace, particularly in the case of those who have a mental illness. They can shape the workplace climate and working conditions and even inspire and encourage specific employee behaviors (Dimoff & Kelloway, 2019b;

Kaluza & Junker, 2022). Furthermore, leaders are in a position where they can provide direct and indirect support by, for example, offering workplace accommodations, connecting employees to available company resources, or even encouraging them to seek out professional help, which could prevent the worsening or chronification of mental illness (Dimoff & Kelloway, 2019b; Evans-Lacko & Knapp, 2018; Pischel et al., 2023). Considering this, health-specific leadership approaches, such as Franke et al.'s (2014) *health-oriented leadership* (HoL) model, have recently been developed to explain how leaders can influence employees' (mental) health and well-being, going beyond classical leadership concepts (Arnold & Rigotti, 2021).

2.2.1. Health-oriented Leadership

The concept of *health-oriented leadership* (HoL) posits that leaders' attitudes, values, and behaviors can have a significant impact on the health and well-being of employees (Franke et al., 2014; Kaluza & Junker, 2022; Rudolph et al., 2020). Specifically, the HoL model proposes two mechanisms through which leaders can positively affect employees' well-being: promoting *self-care*, which involves the concern for one's own health, and engaging in *staff-care*, which encompasses leaders' concern for the health of their employees (Franke et al., 2014). Both mechanisms further include three components: *value*, *awareness*, and *behavior*. *Value* refers to the importance that leaders ascribe to employee health. *Awareness* alludes to leaders' ability to evaluate employees' stress levels and perceive warning signs of impending health issues. Finally, *behavior* considers engagement in health-promoting actions, such as ensuring healthy work conditions, encouraging healthy working behavior, and providing relevant information about safety and health (Franke et al., 2014).

Following the *conservation of resources* (COR) theory, individuals need resources to protect and maintain their health (see Hobfoll (1989, 2001)). These resources can be internal, which derive from one's own cognition and personal characteristics, or external, which involve social and organizational elements (e.g., social support) (Franke et al., 2014). Within this framework, HoL in itself can be understood as an external resource for employees, which can help them promote and maintain their well-being and prevent psychological and physical strain (Arnold & Rigotti, 2021; Kaluza & Junker, 2022). In fact, previous research has shown that employees experience lower levels of burnout, depression (Santa Maria et al., 2018), and strain (Franke & Felfe, 2011; Klebe et al., 2021), have fewer health complaints (Franke et al., 2014; Klug et al., 2019; Köppe et al., 2018; Santa Maria et al., 2018), better health outcomes (Franke et al., 2014; Klug et al., 2019), and report higher well-being (Santa Maria et al., 2018), when their leaders exhibit a HoL style.

Besides being a resource in themselves, leaders can also help employees by providing and connecting them with other external resources, such as relevant organizational programs, psychological support options, or temporary workplace accommodations (e.g., through reduced workload or working

hours). In this regard, leaders are in an excellent position to act as a bridge between the organization and its employees, as their formal standing allows them to be aware of existing organizational policies, programs, and initiatives and to promote and encourage their usage within their team (Dimoff & Kelloway, 2019b).

2.2.2. Recognizing warning signs

One key takeaway from the HoL model is that for leaders to offer adequate and well-timed support for struggling employees (i.e., *staff-care behavior*), they need to first be able to perceive warning signs of mental strain (i.e., *staff-care awareness*), which start to develop before the onset of a mental illness (Pischel et al., 2022, 2023). However, awareness may be muddled due to employees trying to hide their condition or, in some cases, due to employees themselves being unaware of their compromised mental health owing to emotional and cognitive strain (Dimoff & Kelloway, 2019b; Pischel et al., 2022). Moreover, even if an employee displays warning signs of an underlying mental health condition, these can often be ambiguous or inconclusive, and leaders may not adequately assess them as a potential health risk, dismissing them as poor motivation or the employee "having a bad day" (Dimoff & Kelloway, 2019a; Pischel et al., 2022).

In this regard, Dimoff and Kelloway (2019a) proposed a Signs of Struggle (SOS) checklist with five categories of behavioral warning signs that leaders should be able to perceive in a workplace setting: *expressions of distress*, *withdrawal*, *reduced attendance*, *degradations in performance*, and *extreme behaviors*. *Expressions of distress* encompass emotional behaviors, such as crying at work, mentioning problems at home, or complaining about work. *Withdrawal* behaviors include social- and work-withdrawal, such as reduced participation in social activities with coworkers or less engagement in organizational citizenship behaviors. *Reduced attendance* includes lateness and increased absenteeism, regardless of the cause. *Degradations in performance* involve changes in work quality or quantity, such as failing to meet goals or deadlines or simply not performing to one's usual standard. Finally, *extreme behavior* includes more severe distress conducts, such as neglecting personal hygiene or intending to harm oneself, which require swift intervention.

The above mentioned factors were shown to be significantly correlated with participants' self-reported strain, with the individual factors of *withdrawal*, *extreme behaviors*, and *degradations in performance* showing an even stronger connection with strain. These findings suggest that the items in these categories are both recognizable by others and representative of behaviors likely displayed by distressed employees at work (Dimoff & Kelloway, 2019a). In a similar line, a recent study conducted by Pischel et al. (2022) proposed that leaders became aware of employees' deteriorating mental health through perceived changes in performance and socioemotional behaviors and showed that leaders' awareness was significantly higher when employees displayed impairment in both areas, as opposed to impairments in the performance or socioemotional spheres only.

Given that leader awareness is crucial for taking appropriate action, we expand our main research question by incorporating the following sub-question:

RQ1a. How do leaders respond to employees displaying warning signs of mental health issues?

2.3. Muddying the waters: Managing mental illness stigma

Leader awareness is, however, just one side of the coin. Given the stigma surrounding mental illness, even if a leader realizes that one of their team members is displaying signs of an emerging mental health issue, the employee could choose to downplay or even deny having a problem. As Erving Goffman (1963) noted, individuals with a concealable stigma are constantly faced with the decision "to display or not to display; to tell or not to tell; to let on or not to let on; to lie or not to lie; and in each case, to whom, how, when, and where" (p. 42). To understand the challenges behind mental illness disclosure in the workplace and what drives individuals to conceal or reveal, we must first understand *social identity theory* (SIT) and *stigma theory*.

2.3.1. Mental illness as a (concealable) social identity

According to SIT, individuals tend to categorize themselves and others as members of certain social groups that have an ascribed emotional significance or value (Tajfel & Turner, 1986). This membership, known as one's *social identity*, shapes one's sense of self and the way we perceive the world, relying on intergroup social comparison to make a distinction between the ingroup ("us") and the outgroup ("them") (Haslam, 2004; M. A. Hogg & Terry, 2000). Notably, an individual maintains multiple social identities at any given time, but the extent of their salience depends on how central an identity is to one's self-concept and specific contextual cues (Ragins, 2008; Roberts, 2005).

Some social identities may be visible to others, as is the case with race and gender, while others are not readily observable and may be concealed, such as sexual orientation and religious affiliation (Follmer et al., 2020; Lynch & Rodell, 2018; Roberts, 2005). In the case of mental illness, visibility is mainly influenced by the severity of the symptoms and the extent to which they interfere with an individual's behavior. However, even if others notice these signs, they can often be attributed to other causes, such that the mental illness itself remains hidden unless the individual chooses to disclose it (Colella & Santuzzi, 2022). In this sense, mental illness represents a complex type of concealable social identity.

The social categories to which one belongs also influence other's perceptions and subsequent treatment (M. A. Hogg & Terry, 2000), which adds to the complexity of managing a concealable identity. On the one hand, if disclosing the identity makes the individual more like their colleagues, disclosure would likely result in positive outcomes. On the other, if disclosure enhances differences between the individual and their colleagues, the individual is more likely to experience adverse outcomes, such as rejection or discrimination (Follmer et al., 2020; M. A. Hogg & Terry, 2000).

2.3.2. Mental illness and stigma

Stigma is a characteristic or attribute that "marks" the bearer as someone who deviates from what a society considers normal or desirable (Goffman, 1963; E. E. Jones et al., 1984). Link and Phelan (2001) further conceptualize stigmatization as a process that occurs in four stages: *labeling*, *stereotyping*, *separation*, and *status loss and discrimination*. In the first, people distinguish and label human differences that are deemed socially relevant. As a result, an individual is labeled as belonging to a specific, often oversimplified, social group. In the second, the labeled social group is linked to undesirable characteristics or behaviors, which results in negative stereotypes. In the third, the given social labels result in an "us vs. them" mentality, separating labeled individuals from those who consider themselves to be normal. In the fourth, the labeled individuals experience devaluation, rejection, and overall discrimination, leading to unequal outcomes. This conceptualization was later expanded by Link et al. (2004) to account for the *emotional reactions* that the stigmatization process entails. Specifically, both the stigmatizer and the stigmatized are likely to experience negative emotional responses. The former may feel "anger, irritation, anxiety, pity, and fear" (p. 513), while the latter may experience "embarrassment, shame, fear, alienation, or anger" (p. 513).

The degree to which a stigmatized identity is perceived as deviant or flawed varies across social contexts and circumstances. To explain this phenomenon, E. E. Jones et al. (1984) proposed six dimensions of stigma: *concealability*, the extent to which the identity is salient or detectable by others; *course*, how reversible is the stigmatizing condition over time; *disruptiveness*, the extent to which the condition may disturb or strain interpersonal interactions; *aesthetics*, the extent to which an identity is displeasing for others; *origin,* the extent to which the stigmatized individual is perceived as responsible for their condition; and *peril*, the extent to which others perceive the individual as a threat to their well-being, be it physical or emotional (Link et al., 2004). Although these dimensions shed some light on which aspects of an identity might be a source of stigmatization, the relevance of each dimension depends on the condition under study. Furthermore, additional dimensions might be required to explain the stigma behind specific identities (Feldman & Crandall, 2007).

In the case of mental illness, the stigmatization of individuals has been mainly ascribed to Jones et al.'s (1984) dimensions of *origin* and *peril*, plus additional dimensions of *legitimacy*, *fluctuations* (Follmer & Jones, 2018), and *rarity* (Feldman & Crandall, 2007). These dimensions set mental illness apart from other concealable identities and pose a unique set of challenges for affected individuals.

From an *origin* standpoint, a common misconception is that people with mental illness are responsible for their condition (also referred to as *onset controllability* (Colella & Santuzzi, 2022)), which leads to decreased sympathy and helping behavior, and increased discrimination (Corrigan et al., 2002; Feldman & Crandall, 2007). As a result of this perceived control, mental illnesses are often regarded as being less *legitimate* than physical conditions, underpinned by mistaken beliefs that "the condition is "all in their heads" or that individuals have the ability to "snap out of it"" (Follmer & Jones, 2018, p. 330). These legitimacy concerns are further fueled by day-to-day *fluctuations* in the severity of the symptoms, which can lead to the belief that those with mental illness are "faking it" (Follmer & Jones, 2018).

Another common misunderstanding is that individuals with mental illness are *dangerous* or unpredictable, which leads to fear and, subsequently, to higher levels of avoidance and segregation (Angermeyer & Matschinger, 2003; Corrigan et al., 2002). This perceived dangerousness can either be due to fear of potentially violent behavior or exposure to uncomfortable situations, such as interpersonal conflict (Link et al., 2004). Finally, mental illness stigma has been shown to be further predicted by the degree to which people believed a specific mental disorder to be *rare*, with uncommon conditions resulting in higher stigmatizing behaviors (Feldman & Crandall, 2007).

As we can see, stigma is rooted in others' perceptions and is therefore dependent on social cues and cultural norms (Abdullah & Brown, 2011). For example, an identity that is highly stigmatized in one country may not be stigmatized in another, as is the case with sexual minorities (see, for example, Pachankis et al. (2015)). Furthermore, being social constructs, stigmas can change over time (Ragins, 2008). Therefore, understanding the dimensions that underlie the stigmatization of mental illness in a particular social context is crucial for developing initiatives and interventions for its reduction.

2.3.3. Mental illness and IM in the workplace

Given that mental illness is a stigmatized social identity that can be concealed, individuals affected by mental illnesses must carefully decide how to manage this identity, particularly in the work context. On the one hand, disclosing their condition could result in discriminatory outcomes, both social and economic (Follmer & Jones, 2022). On the social side, they might experience exclusion, rejection, and mistreatment from their peers (Follmer & Jones, 2017). On the economic side, disclosure might result in fewer employment and promotion opportunities and decreased access to benefits (Colella & Santuzzi, 2022). On the other hand, concealing their condition could result in increased psychological stress due to the pressure to "pass as normal" and the constant fear that they could be "found out" (Pachankis, 2007; Ragins, 2008). Therefore, individuals are faced with a *disclosure dilemma*, in which they must balance these two sides to protect themselves from negative reactions from others while being authentic to themselves (Griffith & Hebl, 2002; K. P. Jones & King, 2014).

Multiple models have been proposed to explain how individuals manage and disclose their stigmatized identities (see, for example, Chaudoir and Fisher (2010), Clair et al. (2005), K. P. Jones and King (2014), Omarzu (2000),

Pachankis (2007), and Ragins (2008)). Although each explores different aspects of the disclosure process, most focus on uncovering the individual and organizational factors that drive the stigmatized individual's decision to conceal or reveal (Follmer et al., 2020) and tend to neglect the immediate interpersonal reactions to disclosure (Barth & Wessel, 2022). Furthermore, some were developed for social rather than work contexts, which can limit their applicability (K. P. Jones & King, 2014). As the present study focuses on leaders' reactions to stigma management strategies enacted by their employees, we will briefly outline three models that explicitly consider the interpersonal consequences of disclosure and stigma management.

One of the first conceptual models proposed to explain disclosure in the workplace context was developed by Clair et al. (2005). This model considers that an individual's disclosure decision is partly driven by their propensity toward risk-taking, self-monitoring, developmental stage, and motives. In addition, it considers that certain interpersonal and environmental contextual conditions further influence the decision, namely the organization's diversity climate, existing professional and industry norms, legal protections, and the relationship with and characteristics of the target of their disclosure (i.e., the confidant). Eventually, the individual's decision to reveal (i.e., disclose) or pass (i.e., conceal) results in individual and interpersonal costs and benefits, which will, in turn, influence future disclosure decisions. Although this model highlights the importance of interpersonal outcomes within the disclosure process, it does not explore specific constructs.

Next, we consider Chaudoir and Fisher's (2010) *disclosure processes model* (DPM). Distinct from prior models, the DPM aims to explain when and why disclosure might be beneficial and conceptualizes disclosure as a single process that involves decision-making and outcome processes. Within the decision-making process, an individual's decision to disclose will be influenced by either approach- (e.g., to pursue positive outcomes) or avoidance-focused goals (e.g., to prevent negative outcomes). These goals will then shape both the content of the disclosure, in terms of depth, breadth, duration, and emotional content, and the reaction of the confidant, which can be supportive or unsupportive. Within the outcome process, the model proposes three types of mediating processes to explain how the disclosure event impacts long-term outcomes: by alleviating the individual's stress due to the concealment of their condition, by allowing the individual to garner social support, and by impacting the social context and the way people interact with one another. Finally, the authors posit that the disclosure experience will influence individual outcomes (e.g., psychological, behavioral, and health effects), dyadic outcomes (e.g., liking, intimacy, and trust), and social contextual outcomes (e.g., cultural stigma and norms for disclosure) in the long term, shaping future disclosure experiences. In the context of our study, one of the drawbacks of the DPM is that it does not consider the use of specific strategies for concealing or disclosing a stigmatized identity but instead focuses on the content of the

disclosure itself. Furthermore, unlike the model developed by Clair et al. (2005), the DPM was not explicitly developed for the workplace setting. However, this model provides valuable insights into how stigmatized individuals can influence the confidant's reactions through disclosure and distinctly explores outcomes at the dyadic level.

The third and final model we consider is Jones and King's (2014) *multilevel model of workplace concealable stigma management*, which conceptualizes IM as a phenomenon at a between-person and within-person level. The between-person level considers behavioral averages, tendencies, and accumulation, while the within-person level varies depending on specific situational characteristics. At the latter, each time an individual with a concealable stigma interacts with someone else at work, they make decisions regarding the management of their identity. Their disclosure behavior will be primarily predicted by the level of acceptance they anticipate from the confidant. Depending on this, they then must choose the extent of their disclosure, that is, how much information they will disclose and which strategies they will use to enact their decision. Afterward, they experience both individual outcomes, such as changes in their psychological and physical well-being, and social outcomes, such as changes in helping behavior from others. The model further proposes three boundary conditions that influence the outcomes of a disclosure decision: the confidant's reaction, the timing of disclosure, and the visibility of the stigma. Firstly, the degree to which a confidant's reaction is accepting or supportive will impact the well-being of the discloser and will influence future decisions to disclose. The reaction of the confidant is further influenced by the timing of the disclosure, with disclosures that happen later in the relationship generally resulting in more positive responses. Finally, the degree of visibility of the stigma will influence disclosure outcomes, with more evident stigmas resulting in decreased benefits from revealing and increased damage from concealing strategies.

Although these models focus on different antecedents and outcomes, they all underscore the importance of confidants' reactions to the disclosure process. Not only do their reactions have the power to affect outcomes at the individual and social level, but they can also influence an individual's future decisions to disclose. This notion becomes particularly relevant in the workplace context, where a leader's reactions have the potential to impact critical outcomes, such as compensation or promotion decisions. These models, however, do not explicitly explore immediate interpersonal responses to disclosure. Furthermore, they tend to consider broad categories of supportive and unsupportive reactions without addressing the specific emotional and cognitive elements that shape them, nor what form these supportive responses may take.

2.3.4. Concealable IM strategies

Disclosure can be understood as a continuum in which an individual may choose not to disclose their identity, disclose only partial information about it, or disclose it fully (Ragins,

2008). Depending on the desired extent of disclosure, individuals may then enact different behavioral strategies to manage and present their identity. Relevant to our work, a recent study performed by Follmer and Jones (2022) used in-depth interviews to organically derive the IM strategies that individuals with a mental illness (i.e., depression) utilized in the workplace context. Their study maps these strategies along the disclosure continuum into three major categories: *non-disclosure*, *partial disclosure*, and *full disclosure*. Although distinct, these categories are comparable to Jones and King's (2014) classification between *concealing*, *signaling*, and *revealing* strategies.

Non-disclosure strategies, similar to *concealing* strategies, involve hiding the stigmatized identity and posing as a non-stigmatized individual to prevent discovery (Clair et al., 2005). Follmer and Jones (2022) mapped three strategies in this category: *concealment*, *fabrication*, and *masking* (see also Clair et al. (2005) and Goffman (1963)). *Concealment* involves hiding information and behaviors that could expose the stigmatized identity. A *fabrication* strategy occurs when an individual goes beyond withholding information and deliberately provides false information to others to cover up. Finally, with a *masking* strategy, individuals "put on a mask" at work to prevent others from realizing their condition.

In the middle of the spectrum, *partial disclosure* strategies are those that straddle the line between disclosure and non-disclosure and involve selectively sharing some information about the identity or disclosing only to certain individuals. Strategies in this category include *signaling*, *limited disclosure*, and *selective disclosure*. Among *signaling* strategies, Follmer and Jones further identified passive and active signaling. The former occurs involuntarily when an individual cannot hide their stigmatized identity (e.g., when depressive symptoms become salient), while the latter involves actively dropping hints, using nonverbal cues, or giving clues to their condition (Clair et al., 2005). When using a *limited disclosure* strategy, individuals disclose some aspects of their social identity but do not share complete information. Finally, by using a *selective disclosure* strategy, individuals reveal their identity only to specifically chosen people.

On the other end of the spectrum, *full disclosure* strategies, similar to *revealing* strategies, involve making the stigmatized identity known to others or "coming out" (Clair et al., 2005). Two strategies identified in this category are *transparency* and *advocacy*. With a *transparency* strategy, individuals show a general openness to share information with others about their stigmatized identity when prompted. On the other hand, someone using an *advocacy* strategy goes beyond sharing information and seeks to educate others about their identity with the aim of promoting awareness and social change.

In this study, we aim to explore leaders' reactions to employees with mental illness. For this, as outlined in **Section 2.2.**, we will first assess their responses to an employee displaying warning signs of a mental health issue, which would be consistent with a *passive signaling* strategy (an example of partial disclosure). Afterward, we will analyze their

responses when the employee actively uses either a non-disclosure or a full-disclosure strategy to cover the remaining sides of the spectrum.

On the non-disclosure end, we argue that if an individual is already displaying symptoms of a mental health issue, *concealment* or *signaling* strategies would no longer be a viable option. They must find a way to "justify" their symptoms or devise a believable excuse if they wish to hide their condition, which would be consistent with a *fabrication* strategy.

On the full disclosure end, we posit that an individual who has observable symptoms and has not actively talked about them at work does not fit an *advocacy* strategy. Such behavior would be better explained through a *transparency* strategy to the extent that they would share information about their condition if prompted.

Considering these arguments, we narrow down our previously stated research question (see **RQ1**) by considering the following sub-question:

> **RQ1b.** How do leaders respond to employees with mental health issues when they use a *fabrication* versus a *transparency* strategy?

2.4. The present study

This study aims to contribute to IM literature by addressing the oft-overlooked perspective of leaders. To achieve this, we used *inductive thematic analysis* to understand the processes that shape leaders' responses toward employees showing warning signs of mental health issues and how specific IM strategies used by employees can further influence leaders' perceptions. Thematic analysis is a widely adopted approach for analyzing individuals' experiences, perspectives, and views and was, therefore, deemed appropriate for the given research goals.

The rest of the thesis is structured as follows. In **Section 3**, we explain the methodology adopted in this study and describe the design and implementation of our research materials. In **Section 4**, we report our main findings. Finally, in **Section 5**, we summarize and discuss our results, their potential theoretical and practical implications, and the limitations of our study.

3. Method

The focus of this research is exploratory, as we are looking to develop an understanding of leaders' perspectives, how they make sense of, analyze, and evaluate employees with mental health issues and their IM strategies, and how this shapes their reactions toward them. For this purpose, we conducted in-depth semi-structured interviews with team leaders from different industries and explored their responses to three specific strategies, namely *passive signaling*, *fabrication*, and *transparency*, which were manipulated through written vignettes in a within-subjects design.

3.1. Sampling

To achieve our research goals, we used a purposive sampling technique, according to which we identified and selected participants based on their potential to provide rich and valuable insights into our research question (Etikan et al., 2016). Specifically, participants were required to meet the following criteria to be included in the study:

1. **Working in Germany.** Since stigmas are socially constructed, cultural context and norms must be taken into consideration (Evans-Lacko & Knapp, 2014; Ragins, 2008). Therefore, we limited our study to the German working context to produce comparable results.

2. **At least one year of leadership experience.** A minimum of leadership experience was deemed necessary for participants to be aware of the challenges of their role and be able to put themselves in the situations described in this study.

It should be noted that since our goal is to understand leaders' attitudes and perceptions, recruitment was not restricted to those with first-hand experience managing employees with mental health issues. Furthermore, participants from different industries, ages, and genders were encouraged to participate to ensure that multiple perspectives were accounted for.

To reach our target population, we created a recruitment flyer (see **Figure 1**), which included a vague description of the purpose of the thesis (i.e., without mentioning the focus on mental health issues and IM strategies), the above-mentioned inclusion criteria, the procedure, and contact information. To increase engagement, it also included a QR code leading interested individuals to a survey in which they could share their email addresses to be contacted by the researcher. The flyer was distributed among personal and professional networks via email and social media platforms such as LinkedIn, WhatsApp, and Instagram.

This strategy yielded 19 potential candidates, who were then contacted via email and invited to a 30-minute online interview via Zoom. The email contained a reminder of the thesis topic and inclusion criteria, as well as a link to Calendly. This online scheduling software allowed candidates to schedule their interview appointments at their convenience. We used this setup to simplify the scheduling process and increase the engagement of potential candidates from the first email. In the end, 15 leaders showed interest and scheduled an interview.

3.2. Participants

The final sample consisted of 15 team leaders, in line with our expectations given the qualitative nature of our research (Charmaz, 2006), the restricted target group, and the limited time frame of the study. Most participants identified as male (66.67%, $N = 10$), with 4 (26.67%) identifying as female and 1 (6.67%) as diverse. Their age ranged from 30 to 60 years ($M = 40.71$, $SD = 9.24$). On average, participants had

7.67 years of leadership experience ($SD = 5.98$) and worked in various industries and roles. A detailed description of participants' demographics is presented in **Table 1**.

3.3. Materials
3.3.1. Vignettes

Vignettes are traditionally used in qualitative research to explore participants' thoughts, attitudes, and beliefs within a specific context (Barter & Renold, 1999). Furthermore, their hypothetical nature provides a non-threatening way of analyzing sensitive topics (Barter & Renold, 1999; Schoenberg & Ravdal, 2000), making them a valuable tool in stigma-related research.

The vignettes used in this study were developed by integrating critical elements from studies performed by Angermeyer et al. (1998) and Martin et al. (2015), and Dimoff and Kelloway (2019a) (see **Appendix A**). Given practical limitations and to avoid introducing gender as an additional variable, the vignettes only described a male employee, referred to as "Mr. Müller." Previous research has shown that men tend to be subjected to more mental illness stigma than women (Brown et al., 2017; Farina, 1981) and are less likely to be diagnosed with depression and anxiety disorders (Cochran & Rabinowitz, 2000; Purvanova & Muros, 2010). Therefore, we expect participants' potential stigma-related responses to be stronger if the hypothetical individual is a male. Furthermore, to minimize name-related bias, we opted for the surname Müller, the most common surname in Germany (Marynissen & Nübling, 2010).

In the first vignette, Mr. Müller displayed clear warning signs of an emerging mental health issue. Following Dimoff and Kelloway's (2019a) SOS checklist, the described signs were a combination of expressions of distress (e.g., "he looks tense and exhausted"), withdrawal (e.g., "has withdrawn from social activities"), reduced attendance (e.g., "he is often late for work"), and degradations in performance (e.g., "the quality of his work has decreased"). Although no specific diagnostic label was given, the symptomatology used aligned with DSM-5 criteria for a severe depressive disorder, with symptoms that markedly interfered with social and occupational functioning. Depression was chosen as a baseline to illustrate mental distress because of its high prevalence in the adult population (Jacobi et al., 2014, 2016) and its diagnostic overlap with other disorders, such as generalized anxiety disorder (Zbozinek et al., 2012).

The second and third vignettes were elaborated considering Follmer and Jones' (2022) findings on IM strategies used by individuals with depression. Both vignettes were almost identical in their formulation, with changes in key aspects to indicate the use of a specific strategy. In the second vignette, Mr. Müller disclosed a mental health issue using a *transparency* strategy, openly sharing information about his condition (e.g., "reveals that he has been struggling with a mental health issue"). We chose the common-use term "mental health issue" instead of the medical terms "mental disorder" or "mental illness" because we deem its usage more realistic in a workplace setting. In this scenario, Mr. Müller

Figure 1: Recruitment flyer

acknowledged a link between his condition and his diminished work performance and confessed feeling embarrassed about it, a common issue among individuals with depression (Dietrich et al., 2014). In the third vignette, Mr. Müller did not disclose his condition and used a *fabrication* strategy instead, explaining his behavior using other excuses (e.g., "tells you that he has been having relationship problems"). In this vignette, Mr. Müller tried to keep his condition separate from his work performance, brushing off possible concerns in that regard.

3.3.2. Interview protocol

As mentioned at the beginning of this section, we used semi-structured interviewing, a qualitative research approach that uses a predetermined set of questions as a guide but gives the interviewer the freedom to dive deeper into interviewees' responses through follow-up questions (McGrath et al., 2019). As such, it is particularly suited for understanding a participant's unique point of view, attitudes, and experiences surrounding a phenomenon expressed in their own words (Charmaz, 2006; McGrath et al., 2019). This format is characterized by its flexibility, which offers both the possibility to address specific research constructs and a chance for participants to share their own reflections, discuss their impressions, and tell their stories (Charmaz, 2006; Galletta, 2013). In this way, this method helps guide and advance understanding when little is known about an issue, helping uncover important concepts to guide future inquiries. Furthermore, it provides an appropriate format for discussing sensitive topics (Fylan, 2005), such as mental illness awareness and management.

Drawing on our literature review, we crafted an interview protocol aimed at exploring different aspects of leaders' reactions, including their emotional (i.e., their feelings) and cognitive (i.e., what they think) responses, as well as their behavioral intentions (i.e., how they intend to behave in each situation). This protocol was then tested during a pilot interview, which resulted in minor changes to some questions to improve clarity.

The final interview protocol was structured in five sections, which are illustrated in **Figure 2**.

1. **General background information.** Following the recommendations by Galletta (2013), the interview began with simple questions to build rapport and help make the interviewee comfortable (e.g., their current position, their years of leadership experience).

2. **Leader awareness.** In this stage, the interviewees were presented with *"Vignette I: Warning signs."* First, they were asked about their feelings toward Mr. Müller. Participants were presented with a pictorial feeling thermometer to aid in this process, a tool commonly used to gauge feelings about a specific group (Lavrakas, 2008). The thermometer was structured on a 9-point scale ranging from 0° (*very unfavorable/negative feeling*) to 100° (*very favorable/positive feeling*). It should be noted that this thermometer was only used as a visual aid to help participants evaluate and voice their feelings and was not intended as a quantitative measure. Afterward, interviewees were asked about their expectations regarding Mr. Müller and his situation (i.e., what they thought should happen next).

3. **IM strategy I.** Here, the interviewees were randomly presented with either *"Vignette II: Transparency"* or *"Vignette III: Fabrication."* We first used an open-ended instruction to assess their implicit attitudes: "Please tell me 1 or 2 words that you would use to describe Mr. Müller." Afterward, participants were asked about their feelings toward Mr. Müller and whether they had changed from the previous scenario, using once again the feeling thermometer as an aid. Finally, they were asked about their perceptions and strategies (e.g., how they would handle the situation, what were their main concerns).

Table 1: Participant demographics

ID	Age	Gender	Years of leadership experience	Current position	Industry	Company size	Experience with others' MH issues	
							Workplace	Private life
L_01	33	Male	7	CEO	Healthcare	11 - 50 employees	Yes	Yes
L_02	60	Male	20	Managing Director	Renewable energy	5 - 10 employees	Yes	Yes
L_03	35	Diverse	2	Head of Department	Semiconductor	More than 10.000 employees	Yes	Yes
L_04	34	Male	1	Team Lead	E-mobility software	51 - 250 employees	No	N/A
L_05	33	Male	4	Project Manager	Temporary architecture	51 - 250 employees	Yes	No
L_06	N/A	Female	8	Head of Department	Climate tech	11 - 50 employees	No	Yes
L_07	30	Female	3	Team Lead	E-mobility software	51 - 250 employees	Yes	Yes
L_08	53	Male	20	Director	Mining	251 - 500 employees	N/A	Yes
L_09	46	Male	5	Consultant	IT	1.001 - 5.000 employees	Yes	Yes
L_10	40	Male	2	Team Lead	Automotive	51 - 250 employees	No	Yes
L_11	46	Male	9	Group Leader	Space engineering	5.001 - 10.000 employees	Yes	Yes
L_12	38	Male	10	Team Lead	Healthcare	5.001 - 10.000 employees	Yes	Yes
L_13	38	Male	5	Director	Software development	51 - 250 employees	Yes	Yes
L_14	52	Female	13	Head of Department	Semiconductor	51 - 250 employees	Yes	N/A
L_15	32	Female	6	Head of Department	Fashion e-commerce	1.001 - 5.000 employees	Yes	Yes

Note. MH = Mental Health.

4. **IM strategy II.** In this stage, the interviewees were presented with the remaining vignette, "*Vignette III: Fabrication*" or "*Vignette II: Transparency*." The line of questioning was the same as in the previous stage.

5. **Final questions and sensitive information.** The interview finished with questions regarding organizational resources, interviewees' training needs, and personal experiences with mental health issues. Demographics such as age, gender, industry, and company size were collected using Zoom's poll feature.

Upon completion of the interview, participants were thanked for their participation and had the opportunity to share additional thoughts and insights. The complete interview protocol is detailed in **Appendix B**.

It should be noted that, given the semi-structured nature of the interviews, the order of the questions within each section of the protocol was not rigorously followed but rather used as a general guideline. Furthermore, participants would sometimes answer questions planned for a later moment, in which case the interview was adapted to allow for a more natural flow in the conversation.

3.4. Procedure

Before the interview, each participant was sent a reminder email with the interview date, time, Zoom meeting details, and a consent form in PDF format (see **Appendix C**), which detailed the interview procedure as well as data privacy and confidentiality conditions. Participants could then indicate their consent by sending a copy of the signed consent form or by sending an email expressly stating their consent (e.g., by replying, "I consent to the processing of my data for the purpose of this research").

Once participants had given their consent to the recording of the interview, they were invited to respond to the questions outlined in the interview protocol. The interviewing process took place between July and September 2023. All interviews were conducted in English and digitally recorded. Most interviews were conducted via Zoom (version 5.15.7), with two of them being conducted via Microsoft Teams due to technical difficulties on the participants' side. Overall, the interviews lasted between 26 and 48 minutes.

3.5. Data analysis

Each interview was digitally recorded via Zoom (version 5.15.7) or Microsoft Teams and transcribed verbatim prior to data analysis. An initial transcription was done using Trint transcription software (https://trint.com/), an AI-powered tool with automated speech recognition and natural language processing technology. Afterward, the resulting transcript was reviewed thoroughly and edited to accurately reflect the participants' exact wording. During this phase, a detailed transcription protocol following the guidelines proposed by McLellan et al. (2003) was developed to ensure the creation of standardized transcripts to facilitate data analysis (see **Appendix D**). This process resulted in approximately

204 pages of text. The finalized transcripts were analyzed and coded using MAXQDA Analytics Pro 2022 software (Release 22.8.0).

Data analysis was performed through *inductive thematic analysis*, which entails identifying, analyzing, coding, and reporting patterns within the data without trying to fit them into preconceived frameworks (Braun & Clarke, 2006). Following Braun and Clarke's (2006) guidelines, the analysis involved six phases. The first phase, *becoming familiar with the data*, was achieved by repeatedly listening to the interview recordings, performing a detailed transcription, and then reading and re-reading the finalized transcripts. At this stage, some meaningful experiences and ideas were noted down for future analysis without engaging in formal coding. In the second phase, we *generated initial codes*, systematically coding each transcript line-by-line. These initial codes were developed inductively and were meant to reflect participants' actual wording without engaging in interpretations. For example, when participants read about Mr. Müller's situation, some of them described their feelings using phrases such as "poor guy," "sorry for him," or "sad for him," all of which were coded separately. Furthermore, during this process, the answers pertaining to each vignette were color-coded and treated as separate units of analysis: "*Vignette I: Warning signs*" was light blue, "*Vignette II: Transparency*" was green, and "*Vignette III: Fabrication*" was orange. This approach resulted in over 350 initial codes. In the third phase, we started *searching for themes* in the coded data by grouping similar codes together. For example, the previously mentioned expressions "sorry for him" and "sad for him" were clustered together under the sub-theme "Sympathy." By the end of this stage, lists of candidate themes and sub-themes that better summarized the coded feelings, experiences, and understandings were developed for each of the three vignettes. In phase four, *reviewing themes*, the codes within each theme were reviewed to ensure conceptual similarity, and the different themes were compared to ensure their distinctiveness. At this stage, themes and sub-themes evolved iteratively, and patterns within and across vignettes started to emerge. In the fifth phase, *defining and naming the themes*, the themes found in the previous phase were further refined and organized to uncover the "story" behind the data. Finally, in phase six, we started *producing the report*, polishing our chosen themes and sub-themes, selecting quote examples and extracts, and linking the analysis to our guiding research question and sub-questions. For simplicity and to aid the narrative, the extracted quotes do not consider filler and repetitive words used by participants, nor the interviewer's crosstalk. The final themes and sub-themes derived for each vignette are detailed in **Appendix E**.

4. Results

4.1. Leaders' responses to warning signs of mental health issues

The diagram in **Figure 3** summarizes the general process leaders underwent when presented with an employee with
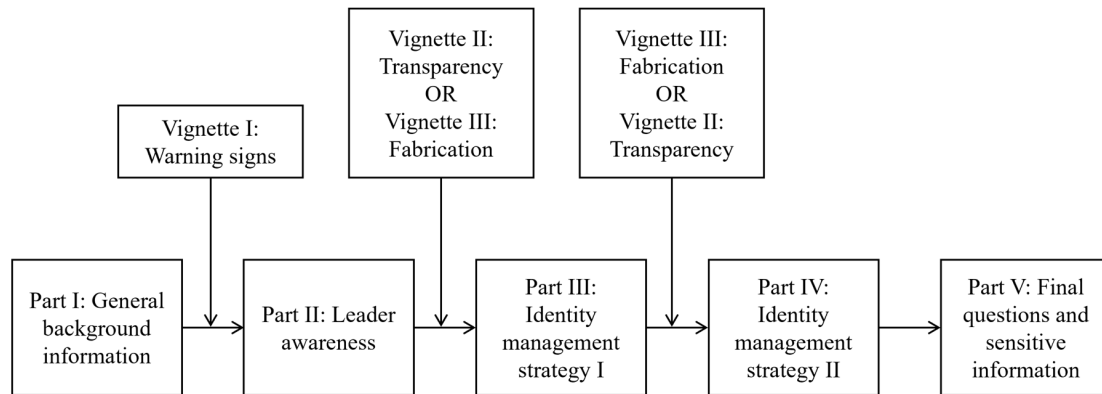
Figure 2: Study design

warning signs of a mental health issue. This process model proposes that managing a distressed employee involves emotional and cognitive reactions, which are closely linked and dynamically shape leaders' behavioral intentions. These reactions often happen simultaneously, so there is no clear distinction between a cause and an effect.

When reading the first vignette, all interviewed leaders recognized that there was something wrong with Mr. Müller and expressed a need for immediate action. As one interviewee pointed out, "Clearly something is going on. [...] Immediate reaction, I would say I... You have-, I have to talk to him. Ask him 'What's going on?'" (Leader_13). However, only two leaders explicitly recognized the signs described in the vignettes as indicators of a potential mental health issue, specifically depression. In the case of one leader, this early detection stemmed from his own experience dealing with burnout and depression and allowed him to empathize with Mr. Müller:

> I think that what I would feel it's empathy. Because I've been in that situation. I've been burned out. Or I've been with depression. So, I know what it feels. I know when someone is feeling down and I've been there. (Leader_01)

When elaborating on this instinctive thought of "I need to talk to him" or "I need to do something about this," both emotional and cognitive aspects emerged. On the emotional side, the interviewed leaders exhibited a range of sympathetic and empathetic responses toward Mr. Müller and his situation. These included expressions of concern, worry, and a desire to support him professionally and sometimes even personally:

> I feel sad for him, actually. I would like to find a way to help him somehow. (Leader_10)

> Well, I feel concerned. More on a personal level, I would say. So, yeah, I have the feeling that something is off. (Leader_11)

Furthermore, most leaders evaluated Mr. Müller favorably on the feeling thermometer (ratings of 50° and above),

focusing first on understanding his situation rather than jumping to negative judgments. Only one leader perceived his behavior as someone who was "losing track and interest in his work" (Leader_09), resulting in a more unfavorable evaluation.

On the cognitive side, interviewees tended to reflect on their role as leaders and their dual responsibility of ensuring the employee's well-being and the team's performance. Leader 15 best explains this duality as follows:

> For me, always, I have two thoughts, right? And I guess that's due to my role. [...] And first thing is, like, you feel sorry for the person, and you want to personally help this person to feel better. But obviously, then you have a second thought that's more rational and is, "Okay, I will need to replace this person, or I need to see how I can make work happen if this person is not working." Right? So... You cannot be only in the personal level, because otherwise you're just a friend. And at the end of the day, you also need to make sure that the work is done and that the other teammates are not being affected by this case. (Leader_15)

Looking to fulfill these two responsibilities, interviewees set themselves two consecutive objectives to successfully manage the situation: (1) try to understand what is behind Mr. Müller's behavior (i.e., sensemaking), and (2) figure out how to help (i.e., problem-solving). In the words of two leaders:

> So, I would confront him, basically. Confronting sounds aggressive, but I would confront him with the situation. I would ask him, "Hey, look. You were really contributing a lot in the past, and the quality that you delivered was really good. And recently, I see that, you know, your behavior has changed, the quality of your output decreased, and you seem stressed. So... Is something wrong? And can I support you with this?" (Leader_04)
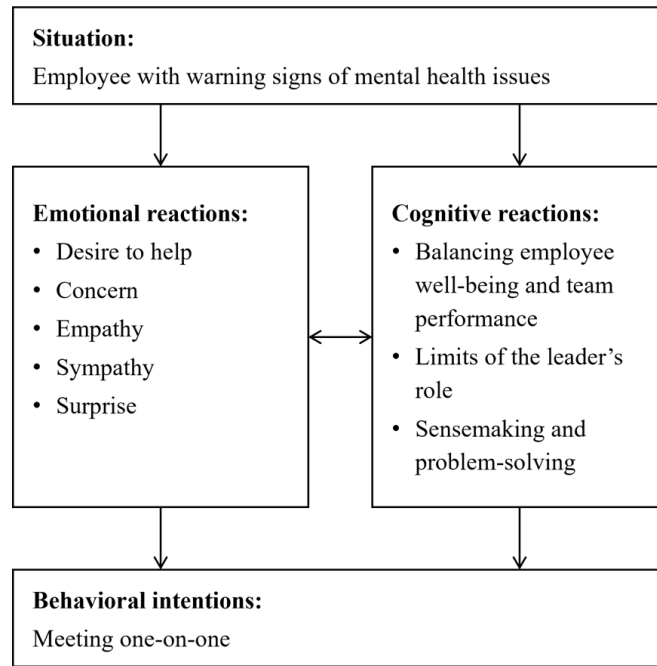
```
┌─────────────────────────────────────────────────────────────────────┐
│ Situation:                                                            │
│ Employee with warning signs of mental health issues                   │
└─────────────────────────────────────────────────────────────────────┘
        │                                           │
        ▼                                           ▼
┌──────────────────────────┐        ┌──────────────────────────────┐
│ Emotional reactions:      │        │ Cognitive reactions:          │
│  • Desire to help         │        │  • Balancing employee         │
│  • Concern                │◄──────►│    well-being and team        │
│  • Empathy                │        │    performance                │
│  • Sympathy               │        │  • Limits of the leader's     │
│  • Surprise               │        │    role                       │
│                           │        │  • Sensemaking and            │
│                           │        │    problem-solving            │
└──────────────────────────┘        └──────────────────────────────┘
        │                                           │
        ▼                                           ▼
┌─────────────────────────────────────────────────────────────────────┐
│ Behavioral intentions:                                                │
│ Meeting one-on-one                                                    │
└─────────────────────────────────────────────────────────────────────┘
```

Figure 3: Leaders' responses to an employee displaying warning signs of a mental health issue

I should try to understand what's the origin of this situation. So, if it's related to the work environment, if it's something that is out of the, let's say, sphere of the work. So, and yeah, I feel that I should try to understand what's going on and, if possible, to help. (Leader_11)

Emphasizing the importance of communication and understanding as a first step, leaders often pondered possible causes for Mr. Müller's change. For example, Leader 08 recounted:

So, if a person's behavior changes like that, usually you're gonna find something in the private background, yeah? So, could be a family member that needs extra care. So, it could be a kid that's passed away. Could be a partner that's passed away. Could be financial problems. All of that. So, I would, first of all, be interested in what's happening with that person. And, of course, I would, um, talk to the person and say, "We should have a four-eye conversation. Is there anything you would like to tell me?" (Leader_08)

In this regard, Leader 04 further highlighted the importance of figuring out whether Mr. Müller was struggling due to a personal situation or something in the workplace, as there are limits to what a leader can help with:

I think it's a thin line, right? You should not really... If it's something private, then you should-, I mean, it's difficult to confront people with

something private, obviously. But maybe it's also within the company, right? And if it's within the company, then it's also my duty to find out. Maybe [...] he has problems with other colleagues, or something like that. (Leader_04)

This search for understanding to develop a concrete action plan, together with their underlying feelings of sympathy and concern, ultimately translated into the intention of arranging a one-on-one meeting with Mr. Müller. In describing this hypothetical meeting, leaders emphasized aspects such as asking directly, discussing openly, and explaining their position by "sticking to the facts." Moreover, some leaders noted the importance of trying to ensure a comfortable, non-threatening environment for the employee to encourage an open and honest dialogue:

And I would approach him out of the office, for example. "Let's go have a coffee in the corner." I think when you take twenty minutes, half an hour, to do something like that is equally important than "keep on working" because it depends... Your whole team is depending on this person, so you're working for everyone. So, I would take some time - and I've done it actually - outside of the office, some like common space, not... Like at the same heights, in a more friendly way of speaking, you know? More like "relax." And ask him, "What is happening?" [...] And the idea is to... Both of us to feel comfortable, and nobody's watching, and it's like a safe space or something like that. So, I would-, I prefer that. (Leader_05)

4.2. Leaders' responses to employees' IM strategies

4.2.1. Commonalities in managing transparency and fabrication strategies

When analyzing interviewees' responses to Mr. Müller's IM strategies, a general pattern of management emerged, rooted in leaders' distinction between their own responsibilities (i.e., what they should do) and the employee's responsibilities (i.e., what they expected the employee to do). However, these two spheres of responsibility are not entirely separate: both sides have a shared responsibility in finding solutions to move forward. These findings are visually represented in **Figure 4**.

"What the leader should do"

The dual responsibility of protecting employees' well-being while ensuring the team's performance mentioned during the warning signs stage also underpinned leaders' cognitions and intended behaviors when reflecting on how to manage Mr. Müller's *transparency* and *fabrication* strategies, with differential focus on the well-being or performance sides depending on the specific situation. Here, leaders were concerned with finding a balance between providing support to Mr. Müller to aid in his recovery while maintaining productivity and achieving the team's goals. Leader 05 recounts this challenge as striking a balance between a "human" side and a "work" side:

> Like "work thing": what we can do from official information. And "human behavior" is like: "But you're not alone in this. So, we're gonna work it out. We're gonna see what happens." Something like that would be the message. Like in those two channels. [...] Because, well (chuckles), we're still working. And at the end of the day, the results are the results. (Leader_05)

On the well-being side of the equation, leaders were concerned with providing support by offering workplace accommodations, suggesting time off, encouraging the employee to seek professional help, and engaging the employee in an open discussion to find out what he needs. Moreover, some interviewees highlighted the importance of emotional support, particularly by "being there for them" and reassuring job security.

> So, I think if it's a... If it's something that I think is probably very serious, then I'd probably suggest that they, you know, maybe see a counselor or somebody who's professionally trained to take these things on. Obviously, what I can do as a boss is say, "Look," you know, I can reduce their workload so that they'd have more time to focus on their personal problem, or suggest that they take a, you know, bit of time off and this kind of thing... [...] And obviously, if they need professional therapy or counselor or something, to

seek that out, and I would obviously be supportive of that and give them the time to do that. (Leader_02)

> And I would ask him, like, to tell me what's good for him at the moment. Like, if he knows that already or if he has someone he can talk to about it and figure it out. (Leader_07)

> But he doesn't need to worry. I'm not going to fire him or her because of this. Of course not. Especially if he was a good performer. So is all fine. But that he needs to, you know, take it easy. (Leader_15)

On the performance side, leaders reflected on how to manage the workload and balance the team's responsibilities to ensure that work would continue smoothly in the absence of a team member. Here, leaders were concerned with ensuring that Mr. Müller's tasks were covered while trying to minimize the impact on the team. In this regard, interviewees proposed taking up Mr. Müller's tasks themselves, distributing them among the team, or even hiring someone to temporarily cover for him.

> In the meantime, I would check the workload from the rest of the team. Maybe I could take some part of his responsibilities. Work out [...] a plan. [...] But there are for sure tasks that are not being done. So, we have to do something about that today (chuckles). Or yesterday, for sure. So, try to take his activities, that he is not doing. Then, help from the rest of the team, including me. I can take some tasks, etc. But the result? Results are the results, and... When you have to... Explain yourself at the end of the day. The numbers, and from experience, doesn't matter what happened in the middle, right? It's tough. It is tough. But you have to show... Results. (Leader_05)

When reflecting on the impact task redistribution could have on team dynamics, interviewees recounted another dual responsibility for leaders: balancing the needs of the affected employee and those of the other team members. On the employee's side, leaders highlighted the importance of respecting Mr. Müller's privacy and need for confidentiality. On the side of the team, leaders were concerned with managing communication with the team to protect team dynamics and prevent misunderstandings and negative perceptions. These negative perceptions could be directed toward Mr. Müller due to his decreased work performance and any "special treatment" he might receive, but also toward the leader due to a feeling of them "not doing anything about this." In the words of Leader 14:

> Very difficult if it's, like, a closed situation. Nobody knows about it. Nobody wants to talk
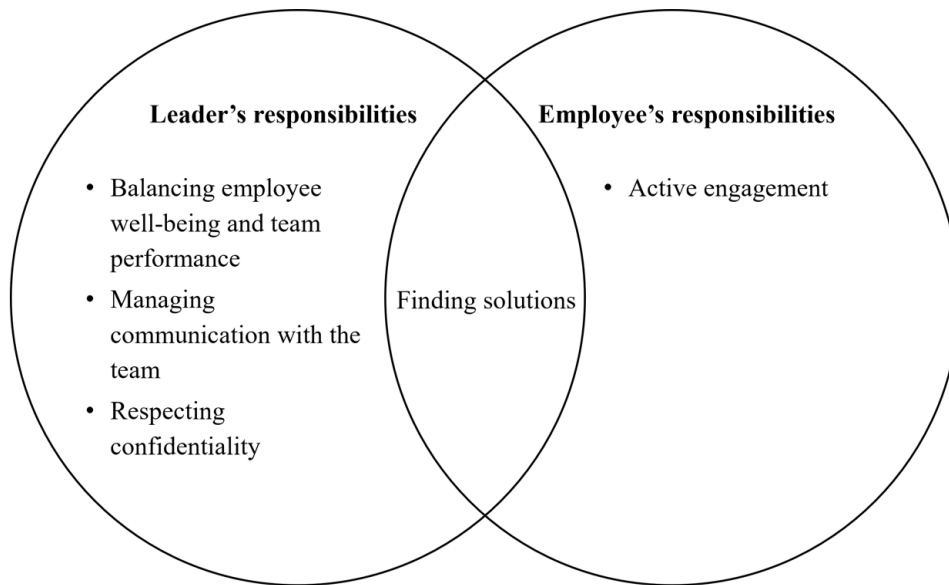
Figure 4: Leaders' distinction between spheres of responsibility

about it. [...] The people will then see, "Okay, we achieved" or "We achieved something, we could cover for that person." But if they don't know what's behind, it will not give them a good feeling or a sense why is... Why is that done. It would be more negative. Not necessarily towards that person but also towards the boss and the company. "Why aren't they doing anything about it? This person is not working, is not performing, is showing up late, is distancing himself from social activities, and nobody does anything about it. The company doesn't care." Yeah? "They let me do more work, and they don't care." (Leader_14)

In managing this delicate balance between confidentiality for the sake of the affected employee and transparency for the sake of the team, interviewees proposed to encourage Mr. Müller to open up with the team, even if partially, citing that keeping the team "in the dark" could create a vicious cycle in which the team starts distancing from Mr. Müller, and this worsens his situation.

> Because I think it makes things easier, right? And I would try to explain him that if there is no knowledge about it, people tend to, you know, go for the wrong conclusions. And think that he's, I don't know, not interested or not motivated or... [...] But that would just be a suggestion, right? It's not... [...] It's not on me to decide, right? I would just suggest it. (Leader_04)

Finally, interviewees also recognized that there were boundaries to their responsibilities as leaders. First and foremost, the support they can provide to a struggling employee

is limited to the workplace context. They can adjust working conditions, take over some tasks, and even offer time off to give the employee time to recover. However, they cannot and should not interfere in the personal sphere. In this regard, several interviewees highlighted that leaders are not trained mental health professionals and, as such, are not qualified to treat an employee's potential mental health issues. The only thing they can do is encourage employees to seek help and support them in a professional capacity.

"What the employee should do"

Just as leaders recognized their responsibilities in managing a struggling employee, they also acknowledged that the situation could not continue indefinitely, and voiced expectations of what Mr. Müller should do. Specifically, interviewees emphasized the importance of not staying passive in the face of challenges, expecting the employee to demonstrate active engagement and proactive involvement in seeking solutions. Furthermore, leaders noted that this perceived effort and willingness to overcome his personal situation would be crucial in shaping their subsequent understanding and support.

> I mean, you're having a problem. Okay, I get it. But what are you doing to get over it? I mean, staying in bed it's not a solution, or not-, getting to a point where you're not delivering, it's not a solution. You cannot be like that, in a momentum forever. You have to do something. (Leader_01)

> And then you understand, you try to support, you try to change the work schedule, and so on, but you still EXPECT something also from the team member. We try to give some flexibility or sup-

port, but [...] I also expect something back. (Leader_14)

I also feel like this in a personal way. That we can be like that, but eventually the person needs to take action. What I mean with this is, like, we can have this conversation. I can support you. I can advise you. I can tell you, okay, how we can come-, what can we do. But this is not something that could lend-, long for... Three months. So, this person needs to take action. Because, again, [...] my boss part. And my boss part is, "I need the job to be done." (Leader_15)

Finding solutions: A shared responsibility

Although leaders established having a responsibility to provide support for a struggling employee, they emphasized that finding solutions and moving forward was a shared responsibility. In this regard, interviewees sought to empower Mr. Müller to voice his needs and encourage him to make choices that could help him move forward, whether this involved taking time off, staying engaged at work, or seeking professional support.

I mean, I can offer him any kind of options. So, if he prefers to keep doing the work he's doing because somehow it helps to keep his mind occupied, then we can do that. He prefers to be a little bit unloaded from work duties? We can do that as well. He'd prefer to take to take a period off? That's totally okay. So, we can tune the situation to what also he believes is the best for him. (Leader_11)

Employees are so different and different personalities. And I think, like, each person knows best what would help. And also, I think it's always important to bring them into an active role because when I always offer something, then, I mean, he seems-, it seems that he's a more passive person. So that's why I also would ask HIM to say, "Okay, are you then committed to get better at that point? And what helps you there?" And I think when he suggests something, him, then he also is able to take more commitment for it. (Leader_06)

4.2.2. Differences in managing transparency and fabrication strategies

When comparing leaders' responses to *transparency* versus *fabrication* strategies, we uncovered three main differences: (1) in their feelings toward Mr. Müller, (2) in their focus on well-being versus performance, and (3) in their perception of Mr. Müller's control over his situation (i.e., controllability) and, subsequently, his expectations of recovery.

The importance of (perceived) transparency

When faced with a *transparency* strategy, interviewees tended to feel more favorably toward the struggling employee (i.e., indicated they would increase their rating on the feeling thermometer), voicing renewed feelings of sympathy, empathy, and support. When reflecting on why they felt more positively, leaders indicated their appreciation for Mr. Müller's openness and honesty in sharing his personal difficulties, with two leaders further characterizing him as "brave." Moreover, due to his acknowledgment of his mental health issues, leaders perceived him as someone who was willing to face his problems and wanted to move forward. One leader explained this as follows:

Here's a German saying, maybe you can translate, "*Einsicht ist der erste Weg zu Verbesserung.*" [...] So, if you acknowledge something's wrong, that is the first step for change. [...] And that, of course, would make my life and the person's life much better, because this is the first step on a way towards a change, right? Because when the person says, "Yes, of course, there is something wrong." Okay. Then you know, from there, you can change something. But if you deny that something's wrong, then of course it's not gonna-, you're gonna head down the same path as you have been doing the last couple of days or months. (Leader_08)

In contrast, when faced with a *fabrication* strategy, interviewees tended to feel more unfavorably toward Mr. Müller, rating him lower on the feeling thermometer compared to the *warning signs* and *transparency* scenarios. In this case, leaders generally perceived him as someone in denial or lacking self-awareness regarding how his personal situation affects his and the team's overall performance. Furthermore, interviewees noted that insofar as the person continued denying or refusing to acknowledge the problem, their ability to intervene and address the issue would be hindered, resulting in feelings of frustration and annoyance.

He was blocking. [...] He blamed it on different sources and not in his self. That's or he's not aware that his performance is not good. And if someone is not aware of this issue, and I had this too, it's very difficult to talk with these people because they're living their own bubble. (Leader_09)

From the scenario reading, I would assume it IS affecting work and I have an objective view on the things here. So, it's always hard, because always-, if you deal with people, it is always subjective. It can never be 100% objective. But given the fact that I am absolutely objective in this scenario, and if someone then would say, "Well, no, I don't have a problem" and forces that

away, then of course I would have a more un-favorable feeling, saying, "Listen, you gotta do something and you can't ignore that there is a problem." (Leader_08)

Despite this comparatively more unfavorable evaluation, most leaders still showed sympathy and concern toward Mr. Müller and an overall positive evaluation on the feeling thermometer (ratings of 50° and above), with only three leaders evaluating him below 50°. However, interviewees pointed out that this evaluation hinged on Mr. Müller's reactions during and after the meeting.

> Depending on the outcome of the discussion. Because, of course, in the meeting, I would tell them, "Look, I understand your situation. I understand it's really tough." [. . .] "Your performance HAS changed significantly, and everybody is noticing it." And depending on... How he would react to that. Understanding when I give [. . .] him examples and so on. Or still rejecting. Yeah? So, if he would understand, my feelings would still be the same. If not, of course, they would go down. (Leader_14)

Finally, it should be noted that two leaders considered that Mr. Müller was being open and honest when using a *fabrication* strategy. In this case, they sympathized with his relationship problems and appreciated his perceived transparency, which resulted in an overall favorable evaluation. In the words of Leader 13:

> If he was good before. . . And he was transparent. There is no trouble. In my-, from my side. If he's trying to conceal something, to hide something, then there would be the drop there. (Leader_13)

Shifting the focus between well-being and performance

As mentioned previously, leaders' cognitions and intended behaviors were primarily rooted in keeping a balance between protecting employees' well-being and ensuring the team's performance, with differing emphasis on one side or the other depending on the IM strategy the employee used. When confronted with a *transparency* strategy, leaders' focus shifted toward the well-being part of the scale, striving to provide support and encourage the struggling employee. In this case, leaders focused on urging Mr. Müller to seek professional help and to prioritize their health over work. In addition to workplace accommodations and potential time off, leaders also mentioned enlisting HR's support, acting as a bridge to find suitable help, and monitoring the employee to provide further assistance as needed.

> So first of all, I was mentioning offer my support, but also to make sure that he takes the right steps on looking for a specialist [. . .] "Hey, I wanna

help you. I don't wanna you to come to work if you feel mentally disabled, so I want you to stay home and look for a treatment so that you can get well again." (Leader_03)

> I think this is, like, also some issue that you as an employer or manager should really take serious. And actually I would, like, recommend him to also, like, maybe go to the doctor's and maybe to take some time off, so to be, I mean, sick. And then to just focus on his mental health and to say, "This is more important than your job is at the moment, and just take your time." And I wouldn't put any pressure on him. And I mean, of course, I can't really recommend, when it comes to the whole doctor things, but I would just say for myself, "It's totally okay when you take your time" and "Focus on your health now" and "Don't be embarrassed about it" and, yeah, that we find a solution there. And I would support him. (Leader_06)

Moreover, leaders sought to provide more emotional support, emphasizing that mental health is like physical health and "there is nothing to be embarrassed about." In this regard, two leaders stated that they would share their own experiences with mental health issues to make Mr. Müller more comfortable and to show him that he can overcome his situation:

> Well, of course, he's been very open and honest. And I would admit the same thing because I've had a burnout. Yeah. So, I know what mental problems can do with you. And, of course, in that very private conversation, I would also admit that I had have problems and that there is a way to solve it. That you have to go and seek for someone that's gonna help you on a professional way, get out of that situation. So, you can't handle that yourself. (Leader_08)

> I mean, first, I also have gone to therapy in my life. I find therapy amazing, so I actually recommend it to everybody. I love it (chuckles). And... I think it's very good. And, you know, you have time to just to talk to someone about your life. So, I would feel even more sorry and more connected to this person. And I will definitely recommend-. I will share my personal experience, as well, so that he doesn't need to feel embarrassed. And I would highlight that mental health is like the physical health. (Leader_15)

In contrast, when faced with a *fabrication* strategy, leaders' focus shifted toward the performance side of the scale, looking to align perspectives and ensure a prompt return to previous performance. Here, interviewees were first concerned with communicating openly to clarify the problem

and ensure that both parties had a shared understanding of the situation. During this process, leaders highlighted the importance of appreciating Mr. Müller's previous contributions and talking in an objective, non-accusatory manner, with concrete facts to back their claims.

> I think, in this case, it's really important to show, but I mean in a really appreciative way. To show HOW it's actually affecting his work and not in a personal way, but I'm just naming examples where I would have wished for other reactions, actions. So, like giving feedback to specific work performance, topics, and situations. And showing him like this, "Okay, see, it IS somehow affecting your work performance." "That's not only the reason why I'm asking and why I want to talk about it, but it shows, like, that we have to deal with that and that we have to find solutions that work for both of us." (Leader_07)

After getting on the same page about the situation, interviewees sought to set clear expectations for future performance, emphasizing that the situation cannot go on for an extended period. To aid in this process, leaders stated that they would, for example, encourage Mr. Müller to take time off to address his personal issues, rest, and return to work with a clear mind.

> So, I would say, "Okay, when you are not able to work at all, then you have to think about, taking some time off or, yeah (chuckles), deal with your things that you have on a private side and then you have to come back to work and be on the same level that you had before." (Leader_06)

> Yeah, come up to a certain agreement that this should not go... For far long. And if he also needs some time to rest and take time for himself, I'd also check if he could take some day off, vacation, so that he can work through his problems. I'd offer some options. (Leader_03)

> [. . .] and if he has a relationship problem, you have to take some days free and come back with a clear mind. (Leader_12)

Perceived controllability and expectations of recovery

Another difference that emerged in the management of IM strategies was Mr. Müller's perceived control over his situation and, subsequently, the expectations that leaders had of a potential recovery. When faced with a *transparency* strategy, leaders highlighted that having a mental health issue was not the employee's "fault" and that it was something out of his control:

> This is not on you; this is not on me. We have something to do. [. . .] But it's not... Whose fault

is this? I cannot feel negative about something that I know he cannot control. (Leader_05)

> [. . .] it's something you never ask for. To be impacted by some problem like this. [. . .] I mean, it's simply something that is impacting you like any other kind of problem-, sickness. I mean. And so, you have just to be lucky of finding the right therapy to get out of this. To get out of this problem. (Leader_11)

Furthermore, interviewees were concerned with the possibility that the workplace or the working conditions caused the employee's mental health issues:

> And with the mental health, for example, we don't know where it came from, right? It can also be a company issue. It could've been that he has too many tasks, too many, I don't know, tight deadlines, pressure from other colleagues, something like that. (Leader_04)

> And I also hope that he's not mentally sick because of the work (chuckles). (Leader_03)

Conversely, when dealing with a *fabrication* strategy, leaders expressed the belief that while personal challenges may affect an individual's well-being, it is ultimately their own responsibility to manage and resolve these issues without letting them interfere with their work performance. Here, interviewees highlighted the importance of maintaining clear boundaries between personal and professional lives and expected Mr. Müller to be able to make this separation in the future.

> I can understand his situation, but it's still unprofessional. Because your private stuff has not to interfere to your job. Of course, when someone died in your family, this is absolutely understandable. But if you have relationship problems, then I would say fix it and get back to work because this pays your salary. (Leader_09)

> I had also a relationship problem in the past. And (sighs) it's a problem, but it's a problem you can keep without infecting your work. [. . .] In the first case, the health issue was the problem. In this case, Mr. Müller is, for me, the problem. (Leader_12)

These opposing views regarding the employee's control over his condition further influenced leaders' expectations of a return to normalcy. In the case of *transparency*, leaders perceived mental health issues as more complex, noting that they could manifest in various forms and had the potential to be more severe and long-lasting, unlike the relationship problems described in the *fabrication* vignette, which could be resolved more quickly. Moreover, interviewees were concerned with the possibility of mental health issues worsening over time without proper intervention.

[...] a relationship problem, you know, it can be triggered for a while, and then it can be managed, or the relationship resolves itself. But a mental health issue can be a much longer term thing. (Leader_02)

Because in the first case *[referring to fabrication vignette]*, it's a personal thing and-, which can be a start for a mental health disease or a depression, but it's just on the beginning, and I think that at that moment, things can develop for better or for worse. And it's just happening there, you know? Which in the second case *[referring to transparency vignette]*, is already-, already became a problem. So, there the person doesn't-, not only need a week at home, maybe having a vacation to... To have a free mindset, but now this is one step ahead. (Leader_03)

So, the period he is probably not at 100% would be much longer. If-, there's a serious probability that it will never be better. It might... There's a serious probability that it will even get worse. (Leader_13)

I'm not sure at this moment if we can go on with him in the future. Psychology problems are not easy to cure. (Leader_12)

4.3. Company support

When asked about the availability of company resources and guidance in cases such as the ones described in the vignettes, six leaders stated that their company did not offer such resources, and three acknowledged that they were unsure what resources were available, if any. On the other hand, five leaders indicated that their companies did offer resources to help them in matters of mental health, either through dedicated mental health platforms or through a specific person responsible for such matters.

Regardless of whether specific resources were available, six leaders stated they would likely ask their HR or P&O teams for support in managing the situation, and four indicated that they would also turn to their supervisors for help.

4.4. Leaders' training needs

In closing, interviewees were also invited to share their training needs regarding the management of mental health issues in the workplace and their preferred learning methods. On the side of leaders' training needs, we identified six main topics of interest, which are detailed in **Table 2**, together with interviewees' specific learning objectives.

Regarding leaders' preferred learning methods, all interviewees emphasized the importance of using interactive, hands-on, experiential learning approaches beyond traditional lectures or theoretical presentations. In this line, leaders expressed the need for an engaging workshop or training focused primarily on real-life applications. More specifically, interviewees highlighted three learning methods:

1. **Role-playing.** By engaging in role-playing scenarios (either with a professional actor/actress, another participant, or a coach), leaders sought to have the opportunity to try out what they learn in a low-stakes environment, giving them a space to practice, adjust, and improve their skills.

2. **Use of real-life cases.** By using real cases and experiences, leaders expected to be able to understand the practical application of the theoretical input. With this method, interviewees wanted the opportunity to engage in practical problem-solving and to better understand how a mental health issue could develop, how to detect it in time, and lessons learned from others' past experiences.

3. **Groupwork.** In this regard, interviewees emphasized the value of having a small, close group of colleagues with whom to work together to solve problems, discuss case studies, give feedback, and exchange opinions and experiences.

Finally, leaders also mentioned needing a handout with concrete guidelines and recommendations. Examples mentioned in this regard included a checklist with the warning signs that leaders should look out for in their employees, a guideline with the critical steps in managing situations of mental ill-health in the workplace, a guide on how to talk about this topic with a struggling employee, and a list with "Dos and Don'ts" with clear instructions to avoid making critical mistakes.

5. Discussion

By using vignettes and semi-structured interviewing, this study aimed to explore leaders' responses to employees with mental health issues depending on their IM strategies. Through an inductive approach, we identified the emotional and cognitive processes that shaped 15 leaders' intentions to behave in three scenarios: when an employee is displaying warning signs of mental health issues, when the employee discloses a mental health issue (a *transparency* strategy), and when the employee covers up their mental health issue by using a personal problem as an excuse (a *fabrication* strategy).

In the first scenario, our results showed that leaders tended to sympathize with the employee, acknowledging that something was wrong and that there was an urgent need for intervention. Although all leaders expressed a desire to understand and help their employee, only two leaders were able to explicitly identify the described signs as symptoms of a mental health condition (i.e., depression). This finding is troubling, as this limited awareness hinders leaders' ability to provide appropriate resources to mentally strained employees in a timely manner (e.g., encouraging them to seek professional help, connecting them to relevant company programs, etc.). Furthermore, this implies that if

Table 2: Leaders' training needs

Topic	Learning objectives
Background on mental health	What is mental health
	Types of mental health conditions
	Prevalence of mental health conditions
	Causes and symptoms of mental health conditions
Prevention	Healthy leadership styles
	How to avoid burnout
	How to design and ensure a healthy workplace
	How to promote healthy behavior in the team
Awareness and sign recognition	How to identify the signs of a potential mental health issue
	How to distinguish warning signs from lack of motivation or a "bad day"
	How to anticipate if someone is more at risk of developing a mental health issue
Managing the situation	How to react depending on the type of mental health condition
	How to broach the subject with the employee
	How to communicate with the employee in an appropriate manner
	How to manage these situations, potential approaches and solutions
	Ways in which the leader (and the company) can provide support
	How to accompany the employee in the process
	How to manage the communication with the team
	Things to avoid or that are a "no go"
Reintegration	How to "onboard" the employee again (when they have been out for a long time)
Training the team	How to train others so that they know how to react

employees themselves do not acknowledge that they have a mental health issue, either because emotional and cognitive impairments preclude them from doing so (Dimoff & Kelloway, 2019b) or because of a conscious decision not to disclose, they may not gain access to these critical resources at all.

In the second and third scenarios, we identified common and distinct elements in leaders' management of employees' IM strategies. Among the commonalities, leaders were concerned with maintaining two balances: one between the employee's well-being and the team's performance, and another between the employee's confidentiality and the communication with the team. In the first, leaders strived to provide support for the struggling employee while ensuring that the team's goals were met. In the second, leaders were concerned with respecting the employee's privacy while determining how to communicate with the team to minimize misunderstandings and adverse effects on team dynamics. These challenges have also been reported in previous research on managers' experiences in situations of employee mental ill-health (Ladegaard et al., 2017; Martin et al., 2018) and highlight the need to provide training and support for leaders to strike the right balance among these different sources of cross-pressure.

Another common point in the management of IM strategies was leaders' expectation of the employee's active engagement and accountability for their situation. In this regard, although leaders were generally understanding and willing to provide support, such support was framed on the expectation of the employee actively trying to resolve their situation and, eventually, returning to their previous performance.

This finding is consistent with previous research showing that individuals with a stigmatizing condition (e.g., depression) who are actively coping and managing their symptoms are blamed less and are more likely to receive social support, regardless of whether they were perceived to be responsible for their condition in the first place (Key & Vaughn, 2019; Schwarzer & Weiner, 1991).

On the other side, we uncovered three main differences in leaders' management of *transparency* versus *fabrication* strategies. First, leaders felt more favorably when they perceived that the employee was being honest and transparent. In contrast, their feelings were more unfavorable when they perceived that the employee was concealing something or was in denial. Second, leaders adjusted their focus on well-being versus performance depending on the situation. In the case of *transparency*, their efforts were focused on ensuring the employee's well-being and providing adequate support. In the case of *fabrication*, the focus shifted toward aligning perspectives and trying to get the employee's performance back to normal. Finally, leaders perceived that the employee had more control over his situation when using a *fabrication* strategy, which further influenced expectations of a quicker recovery.

These findings provide evidence that *transparency* strategies are more likely to lead to supportive leader responses, eliciting more favorable feelings and helping behaviors and allowing struggling employees access to relevant resources, such as employee assistance programs. Conversely, *concealing* strategies such as *fabrication* were shown to be more likely to elicit negative feelings, limiting the extent of the support provided and, in some cases, even leading to un-

supportive responses (e.g., judgmental behavior). One possible explanation for these results derives from the visibility of symptoms. Following Jones & King's (2014) disclosure model, given that leaders were already aware that something was wrong with the employee after the first vignette (indicating a high degree of visibility), an attempt to conceal could communicate distrust in the leader and lead to more negative interpersonal outcomes. Furthermore, such behavior might be perceived as inauthentic, which may damage the relationship and increase social distance (Lynch & Rodell, 2018).

However, although a *transparency* strategy elicited more positive responses, leaders perceived that an acknowledged mental health issue represented a more severe, complex, and challenging situation, with lower expectations of recovery and a higher probability of worsening. These perceptions have the potential to negatively affect the individual's professional outcomes, such as performance evaluations, salary, or future promotion decisions. These results support the existence of a *disclosure dilemma* (Griffith & Hebl, 2002; K. P. Jones & King, 2014) that individuals with mental health issues must negotiate when deciding whether to disclose their condition. On the one hand, they could garner social support and access much-needed resources. On the other hand, they could also face workplace inequities due to underlying assumptions about their capabilities (Colella & Santuzzi, 2022; Kalfa et al., 2021). These findings highlight the need for workplace interventions to reduce stigma and challenge common misunderstandings surrounding mental health conditions, such as the perception that those with a mental illness are less competent or that working is unhealthy for them (Colella & Santuzzi, 2022).

5.1. Theoretical contributions

From a theoretical perspective, this study expands on existing disclosure and IM models and frameworks by exploring the cognitive and emotional mechanisms that shape leaders' supportive or unsupportive responses toward stigmatized employees. Specifically, our findings suggest that the discloser's perceived honesty and active coping efforts (i.e., *offset controllability* (Key & Vaughn, 2019)) could be critical in determining positive outcomes via the confidant's reaction. However, these dimensions were not explicitly explored in the reviewed disclosure models. Future research could further analyze these constructs as potential moderators between IM and the confidant's reaction, similar to the *timing* attribute in the model developed by K. P. Jones and King (2014).

Another contribution from this study relates to the previously discussed *disclosure dilemma*. More specifically, even if the confidant's reaction is supportive and has a positive influence on the discloser's well-being and interpersonal outcomes (as described in the models by Chaudoir and Fisher (2010) and K. P. Jones and King (2014)), individual professional outcomes could still be negatively impacted. This is consistent with Kalfa et al.'s (2021) concept of *care-based structural stigma*: Even a well-intentioned approach, intent

on supporting and protecting the employee, might inadvertently restrict the employee's opportunities and agency in their work. This finding underscores the complexity of the stigma surrounding mental illnesses, showing that supportive responses can be a double-edged sword and challenging the notion that specific IM strategies could be labeled as "good" or "bad."

5.2. Practical implications

The findings from this study also provide practical insights for HR practitioners, management education, and employees. First, our results highlight leaders' need for clearly defined and accessible organizational policies, guidelines, and resources to support them in managing an employee with a mental health issue. In this regard, organizations and HR practitioners can provide support in at least four ways. Firstly, by implementing and investing in mental health-specific resources, such as employee assistance programs and mental health platforms. Secondly, by providing mental health training to leaders so that they have the knowledge and tools to manage their responsibilities and different sources of cross-pressure. Thirdly, by accompanying leaders during the process of managing an employee with a mental health issue, ensuring that the leader also has access to support as needed. Lastly, by continuously promoting the resources available within the company to all employees.

Second, in this study, we uncovered leaders' self-identified learning needs and preferred learning methods regarding mental health management. In this process, we identified six learning topics from which leaders could benefit: background on mental health, prevention, awareness and sign recognition, management of the situation, reintegration, and team training. Notably, and in alignment with leaders' self-evaluation, leaders' responses to the first vignette in this study further highlight the need for awareness training so that leaders can recognize warning signs of mental health issues even if the affected employee is unaware or unwilling to disclose. Moreover, our findings on IM strategies also underscore the importance of stigma reduction training to avoid, for example, possible instances of *care-based structural stigma*. Put together, these topics can serve as a basis for developing and implementing appropriate mental health education initiatives and training programs, which could contribute to creating healthier work environments in which leaders and their teams can thrive.

Finally, our findings may help employees currently struggling with a mental illness to choose a strategy that is more likely to increase supportive responses from others and avoid strategies that could be harmful. Specifically, we found that demonstrating transparency and active coping mechanisms can help garner social support and elicit more favorable feelings. However, it is essential to note that these results are not meant to solely place the responsibility for supportive responses on the employee's shoulders. Both leaders and organizations have a responsibility to provide support and work on ways to reduce discrimination against those diagnosed with a mental illness.

5.3. Limitations and future research

Although this study contributes to theory and practice, it also has several limitations that should be noted. First, even though vignettes are helpful for exploring individuals' attitudes and beliefs in a specific context, they are not as realistic as a workplace setting. Even if they are carefully developed, they cannot possibly include all aspects of the experience of an employee with a mental health issue. Moreover, the lack of para- and non-verbal context in the described interactions might have made it difficult for participants to connect with the hypothetical employee. To address these issues, future research should consider methods that can capture the nuanced dynamics between discloser and confidant, such as experimental field studies with trained confederates. This method has been used in other areas of stigma research (e.g., religion (King & Ahmad, 2010)) and has the potential to provide unique and rich insights.

A second limitation comes from exploring responses to mental illnesses in general rather than a specific diagnostic. This generalization can be problematic, as different mental disorders might be stigmatized for different reasons. For example, an individual with schizophrenia may be perceived as dangerous, while an individual with depression may not face that stigma (Krendl & Freeman, 2019; Link et al., 1999). Furthermore, by using the general term "mental health issues," the interpretation is left to the interviewee, which could minimize or exacerbate underlying stigma processes. Therefore, further research is needed to analyze responses to specific mental disorders and whether they differ from the ones found in this study.

Third, due to practical limitations, our study did not consider the intersectionality of mental illness with other identities, such as gender, sexual orientation, or race. However, extant research suggests that stigmatization may change and even be compounded by this intersection (Colella & Santuzzi, 2022). For example, regarding race, previous research suggests that certain minority groups, such as Latinas/os and African Americans, hold higher levels of stigma toward mental illness (DuPont-Reyes et al., 2020). Concerning sexual orientation, a study by Holley et al. (2016) found that LGB individuals experienced a "double stigma" in mental health treatment programs. Given that individuals have multiple social identities, future research should consider using an intersectional approach to better understand the complexities underlying the management of mental illness.

A fourth limitation derives from our focus on only two types of active IM strategies (*transparency* and *fabrication*). However, these strategies, which were qualitatively derived from the lived experiences of individuals with depression (Follmer & Jones, 2022), may not be the most commonly used in the work context. In this regard, future research should consider exploring other strategies from stigma management literature, such as *claiming* positive aspects or *downplaying* negative aspects (Lyons et al., 2018), to understand how they may influence supportive confidant responses toward individuals with mental illnesses and whether these findings align with the ones from our study.

Fifth, our study might be limited due to interviewees' social desirability biases. Social desirability refers to a desire to present oneself in a socially acceptable way, which might not reflect reality (Bergen & Labonté, 2020). In this regard, leaders might have displayed more empathetic, understanding, and supportive responses than they would have in a real-life situation. To limit this bias, we used several of the techniques recommended by Bergen and Labonté (2020) for qualitative research, such as using indirect questioning (e.g., "What do you think should happen next?"), providing assurances of confidentiality and anonymity, and probing for more information by asking follow-up questions. However, considering that our study was focused on interviewees' intentions to behave and did not analyze actual behavior, the influence of social desirability cannot be completely ruled out. Therefore, future research in leaders' reactions should consider analyzing the discloser's perspective or using independent observers to gather more objective results.

A sixth limitation comes from using a qualitative research approach. This type of research is used to achieve an in-depth understanding of the perceptions and experiences of individuals, which often limits the sample size that can be analyzed (Charmaz, 2006). In this regard, our small sample size limits the external validity of our study. Furthermore, most of the interviewed leaders identified as male, reducing our sample's diversity. To overcome these limitations, future research should consider approaches that allow reaching a more extensive and diverse sample that more closely represents the general working population, such as scenario-based online surveys with open-ended questions.

Finally, it should be noted that the researcher's own biases may have affected how the information was collected and interpreted. To minimize this bias in the interviewing stage, the interview protocol was carefully revised and adjusted so as not to prime participants toward a desired answer. Furthermore, during the interviews, the interviewer would reformulate some of the interviewees' responses in her own words to verify that she had adequately interpreted their answers. This process of asking participants for clarification and confirmation aided in creating memos for the data analysis stage. During data analysis, we tried to limit potential biases by first analyzing the transcribed interviews line by line and coding them with the participant's own words rather than what the researcher thought they meant. However, due to the inexperience of the researcher, the possibility of biases cannot be discarded entirely.

5.4. Conclusion

The high prevalence of mental illnesses and their significant social and economic impact in the workplace highlight the need for organizations to provide adequate policies and resources to support employee well-being. In this regard, given that leaders are in a position to act as bridges between such resources and their teams, it is critical to understand how they react to and manage employees with mental health issues. Through our study, we uncovered different emotional and cognitive elements that shape leaders' re-

sponses to employees' IM strategies. Our findings provide evidence for when specific IM strategies lead to supportive responses. Specifically, a strategy that demonstrates transparency and active coping will be more likely to lead to positive interpersonal outcomes and a higher level of social support. However, unintended stigma can turn this support into a double-edged sword and lead to negative professional outcomes for individuals. Finally, through our work, we also identified leaders' training needs regarding the management of mental health in the workplace. These learning objectives and our findings on leaders' preferred learning methods could provide a foundation for HR practitioners and management education to develop and implement trainings and initiatives that successfully support and prepare leaders to prevent, identify, and deal with these complex situations.

References

Abdullah, T., & Brown, T. L. (2011). Mental illness stigma and ethnocultural beliefs, values, and norms: An integrative review. *Clinical Psychology Review*, *31*(6), 934–948. https://doi.org/10.1016/j.cpr.2011.05.003

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)* (5th). American Psychiatric Publishing.

American Psychiatric Association. (2015). *Understanding mental disorders: Your guide to DSM-5*. American Psychiatric Publishing.

Angermeyer, M. C., & Matschinger, H. (2003). The stigma of mental illness: Effects of labelling on public attitudes towards people with mental disorder. *Acta Psychiatrica Scandinavica*, *108*(4), 304–309. https://doi.org/10.1034/j.1600-0447.2003.00150.x

Angermeyer, M. C., Matschinger, H., & Holzinger, A. (1998). Gender and attitudes towards people with schizophrenia. Results of a representative survey in the Federal Republic of Germany. *International Journal of Social Psychiatry*, *44*(2), 107–116. https://doi.org/10.1177/002076409804400203

Arias, D., Saxena, S., & Verguet, S. (2022). Quantifying the global burden of mental disorders and their economic value. *eClinicalMedicine*, *54*, 101675. https://doi.org/10.1016/j.eclinm.2022.101675

Arnold, M., & Rigotti, T. (2021). Is it getting better or worse? Health-oriented leadership and psychological capital as resources for sustained health in newcomers. *Applied Psychology*, *70*(2), 709–737. https://doi.org/10.1111/apps.12248

Barter, C., & Renold, E. (1999). The use of vignettes in qualitative research. *Social Research Update*, (25). https://sru.soc.surrey.ac.uk/SRU25.html

Barth, S. E., & Wessel, J. L. (2022). Mental illness disclosure in organizations: Defining and predicting (un)supportive responses. *Journal of Business and Psychology*, *37*(2), 407–428. https://doi.org/10.1007/s10869-021-09753-4

Bergen, N., & Labonté, R. (2020). "Everything is perfect, and we have no problems": Detecting and limiting social desirability bias in qualitative research. *Qualitative Health Research*, *30*(5), 783–792. https://doi.org/10.1177/1049732319889354

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Brown, R., Moloney, M., & Brown, J. (2017). Gender differences in the processes linking public stigma and self-disclosure among college students with mental illness. *Journal of Community Psychology*, *46*. https://doi.org/10.1002/jcop.21933

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. SAGE Publications.

Chaudoir, S. R., & Fisher, J. D. (2010). The disclosure processes model: Understanding disclosure decision making and postdisclosure outcomes among people living with a concealable stigmatized identity. *Psychological Bulletin*, *136*(2), 236–256. https://doi.org/10.1037/a0018193

Clair, J. A., Beatty, J. E., & Maclean, T. L. (2005). Out of sight but not out of mind: Managing invisible social identities in the workplace. *Academy of Management Review*, *30*(1), 78–95. https://doi.org/10.5465/amr.2005.15281431

Cochran, S. V., & Rabinowitz, F. E. (2000). *Men and depression: Clinical and empirical perspectives*. Academic Press.

Colella, A., Hebl, M., & King, E. (2017). One hundred years of discrimination research in the Journal of Applied Psychology: A sobering synopsis. *Journal of Applied Psychology*, *102*(3), 500. https://doi.org/10.1037/apl0000084

Colella, A., & Santuzzi, A. (2022). Known and unknown mental illness: Uncovering the multiple routes to workplace inequities. *Journal of Management*, *0*(0), 1–30. https://doi.org/10.1177/01492063221111758

Corrigan, P. W., Rowan, D., Green, A., Lundin, R., River, P., Uphoff-Wasowski, K., White, K., & Kubiak, M. A. (2002). Challenging two mental illness stigmas: Personal responsibility and dangerousness. *Schizophrenia Bulletin*, *28*(2), 293–309. https://doi.org/10.1093/oxfordjournals.schbul.a006939

Deutsche Gesellschaft für Psychiatrie und Psychotherapie, Psychosomatik und Nervenheilkunde. (2023). Basisdaten: Psychische Erkrankungen. *DGPPN*. https://www.dgppn.de/_Resources/Persistent/93a818859031c45661aa7f6d298d6fecc6de45e9/20230104_Factsheet_Kennzahlen.pdf

Dietrich, S., Mergl, R., & Rummel-Kluge, C. (2014). Personal and perceived stigmatization of depression: A comparison of data from the general population, participants of a depression congress and job placement officers in Germany. *Psychiatry Research*, *220*(1), 598–603. https://doi.org/10.1016/j.psychres.2014.06.044

Dimoff, J. K., & Kelloway, E. K. (2019a). Signs of struggle (SOS): The development and validation of a behavioural mental health checklist for the workplace. *Work & Stress*, *33*(3), 295–313. https://doi.org/10.1080/02678373.2018.1503359

Dimoff, J. K., & Kelloway, E. K. (2019b). With a little help from my boss: The impact of workplace mental health training on leader behaviors and employee resource utilization. *Journal of Occupational Health Psychology*, *24*, 4–19. https://doi.org/10.1037/ocp0000126

DuPont-Reyes, M. J., Villatoro, A. P., Phelan, J. C., Painter, K., & Link, B. G. (2020). Adolescent views of mental illness stigma: An intersectional lens. *American Journal of Orthopsychiatry*, *90*(2), 201–211. https://doi.org/10.1037/ort0000425

Elraz, H. (2018). Identity, mental health and work: How employees with mental health conditions recount stigma and the pejorative discourse of mental illness. *Human Relations*, *71*(5), 722–741. https://doi.org/10.1177/0018726717716752

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Evans-Lacko, S., & Knapp, M. (2014). Importance of social and cultural factors for attitudes, disclosure and time off work for depression: Findings from a seven country European study on depression in the workplace. *PLOS ONE*, *9*(3), e91053. https://doi.org/10.1371/journal.pone.0091053

Evans-Lacko, S., & Knapp, M. (2018). Is manager support related to workplace productivity for people with depression: A secondary analysis of a cross-sectional survey from 15 countries. *BMJ Open*, *8*(6), e021795. https://doi.org/10.1136/bmjopen-2018-021795

Farina, A. (1981). Are women nicer people than men? Sex and the stigma of mental disorders. *Clinical Psychology Review*, *1*(2), 223–243. https://doi.org/10.1016/0272-7358(81)90005-2

Feldman, D. B., & Crandall, C. S. (2007). Dimensions of mental illness stigma: What about mental illness causes social rejection? *Journal of Social and Clinical Psychology*, *26*(2), 137–154. https://doi.org/10.1521/jscp.2007.26.2.137

Follmer, K. B., & Jones, K. S. (2017). Stereotype content and social distancing from employees with mental illness: The moderating roles of gender and social dominance orientation. *Journal of Applied Social Psychology*, *47*(9), 492–504. https://doi.org/10.1111/jasp.12455

Follmer, K. B., & Jones, K. S. (2018). Mental illness in the workplace: An interdisciplinary review and organizational research agenda. *Journal of Management*, *44*(1), 325–351. https://doi.org/10.1177/0149206317741194

Follmer, K. B., & Jones, K. S. (2022). Navigating depression at work: Identity management strategies along the disclosure continuum. *Group & Organization Management*, *47*(5), 963–1007. https://doi.org/10.1177/10596011211002010

Follmer, K. B., Sabat, I. E., & Siuta, R. L. (2020). Disclosure of stigmatized identities at work: An interdisciplinary review and agenda for future research. *Journal of Organizational Behavior*, *41*(2), 169–184. https://doi.org/10.1002/job.2402

Franke, F., & Felfe, J. (2011). Diagnose gesundheitsförderlicher Führung - Das Instrument "Health-oriented Leadership"". In B. Bandura, A. Ducki, & H. Schröder (Eds.), *Fehlzeiten-Report 2011. Führung und Gesundheit* (pp. 3–13). Springer.

Franke, F., Felfe, J., & Pundt, A. (2014). The impact of health-oriented leadership on follower health: Development and test of a new instrument measuring health-promoting leadership. *German Journal of Human Resource Management*, *28*(1-2), 139–161. https://doi.org/10.1177/239700221402800108

Fylan, F. (2005). Chapter 6: Semi-structured interviewing. In J. Miles & P. Gilbert (Eds.), *A handbook of research methods for clinical and health psychology* (pp. 65–77). Oxford University Press.

Galletta, A. (2013). *Mastering the semi-structured interview and beyond: From research design to analysis and publication*. New York University Press. https://doi.org/10.18574/nyu/9780814732939.001.0001

Goffman, E. (1963). *Stigma: Notes on the management of spoiled identity*. Simon & Schuster.

Greden, J. F. (2003). Physical symptoms of depression: Unmet needs. *Journal of Clinical Psychiatry*, *64*, 5–11.

Griffith, K. H., & Hebl, M. R. (2002). The disclosure dilemma for gay men and lesbians: "Coming out" at work. *Journal of Applied Psychology*, *87*(6), 1191–1199. https://doi.org/10.1037/0021-9010.87.6.1191

Harvey, P. D., & Bowie, C. R. (2016). Chapter 41: Cognition in severe mental illness. In M. Husain & J. M. Schott (Eds.), *Oxford Textbook of Cognitive Neurology and Dementia* (pp. 463–470). Oxford University Press.

Haslam, S. A. (2004). Chapter 2: The social identity approach. In S. A. Haslam (Ed.), *Psychology in organizations: The social identity approach* (2nd, pp. 17–39). SAGE Publications.

Hennekam, S., Richard, S., & Grima, F. (2020). Coping with mental health conditions at work and its impact on self-perceived job performance. *Employee Relations: The International Journal*, *42*(3), 626–645. https://doi.org/10.1108/ER-05-2019-0211

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied Psychology*, *50*(3), 337–421. https://doi.org/10.1111/1464-0597.00062

Hogg, B., Moreno-Alcázar, A., Tóth, M. D., Serbanescu, I., Aust, B., Leduc, C., Paterson, C., Tsantilla, F., Abdulla, K., Cerga-Pashoja, A., Cresswell-Smith, J., Fanaj, N., Meksi, A., Ni Dhalaigh, D., Reich, H., Ross, V., Sanches, S., Thomson, K., Van Audenhove, C., et al. (2022). Supporting employees with mental illness and reducing mental illness-related stigma in the workplace: An expert survey. *European Archives of Psychiatry and Clinical Neuroscience*. https://doi.org/10.1007/s00406-022-01443-3

Hogg, M. A., & Terry, D. I. (2000). Social identity and self-categorization processes in organizational contexts. *Academy of Management Review*, *25*(1), 121–140. https://doi.org/10.5465/amr.2000.2791606

Holley, L. C., Tavassoli, K. Y., & Stromwall, L. K. (2016). Mental illness discrimination in mental health treatment programs: Intersections of race, ethnicity, and sexual orientation. *Community Mental Health Journal*, *52*(3), 311–322. https://doi.org/10.1007/s10597-016-9990-9

Jacobi, F., Höfler, M., Siegert, J., Mack, S., Gerschler, A., Scholl, L., Busch, M. A., Hapke, U., Maske, U., Seiffert, I., Gaebel, W., Maier, W., Wagner, M., Zielasek, J., & Wittchen, H. U. (2014). Twelve-month prevalence, comorbidity and correlates of mental disorders in Germany: The mental health module of the German Health Interview and Examination Survey for Adults (DEGS1-MH). *International Journal of Methods in Psychiatric Research*, *23*(3), 304–319. https://doi.org/10.1002/mpr.1439

Jacobi, F., Höfler, M., Strehle, J., Mack, S., Gerschler, A., Scholl, L., Busch, M. A., Maske, U., Hapke, U., Gaebel, W., Maier, W., Wagner, M., Zielasek, J., & Wittchen, H. U. (2016). Erratum zu: Psychische Störungen in der Allgemeinbevölkerung. Studie zur Gesundheit Erwachsener in Deutschland und ihr Zusatzmodul "Psychische Gesundheit" (DEGS1-MH). *Der Nervenarzt*, *87*(1), 88–90. https://doi.org/10.1007/s00115-015-4458-7

Jimmieson, N. L., Bergin, A. J., Bordia, P., & Tucker, M. K. (2021). Supervisor strategies and resources needed for managing employee stress: A qualitative analysis. *Safety Science*, *136*, 105149. https://doi.org/10.1016/j.ssci.2020.105149

Johnson, T. D., Joshi, A., & Hogan, T. (2020). On the front lines of disclosure: A conceptual framework of disclosure events. *Organizational Psychology Review*, *10*(3-4), 201–222. https://doi.org/10.1177/2041386620919785

Jones, E. E., Farina, A., Hastorf, A. H., Markus, H., Miller, D. T., & Scott, R. A. (1984). *Social stigma: The psychology of marked relationships*. Freeman.

Jones, K. P., & King, E. B. (2014). Managing concealable stigmas at work: A review and multilevel model. *Journal of Management*, *40*(5), 1466–1494. https://doi.org/10.1177/0149206313515518

Kalfa, S., Branicki, L., & Brammer, S. (2021). Organizational accommodation of employee mental health conditions and unintended stigma. *The International Journal of Human Resource Management*, *32*(15), 3190–3217. https://doi.org/10.1080/09585192.2021.1910536

Kaluza, A. J., & Junker, N. M. (2022). Caring for yourself and for others: Team health climate and self-care explain the relationship between health-oriented leadership and exhaustion. *Journal of Managerial Psychology*, *37*(7), 655–668. https://doi.org/10.1108/JMP-10-2021-0567

Key, K. D., & Vaughn, A. A. (2019). Active coping efforts temper negative attributions of disability stigma. *Stigma and Health*, *4*(2), 152–164. https://doi.org/10.1037/sah0000126

King, E. B., & Ahmad, A. S. (2010). An experimental field study of interpersonal discrimination toward Muslim job applicants. *Personnel Psychology*, *63*(4), 881–906. https://doi.org/10.1111/j.1744-6570.2010.01199.x

Kirsh, B., Krupa, T., & Luong, D. (2018). How do supervisors perceive and manage employee mental health issues in their workplaces? *Work*, *59*, 547–555. https://doi.org/10.3233/WOR-182698

Klebe, L., Felfe, J., & Klug, K. (2021). Healthy leadership in turbulent times: The effectiveness of health-oriented leadership in crisis. *British Journal of Management*, *32*(4), 1203–1218. https://doi.org/10.1111/1467-8551.12498

Klug, K., Felfe, J., & Krick, A. (2019). Caring for oneself or for others? How consistent and inconsistent profiles of health-oriented leadership are related to follower strain and health. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.02456

Köppe, C., Kammerhoff, J., & Schütz, A. (2018). Leader-follower crossover: Exhaustion predicts somatic complaints via StaffCare behavior. *Journal of Managerial Psychology*, *33*(3), 297–310. https://doi.org/10.1108/JMP-10-2017-0367

Krendl, A. C., & Freeman, J. B. (2019). Are mental illnesses stigmatized for the same reasons? Identifying the stigma-related beliefs underlying common mental illnesses. *Journal of Mental Health*, *28*(3), 267–275. https://doi.org/10.1080/09638237.2017.1385734

Ladegaard, Y., Skakon, J., Elrond, A. F., & Netterstrøm, B. (2017). How do line managers experience and handle the return to work of employees on sick leave due to work-related stress? A one-year follow-up study. *Disability and Rehabilitation*, *41*(1), 44–52. https://doi.org/10.1080/09638288.2017.1370733

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*. Sage Publications, Inc. https://doi.org/10.4135/9781412963947

Link, B. G., & Phelan, J. C. (2001). Conceptualizing stigma. *Annual Review of Sociology*, *27*(1), 363–385. https://doi.org/10.1146/annurev.soc.27.1.363

Link, B. G., Phelan, J. C., Bresnahan, M., Stueve, A., & Pescosolido, B. A. (1999). Public conceptions of mental illness: Labels, causes, dangerousness, and social distance. *American Journal of Public Health*, *89*(9), 1328–1333. https://doi.org/10.2105/ajph.89.9.1328

Link, B. G., Yang, L. H., Phelan, J. C., & Collins, P. Y. (2004). Measuring mental illness stigma. *Schizophrenia Bulletin*, *30*(3), 511–541. https://doi.org/10.1093/oxfordjournals.schbul.a007098

Lynch, J. W., & Rodell, J. B. (2018). Blend in or stand out? Interpersonal outcomes of managing concealable stigmas at work. *Journal of Applied Psychology*, *103*, 1307–1323. https://doi.org/10.1037/apl0000342

Lyons, B. J., Martinez, L. R., Ruggs, E. M., Hebl, M. R., Ryan, A. M., O'Brien, K. R., & Roebuck, A. (2018). To say or not to say: Different strategies of acknowledging a visible disability. *Journal of Management*, *44*(5), 1980–2007. https://doi.org/10.1177/0149206316638160

Martin, A., Woods, M., & Dawkins, S. (2015). Managing employees with mental health issues: Identification of conceptual and procedural knowledge for development within management education curricula. *Academy of Management Learning & Education*, *14*(1), 50–68. https://doi.org/10.5465/amle.2012.0287

Martin, A., Woods, M., & Dawkins, S. (2018). How managers experience situations involving employee mental ill-health. *International Journal of Workplace Health Management*, *11*(6), 442–463. https://doi.org/10.1108/IJWHM-09-2017-0069

Marty, M. A., & Segal, D. L. (2015). DSM-5. In R. L. Cautin & S. O. Lilienfeld (Eds.), *The Encyclopedia of Clinical Psychology* (1st, pp. 1–6). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118625392.wbecp308

Marynissen, A., & Nübling, D. (2010). Familiennamen in Flandern, den Niederlanden und Deutschland – ein diachroner und synchroner Vergleich. In A. Dammel, S. Kürschner, & D. Nübling (Eds.), *Konstrastive Germanistische Linguistik* (pp. 311–362, Vol. 1). Georg Olms.

McCarron, R. M. (2013). The DSM-5 and the art of medicine: Certainly uncertain. *Annals of Internal Medicine*, *159*(5), 360–361. https://doi.org/10.7326/0003-4819-159-7-201310010-00688

McGrath, C., Palmgren, P. J., & Liljedahl, M. (2019). Twelve tips for conducting qualitative research interviews. *Medical Teacher*, *41*(9), 1002–1006. https://doi.org/10.1080/0142159X.2018.1497149

McLellan, E., MacQueen, K. M., & Neidig, J. L. (2003). Beyond the qualitative interview: Data preparation and transcription. *Field Methods*, *15*(1), 63–84. https://doi.org/10.1177/1525822x02239573

National Institute of Mental Health. (2023). Mental illness. *NIH*. Retrieved October 3, 2023, from https://www.nimh.nih.gov/health/statistics/mental-illness

Omarzu, J. (2000). A disclosure decision model: Determining how and when individuals will self-disclose. *Personality and Social Psychology Review*, *4*(2), 174–185. https://doi.org/10.1207/s15327957pspr0402_05

Pachankis, J. E. (2007). The psychological implications of concealing a stigma: A cognitive-affective-behavioral model. *Psychological Bulletin*, *133*(2), 328–345. https://doi.org/10.1037/0033-2909.133.2.328

Pachankis, J. E., Hatzenbuehler, M. L., Hickson, F., Weatherburn, P., Berg, R. C., Marcus, U., & Schmidt, A. J. (2015). Hidden from health: structural stigma, sexual orientation concealment, and HIV across 38 countries in the European MSM Internet Survey. *Aids*, *29*(10), 1239–1246. https://doi.org/10.1097/qad.0000000000000724

Phillips, T. (2019). Joker [Film] [Warner Bros. Pictures, Village Roadshow Pictures, Bron Creative, DC Films].

Pischel, S., Felfe, J., & Klebe, L. (2023). "Should I further engage in staff care?": Employees' disclosure, leaders' skills and goal conflict as antecedents of health-oriented leadership. *International Journal of Environmental Research and Public Health*, *20*(1), 162. https://www.mdpi.com/1660-4601/20/1/162

Pischel, S., Felfe, J., & Krick, A. (2022). Health-oriented leadership: Antecedents of leaders' awareness regarding warning signals of emerging depression and burnout. *German Journal of Human Resource Management*, *0*(0), 1–30. https://doi.org/10.1177/23970220221130754

Porter, S., Lexén, A., & Bejerholm, U. (2019). Employers' beliefs, knowledge and strategies used in providing support to employees with mental health problems. *Journal of Vocational Rehabilitation*, *51*, 325–337. https://doi.org/10.3233/JVR-191049

Purvanova, R. K., & Muros, J. P. (2010). Gender differences in burnout: A meta-analysis. *Journal of Vocational Behavior*, *77*(2), 168–185. https://doi.org/10.1016/j.jvb.2010.04.006

Ragins, B. R. (2008). Disclosure disconnects: Antecedents and consequences of disclosing invisible stigmas across life domains. *Academy of Management Review*, *33*(1), 194–215. https://doi.org/10.5465/amr.2008.27752724

Roberts, L. M. (2005). Changing faces: Professional image construction in diverse organizational settings. *Academy of Management Review*, *30*(4), 685–711. https://doi.org/10.5465/amr.2005.18378873

Rudolph, C. W., Murphy, L. D., & Zacher, H. (2020). A systematic review and critique of research on "healthy leadership". *The Leadership Quarterly*, *31*(1), 101335. https://doi.org/10.1016/j.leaqua.2019.101335

Santa Maria, A., Wolter, C., Gusy, B., Kleiber, D., & Renneberg, B. (2018). The impact of health-oriented leadership on police officers' physical health, burnout, depression and well-Being. *Policing: A Journal of Policy and Practice*, *13*(2), 186–200. https://doi.org/10.1093/police/pay067

Schoenberg, N. E., & Ravdal, H. (2000). Using vignettes in awareness and attitudinal research. *International Journal of Social Research Methodology*, *3*(1), 63–74. https://doi.org/10.1080/136455700294932

Schwarzer, R., & Weiner, B. (1991). Stigma controllability and coping as predictors of emotions and social support. *Journal of Social and Personal Relationships*, *8*(1), 133–140. https://doi.org/10.1177/0265407591081007

Suter, J., Irvine, A., & Howorth, C. (2023). Juggling on a tightrope: Experiences of small and micro business managers responding to employees with mental health difficulties. *International Small Business Journal*, *41*(1), 3–34. https://doi.org/10.1177/02662426221084252

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 7–24). Nelson-Hall.

Tengelin, E., Hensing, G., Holmgren, K., Ståhl, C., & Bertilsson, M. (2022). Swedish managers' experience-based understanding of the capacity to work in employees with common mental disorders: A focus group study. *Journal of Occupational Rehabilitation*, *32*(4), 685–696. https://doi.org/10.1007/s10926-022-10029-8

Zbozinek, T. D., Rose, R. D., Wolitzky-Taylor, K. B., Sherbourne, C., Sullivan, G., Stein, M. B., Roy-Byrne, P. P., & Craske, M. G. (2012). Diagnostic overlap of generalized anxiety disorder and major depressive disorder in a primary case sample. *Depression and Anxiety*, *29*(12), 1065–1071. https://doi.org/10.1002/da.22026

Impact of Audit Assurance on the Quality of Sustainability Reporting

Alexander Grommes

Catholic University of Eichstätt-Ingolstadt

Abstract

The subject of sustainability reporting is becoming increasingly important. In consequence of the implementation of the Corporate Sustainability Reporting Directive, a substantial number of companies will be required to have their sustainability reports audited beginning from financial year 2024. This paper examines the influence of external assurance on the quality of those sustainability reports. Therefore, the reports of all DAX and MDAX companies for financial year 2022 are examined using a novel textual analysis approach, to determine the individual report quality. The results demonstrate that there is no statistically significant relationship between assurance level and the quality of sustainability reports. Conversely, it was found that companies that are acting sustainable disclose a higher quantity of information and are more likely to demand voluntary assurance of their reports. These findings offer insights into the implications of assurance on sustainability reporting. Furthermore, the detailed overview of traditional and state-of-the-art textual analysis methods offers researchers a valuable resource for identifying the most appropriate methods to address their individual research questions.

Keywords: audit assurance; CSRD; natural language processing; sustainability reporting; textual analysis

1. Introduction

1.1. Motivation

Sustainability has been a topic of interest in business and academic research for some time, but now more than ever. The number of companies reporting on sustainability-related issues is growing rapidly, as is the number of scientific publications (e.g. Amel-Zadeh and Serafeim, 2018, p. 87, Lucarelli et al., 2020, p. 5, Guidry and Patten, 2012, p. 81). This is due to an intrinsic interest in sustainability on the part of companies and their stakeholders (Tworzydło et al., 2022, p. 144), but also to regulatory requirements that have been newly imposed and increasingly refined in recent years (H. Christensen et al., 2021, pp. 1178–1179).

The Global Reporting Initiative (GRI) reporting framework has emerged as the leading standard for sustainability reporting. As an autonomous entity, the GRI has created guidelines with input from stakeholders across the board, fostering a reliable framework for reporting. Companies are not required to adhere to these guidelines by national lawmakers. Rather, they serve as a common ground for reporting.

If adopted, the GRI standards enable standardized reporting and facilitate comparison between companies, regardless of their size, sector, or country of operation (Christofi et al., 2012, pp. 163–164).

However, there is more than just voluntary guidelines. In fact, the Directive 2014/95/EU created by the European Union (EU) requires companies to report non-financial information. As a result, public interest entities with over 500 employees must comply with the Non-Financial Reporting Directive (NFRD). Starting in the 2017 fiscal year, these companies are required to disclose information regarding environmental, social, and employee-related matters in their management reports. The purpose of this requirement is to provide stakeholders with a clear understanding of the current state of development and position of companies in these areas (European Union (EU), 2014, pp. 4–5, 8).

Not long after the NFRD took effect, the EU revised its sustainability reporting guidelines through the implementation of Directive 2022/2464/EU, also known as the Corporate Sustainability Reporting Directive (CSRD). This directive was introduced to address significant deficiencies in the pre-

vious requirements, which lacked sufficient depth and scope, and to consider issues such as data comparability and reliability. However, one of the main drivers for change is the limited number of reporting companies. The CSRD will make sustainability reporting mandatory not only for public interest entities but also small and medium-sized companies in the future (European Union (EU), 2022, pp. 19–20).

In addition to the new reporting requirements and increased coverage, the CSRD mandates an audit process. Specifically, companies are required to undergo a limited assurance review of their sustainability reports by an external auditor. Under the NFRD, auditors only had to confirm that the related information was published at all. Furthermore, Member States had the option to impose a substantive audit requirement at the national level. The EU aims to establish a consistent link between financial reporting and sustainability reporting by requiring a substantive audit of sustainability reporting conducted by an external auditor, as financial reporting is already subject to a statutory audit. The Commission also reserves the option to take a decision by 2028 to adjust the assurance level from limited assurance to reasonable assurance (European Union (EU), 2022, pp. 34–35; Velte, 2023, p. 4). The mandatory implementation of sustainability report auditing has the potential to aid the EU Commission's objectives and enhance the general compliance of sustainability reports with regulatory requirements. There may be more benefits to consider, but the mandatory audit could also create an additional burden. Similarly, elevating the level of assurance from limited to reasonable could either positively impact reporting or cause unnecessary expenses.

Sustainability reporting is not limited to the European area. Of the world's 250 largest companies by revenue (G250), 96 % disclose sustainability information in the form of reports (KPMG, 2022, p. 13). Only 38 of the G250 are companies from EU members. China represents 30 % of the G250 companies and is showing a positive trend towards reporting on sustainability (KPMG, 2022, p. 18). The majority of the remaining non-EU G250 are located in the United States (69), Japan (26) and the United Kingdom (9) (KPMG, 2022, p. 75). All of these states have extensive, but varying, reporting requirements. On a global level, the International Financial Reporting Standards (IFRS) Foundation addresses the issue of sustainability through the implementation of new standards. In this manner, the standards are designed to meet the needs of the stakeholders of reporting companies, such as customers, employees and investors or the natural environment, which can be considered a stakeholder itself (Technical Readiness Working Group (IFRS Foundation), 2021). Two first two exposure drafts have already been issued. IFRS S1 *General Requirements for Disclosure of Sustainability-related Financial Information* is intended to provide general requirements for the disclosure of sustainability-related financial information. IFRS S2 *Climate-related Disclosures* covers the disclosure of climate-related risks and opportunities. Both drafts relate to information that is meaningful to the cash flows of companies and thus to the valuation of those companies (International

Sustainability Standards Board, 2022a, 2022b).

With different accounting standards, some mandatory, some voluntary, some national, some international, and with different scope and materiality levels, sustainability reporting is highly diverse. Attempts for homogenization are confronted with ongoing substantive and regulatory dynamics. The implementation of the CSRD regulations could be a crucial step towards improving and harmonizing the reporting landscape.

1.2. Problem definition and objective

While the NFRD is currently in effect, the CSRD will find application for the first companies as early as 2024 which means it will impact the fiscal year of 2023 (European Union (EU), 2022, p. 77). It is likely that the application of the Directive will not fully achieve the desired results at first. Similarly, even after the implementation of the NFRD, there remained potential for further improvement (Busco et al., 2022, p. 95), which is one of the reasons why the CSRD was created. In the context of identified weaknesses of the NFRD, the EU Commission directly mentions the role of the audit of reporting and that this should ensure the reliability of the reports (European Union (EU), 2022, p. 19). Additionally, external audits may also increase compliance with the CSRD and other regulations.

On the other hand, there are expenses associated with the engagement of audit firms. The increased scope of the audit beyond the financial reporting has a direct impact on the total audit costs (Zaman et al., 2011, p. 190). At the same time, a mandatory auditing requirement does not guarantee audit quality. Previous studies have shown a variety of weaknesses that can occur in the area of auditing (B. Christensen et al., 2016, p. 1671).

The purpose of this paper is to investigate the extent to which the audit of sustainability reports can improve the quality of these reports, where quality is primarily expressed in terms of the reports' compliance with regulatory requirements.

Non-financial reporting is heterogeneous and thus provides numerous opportunities for academic research. Due to its actuality, the domain still has some research gaps that can be closed. Since non-financial reporting essentially consists of qualitative reporting in text form, textual analysis methods are particularly helpful in filling these research gaps. This thesis makes several contributions. First, it contributes to the literature in the field of auditing, specifically the auditing of non-financial reporting. This area of auditing, while not entirely new, is considerably less investigated than the area of financial reporting. Second, the thesis also contributes to the literature on European financial reporting requirements. In particular, it connects those two streams of literature. Third, it offers a methodological contribution by providing an up-to-date review of textual analysis methods. Finally, a contribution is made by providing evidence on whether auditing improves the quality of non-financial reporting. Stakeholders and other recipients of non-financial reports can assess

the value that auditing provides when making investment decisions. The findings can also support the EU Commission's decision on future assurance level increases.

1.3. Procedure of the work

This thesis is organized as follows. Chapter 2 presents the relevant theoretical background. First, it consists of the regulatory framework with a focus on European accounting, in particular the EU taxonomy. Second, the established theories of sustainability reporting and auditing in general are presented. The theoretical application of textual analysis, which is the central instrument of this thesis, concludes the chapter on the theoretical background.

The following chapters form the first of the two main parts of this thesis. Chapter 3 discusses the relevant literature in the domains of finance and accounting, while Chapter 4 presents the various methods of textual analysis in terms of their functionality and applicability. These methods are not only distinguished according to their field of application, but also between traditional methods and state-of-the-art methods, which utilize the recent technical developments in machine learning and artificial intelligence. On the one hand, the comprehensive presentation of all currently available methods forms the necessary groundwork for the second part of this thesis. On the other hand, it offers a contribution in itself, since it can assist the audience of this thesis in identifying appropriate methods for own research projects in the field of textual analysis.

The second part of the thesis involves utilizing textual analysis techniques to assess corporate non-financial reporting. For this purpose, Chapter 5 formulates three related hypotheses. Chapter 6 describes the methodology by discussing the data set, the research design, and the processing of relevant variables trough textual analysis. The results of the analyses are presented in Chapter 7. Finally, Chapter 8 concludes the thesis and discusses the limitations of the work.

2. Theoretical background

2.1. Development of the regulatory framework

The climate crisis is one of the greatest challenges of our time. Its negative effects are already being experienced today and will get worse as they become more difficult to mitigate in the future (United Nations, 2022). The majority of United Nations member states are committed to addressing the climate crisis through the Paris Agreement, which aims to limit the increase in global temperature to a maximum of two degrees Celsius above pre-industrial levels, raise overall adaptation capabilities to the impacts of climate change, and shift capital flows to a climate-friendly development (European Union (EU), 2016, p. 5). Europe is contributing through the European Green Deal. This framework includes a program of measures for the necessary transformation. The European Commission has set the goal of making Europe the first continent to become climate neutral by 2050 by reducing greenhouse gas emissions to net zero. The interim target

is a reduction of emissions by 55 % until 2030 compared to 1990 levels. The European Green Deal also covers issues such as the sustainable use of consumer goods, with specifications for producers to enable consumers to repair products more easily and make them last longer so that the goods do not have to be replaced. Other parts of the program cover the fields of technology, mobility, food, energy and biodiversity, and various other subjects (European Commission, 2019).

Corporate governance is also specifically addressed in the European Green Deal. Companies are still too focused on short-term financial performance rather than sustainable development. Therefore, companies must increasingly disclose their information on sustainability-related issues alongside their annual reporting in order to inform investors about their development in these areas (European Commission, 2019, p. 17).

The EU taxonomy is part of the European Green Deal and is designed to accompany and support the transition of the environment to the target state. The taxonomy introduces various instruments to achieve this goal and is also supposed to support the financing of the transition by directing capital flows in a way that is conducive to the transition. Another integral part of the EU taxonomy is corporate disclosure (European Commission, 2020, p. 8). Regulations require two groups of companies in particular to address this issue: Financial market participants[1] offering financial products within the EU and companies meeting the size criteria of the NFRD. The required content, especially for the second group of companies, is discussed in more detail in Chapter 6.2 of this thesis. The information must be published either in the non-financial section of the consolidated or annual financial statements or as a stand-alone non-financial reporting or sustainability reporting (European Commission, 2020, p. 27). The EU taxonomy encourages, but does not require, companies to obtain assurance from external auditors (European Commission, 2020, p. 37).

Even before the introduction of the EU taxonomy, many researchers addressed these substantive issues (Lucarelli et al., 2020, p. 6). More recent research identifies the benefits of the taxonomy mainly in the area of harmonization and investment decision support (Dumrose et al., 2022, p. 2), which is consistent with the reporting objectives of the IFRS. It is also important to consider the full scope of the taxonomy. Beyond the entities directly impacted by the EU taxonomy, other entities are also indirectly affected (Dusík & Bond, 2022, p. 92). Suppliers and customers which do not meet the thresholds for mandatory NFRD reporting do not have to collect environmental data for themselves, but may need to be able to provide it to companies covered by the NFRD for their reporting.

In principle, the requirement for more comprehensive reporting also leads to a reduction in information asymmetries. Although this relationship exists in theory, it should not be blindly assumed without evidence and needs to be further

---

[1] e.g. Equity funds, exchange-traded funds, real estate funds, pension schemes, venture capital and private equity funds.

investigated (Breijer and Orij, 2022, p. 350; H. Christensen et al., 2021, p. 1231).

The EU taxonomy has one particular strength. By prescribing the narrative that sustainable activities can only be considered as sustainable if they do not harm other sustainable activities, trade-offs between different areas of development cannot be used as a loophole. The benefits of the EU taxonomy presented in academic literature may also extend beyond the European area. The EU serves as a prominent model for implementing regulations, making it probable that legislators outside of Europe will adopt these or raise similar requirements (Bloomberg, 2021; Dusík and Bond, 2022, pp. 93, 96).

2.2. Fundamental theories on sustainability reporting

Before dealing with the methodology, the theoretical principles need to be defined. Essentially, the publication of company data is crucial for capital market participants and their investment decisions, with information content and timeliness being particularly important (Ball & Brown, 1968, p. 176). For this thesis, theories that consider voluntary disclosure are most relevant. For a long time, sustainability reporting within non-financial reporting has been on a largely voluntary basis, and companies only disclosed data when the benefits exceeded the costs associated with the disclosure. The NFRD made sustainability reporting mandatory for some companies, but the regulation still allows a great amount of flexibility in the nature and extent of disclosure, which is why voluntary disclosure theories are especially relevant.

Voluntary disclosure refers to a company's decision to publish supplementary information beyond what is required by law. There are various determinants that influence whether and how much voluntary disclosure is made, including firm characteristics, ownership structure, or country-specific factors (Zamil et al., 2023, pp. 232–235). For the purposes of this thesis, however, the general theories, on which voluntary disclosure is based, are crucial.

Agency theory, which is most often applied in the context of voluntary disclosure (Zamil et al. 2002: 239), is closely linked to the well-known principal-agent problem from economics, which is primarily founded on information asymmetries between parties (Arrow, 1963, p. 967). According to agency theory, firms voluntarily disclose information in order to reduce information asymmetries between themselves and their stakeholders and thus facilitate business relationships or capital flows.

In addition to the agency theory, the next two theories most commonly used in this context are legitimacy theory and stakeholder theory. Legitimacy theory is concerned with the interaction between companies and their social environment and postulates that companies strive to shape their actions, decisions, and practices so that they are viewed as legitimate and acceptable by the society. Through voluntary disclosure, companies seek to achieve the necessary legitimacy and gain the trust of stakeholders. The theory is founded on the premise that there is a social contract between companies and society. Recently, increased awareness of Corporate Social Responsibility (CSR) concerns has influenced corporate practices in sustainability reporting, and companies have used CSR disclosure to gain legitimacy (Lepore & Pisano, 2023, pp. 56–57). Stakeholder theory, on the other hand, emphasizes that companies are not only beholden to the interests of their owners, but should also take into account the interests of a broader group of stakeholders who are affected by the company's activities. This theory emphasizes that companies should recognize the expectations, values, and needs of their various stakeholders. Therefore, voluntary disclosure can be seen as an effort to increase transparency and address stakeholder interests and concerns. In addition, there are several other theories on the basis of which voluntary disclosures can be useful for companies (Zamil et al., 2023, p. 239).

These theories explain different incentives for companies to voluntarily disclose information. Furthermore, the voluntary disclosure theory considers the costs of disclosure and suggests that information will be voluntarily provided only if the benefits for the company outweigh the costs of disclosure. According to this principle, information that is insignificant or disadvantageous to a company will not be disclosed (Verrecchia, 1983, pp. 179, 192).

2.3. Fundamental theories on audit

In addition to voluntary disclosure theories, the principal theories of auditing are particularly relevant for this thesis. Auditing is one of the central areas of accounting. The external verification of financial or non-financial information by an auditor can ensure the reliability of reporting for external stakeholders. In very simplified terms, this is achieved by the audit firm determining the actual financial position and performance of a company through various audit procedures and comparing these with the figures reported in the financial statements (Wagenhofer & Ewert, 2015, pp. 410–411).

The exact procedure and structure of the audit is not the focus of this thesis. Instead, the basic theories and related concerns are addressed in order to understand how they relate to the audit of sustainability reporting. Again, the principal-agent theory is a fundamental theory with significant importance. This behavioral theory can be applied to audit firms and their client companies. The principal, representing the company to be audited, hires an agent, the audit firm, to perform an audit of the company's disclosures. With a predetermined audit fee, the auditing company lacks in motivation to undertake high costs in the form of a detailed audit. Instead, the auditing company seeks to maximize its own benefit by minimizing the audit effort, since the compensation remains the same. The client and other parties seeking audit assurance suffer as a result (Antle, 1982, pp. 503, 508, 512). However, this opportunistic behavior exists only in theory. In practice, other factors also influence audit intensity. For example, the audit result itself is reviewed by other entities, and insufficient audit actions can be sanctioned. Never-

theless, it is useful to keep in mind the fundamental problems that arise in auditing and the application of flat fees.

Audit firms use various forms of auditing procedures to detect accounting manipulation or unintentional misstatements. The model structure distinguishes between substantive and systematic audit procedures. While substantive audit procedures provide assurance on specific balance sheet items, for instance by sampling, systematic audit procedures provide broader assurance, for example by testing the functionality of internal control systems. In most cases, the desired level of assurance is achieved through a combination of both types of procedures (Wagenhofer & Ewert, 2015, pp. 432–435). Auditing sustainability reporting is unique in that it concerns non-financial reporting. Essentially, non-financial reporting provides more qualitative information rather than actual numbers, as it would be in the case for financial reporting. Almost all audit firms refer to the International Standard on Assurance Engagements (ISAE) 3000 (Revised) when performing sustainability reporting audits. This standard specifically covers the audit of information that can be classified as non-financial information (International Auditing and Assurance Standards Board, 2013, p. 5) and is therefore considered an *umbrella standard*. As the ISAE 3000 (Revised) is applied to a wide range of disclosures, it does not contain explicit audit procedures. Rather, it describes general requirements for audit firms, such as integrity, independence, and professionalism, which are also required for financial audits. It further provides detailed information on the content and scope of the audit firm's reporting on its engagement. For the actual audit, the standard primarily requires auditors to review the content of the qualitative disclosures for material inconsistencies (International Auditing and Assurance Standards Board, 2013, pp. 20–21). However, the standard does not specify how materiality has to be determined or how audit procedures should be performed.

There is no dispute that the audit in itself is a valuable tool. In general, auditing increases the credibility of the information disclosed, as shown, for example, by the fact that firms with audited financial statements pay lower interest rates than comparable firms with unaudited financial statements (Blackwell et al., 1998, pp. 58, 68). It should be noted, however, that the magnitude of such an effect varies depending on whether the information disclosed is favorable or unfavorable for a company. Another variable of particular importance for this thesis is the voluntariness of the audit. The following 2x2 matrix illustrates four possible conditions that financial or non-financial reporting can adopt.

According to the attribution theory, financial statement users challenge positive information because it is consistent with the company's interests. Negative information, on the other hand, is less challenged since it would not be reasonable for companies to misrepresent information that is not in their best interest. This theory is confirmed by practice. In experiments, Coram et al. show that voluntary audit assurance of positive sustainability disclosures has a significant positive effect on the share price. In contrast, no significant results were found for negative disclosures. It can therefore be concluded that financial statement readers have reliability concerns mainly when the disclosed information is positive. These concerns are consistent with attribution theory, which suggests that it is beneficial for firms to voluntarily undergo an external audit when published information is positive, in order to increase reliability of those results, while negative information already carries a higher level of reliability (Coram et al., 2009, pp. 145–148).

These results are relevant for the research of this thesis, as the EU member states' option right and the implementation within Germany allow companies to voluntarily subject their non-financial reporting to an audit. Accordingly, such a voluntary submission can have different motivations: The counteraction of the principal-agent relationship, the creation of a higher reliability of the information, especially if it is positive and therefore, according to the attribution theory, more likely to be doubted by readers of the report, or simply the satisfaction of stakeholders in order not to be at a comparative disadvantage to other companies (Bradbury, 1990, p. 33).

The presented theories provide the basis for multiple research streams. They also form the basis for the development of the hypotheses for this thesis presented in Chapter 5.

2.4. Textual analysis in research

Research in business economics heavily relies on quantitative methods for gaining new findings. The rationale is clear: countless amounts of data exist in numerical form. Financial statements containing balance sheets and profit and loss statements, stock prices and a vast range of related financial indicators, as well as statistical information on companies, industries, regions, and countries. The amount of numerical data is enormous. When this data is effectively contextualized, new insights can be uncovered. However, how do researchers handle data that is not numbers, but letters? In addition to the balance sheet, every financial statement provides notes. The income statement enables insight into earnings, but the management report covers even more. Stock prices and financial ratios are paired with analysts' recommendations and company announcements, both written and verbal. Each statistical survey is accompanied by a corresponding text. All of this information is easily overlooked.

However, it would be incorrect to state that textual data is not a topic of interest in research at all. In fact, this field of research has been growing in importance for some time. As a result, both earlier and more recent papers cover not only results in this context, but also the methodology on its own (e.g. Bae et al. (2023), Bochkay et al. (2023), Gentzkow et al. (2019), and Loughran and McDonald (2016, 2020)).

The EU taxonomy and especially the NFRD requirements have greatly increased the volume of non-financial reporting. This new information in form of textual data provides potential for research using textual analysis methods. However, it is important to ensure that the methodology does not take precedence over the actual research question (Bochkay et al., 2023, p. 792; Bae et al., 2023, p. 3). Therefore, before addressing the hypotheses, the methodology of textual analysis will be examined in detail based on the existing literature.

Table 1: Effects of audit on reliability based on the experiment of Coram et al. (2009, pp. 142–145)

	Positive information content	**Negative information content**
Audit assurance	High reliability	High reliability
No audit assurance	Low reliability	High reliability

This review provides a summary as well as an explanation of current methods and highlights their advantages, disadvantages, and areas of application. This will not only identify the appropriate methods to apply to the research purpose of this thesis. It also provides a valuable contribution as it summarizes the leading research in various fields, particularly in the domain of finance and accounting.

Textual analysis has already been used to find evidence in several areas. Chen et al. found that both stock returns and earnings surprises can be predicted by peer-based knowledge on social media. They used one of the simplest methods imaginable: counting negative connoted words in articles written by individual investors on the social media platform Seeking Alpha. The ratio of negative connoted words[2] to the overall number of words was utilized to determine first a negative sentiment and then a decline in stock returns and even in earnings surprises. This effect increased as the number of negative words increased (H. Chen et al., 2014, pp. 1368–1369, 1382, 1400).

In a more recent study, Sautner et al. measured the extent of corporate exposure to climate change by using an algorithm to count key words[3] in earning call transcripts that are directly related to this topic. This method captured climate change exposure from the perspective of all key stakeholders, as the earning call transcripts included both shareholder and stakeholder questions as well as management responses (Sautner et al., 2023, pp. 1450–1451, 1492–1493).

Using a comparable methodology, Chen and Srinivasan analyzed the 10-K reports of non-tech firms to investigate the relationship between digital activities, firm value, and performance. Specifically, they measured the frequency of digital terms[4] in the description section of these reports. The authors discovered that non-tech firms have generally increased their digital activities over time, and that greater involvement in digital activities has a positive impact on firm value and stock performance. These findings were made possible by quantifying the degree of digitalization within firms through textual analysis (W. Chen & Srinivasan, 2023, pp. 2, 10, 29, 35).

As a final example, in a 2014 study, Purda and Skilliorn analyzed quarterly and annual financial statements for fraudulent activities. A multilevel textual analysis process first sorted words within the sample by frequency, then tested their predictive power using a decision tree-based approach, and finally concluded from the reports the probability that the statements were completely true and did not contain fraud. The algorithm based on textual analysis was able to confirm the presence or absence of fraudulent activity in over 82 % of the reports (Purda & Skillicorn, 2015, pp. 1194, 1197–1200, 1218).

The listed research is illustrative for the wide range of possible applications for textual analysis. Ranging from meaningful, market-relevant results in the area of finance, to risk exposure in the example of climate change, to opportunities for companies in the example of technology adaptation, to relevant accounting issues like fraud detection, the application possibilities are unlimited. The textual data examined ranges from individual social media posts to transcribed communications between companies and stakeholders to official corporate disclosures in annual and quarterly financial statements. This demonstrates that textual data can contain relevant information in any conceivable form, regardless of its type and nature.

In quantitative research, the approach is usually relatively straightforward. With the evaluation of a sample using statistical methods in direct relation to a hypothesis, researchers intend to obtain significant findings. The procedure in textual analysis is not as simple, as the database is initially qualitative. The information required for research can only be obtained in an exploitable form by means of an appropriate transformation (Loughran & McDonald, 2016, p. 1191).

The major difficulty is not that textual data is less structured or presented in a different way, but rather that it has a high dimensionality. The base of the dimensions is defined by the number of different words in a language, and the exponent by the number of words in the text, as shown in *Equation 1*. When taking a text that consists of only ten words, and it is written in a fictional language that also only possesses ten different words, then this text can have ten billion different dimensions, each of which is different from the others. In reality, texts are much longer than ten words, and languages consist of more than ten different words, so both the exponent and the base, and thus the total number of dimensions, take on an unimaginably high degree (Gentzkow et al., 2019, pp. 535–536).

$$t = n^l \tag{1}$$

t = *textual data dimensions*

l = *language word options*

n = *length of text in words*

---

[2] Examples for negative connoted words are *loss, termination, against or impairment.*

[3] The key words with the highest frequency were *renewable energy, electric vehicle, clean energy, new energy, climate change and wind power* (Sautner et al., 2023, p. 1466).

[4] Examples for digital terms are *analytics, virtual reality, automation, artificial intelligence, big data, data science or digitalization* (W. Chen & Srinivasan, 2023, p. 36).

Humans can handle the high number of dimensions because they are not important when reading text. Words are perceived and interpreted in the context of other words. Accordingly, sentences do not represent a sequence of independent variables. In textual analysis, however, these dimensions are important and must be addressed. At the beginning of any textual analysis, the number of dimensions considered should be drastically reduced in order to deal with the enormous amount of data. This reduction is usually performed within three steps. The first step is to divide the total volume of text into sections suitable for research. In the later course of this work, non-financial reports from different companies are analyzed. It is not necessary to examine the reports of all companies together. Rather it is sufficient to extract information from each report separately. This information can then be used to draw conclusions by applying other research techniques. By analyzing individual texts separately instead of performing one single overall analysis, the number of dimensions can be drastically reduced. In a second step, certain parts of the text can be excluded from the analysis. These are first of all frequently occurring words that maintain the grammatical structure of a text. Such words are important for human readers of a text, but contain little or no information that will emerge in the textual analysis. In addition, for some research it can also be useful to exclude words that occur very rarely in a text. Although these words may contain relevant information, the benefit of gaining this information could be outweighed by the additional effort involved in analyzing these words. In a final step, the stemming method can be used to adjust all words that have the same meaning but are spelled differently. This method unifies differently conjugated words by removing their suffixes. For example, the words *connected, connecting, connection, and connections* have the same informational meaning. By replacing them with their stem word *connect*, the dimensional base of the overall text is reduced once again (Porter, 1980, p. 130). The important aspect is to decrease the number of different words with identical information content. With these three steps, the dimensions of a text can be drastically reduced by lowering the base n of the dimension equation (Gentzkow et al., 2019, pp. 537–538).

The efforts for simplification are addressing the base n of *Equation 1*. From a purely mathematical point of view, a reduction of the exponent would be more effective. However, it is not as easy to reduce the exponent. Textual data from a sample can be decreased or simplified at the expense of information loss. But the vocabulary of the language in which a text is written is exogenous.

In textual analysis, instead of trying to reduce the exponent, often the entire formula gets modified. The so-called *bag of words* method ignores the position of words in a text. Alternatively, it only counts whether and how often individual words occur. This implies that the number of possible dimensions only result from the multiplication of the number of *words n* in the text by the number of possible words of a *language l*. Whereas before, a text of ten words length in a language containing only ten different words already had ten

billion dimensions. Using the bag of word method a text in English language[5] with the same amount of dimensions can contain more than 100,000 words. Thus, ignoring the order of words in texts leads to a massive reduction of the dimensionality of a text (Gentzkow et al., 2019, pp. 539–540).

After presenting a general overview of how textual analysis works, the next step is to specify its application areas. Text contains some information, but what kind of valuable information is included and how can it be extracted? Prior research has established various applications of textual analysis for information acquisition, which will be presented in the following literature review for the finance and accounting domain, which does not present all the literature, but the most important in terms of the objective of this thesis.

3. Literature review

3.1. Readability

Readability is one of the main areas of use in textual analysis. Depending on the context, the definition of readability varies. Either way, it should somehow determine if text is designed in a way that readers can recognize and comprehend the underlying message (Loughran & McDonald, 2016, p. 1188). More specifically, readability represents the relationship between a text and the cognitive load required to understand it (Martinc et al., 2021, p. 143). Even if a text is generally comprehensible to a reader, a high cognitive load, or in simple terms, a text that is challenging to read, may indicate poor readability. The readability of a text always should be considered in the context of the target audience (Loughran & McDonald, 2020, p. 28). The United States Securities and Exchange Commission (SEC) supports this position (United States Securities and Exchange Commission (SEC), 1998, p. 9). The *Plain English Handbook* published by the SEC describes the linguistic form in which publications should be made. This includes the annual financial statements and non-financial reporting components. The handbook recommends, among other things, the use of everyday language words and short sentences. It further recommends to perform automatic readability checks by using formulas developed for this purpose, but also manual testing by simple human proofreading of own publications (United States Securities and Exchange Commission (SEC), 1998, pp. 18, 57). This thesis examines non-financial reporting with focus on sustainability reporting within the German market, although European or other international regulators have objectives for publication requirements similar to the SEC.

The readability of text has been subject of many studies. Li's widely cited paper examines the relationship between the readability of annual reports and company earnings. Here, readability was measured by two variables, the so-called *Fog Index* and the length of the reports. The Fog Index is closely

---

5   There are several underlying bases for determining the number of English words. The following example is calculated using the number of 88,500 English words (Nagy & Anderson, 1984, p. 320).

related to the topic of readability and will be discussed in Chapter 4.2.1 in more detail. Li found that companies with a low readability score on their reports had worse earnings persistence. On the other hand, companies with easily readable annual reports are more persistent. This correlation could suggest that management is hiding negative information about its company by making the information in the reports more difficult to access (Li, 2008, pp. 222, 225–226, 244–245).

Reporting quality can also influence investment allocation. Biddle et al. found that companies with higher reporting quality are less likely to be over- or underinvested. Over- or underinvestment occurs when the marginal benefit of a capital investment is lower than the marginal cost of that investment. Information asymmetries between management and investors in capital markets are one main reason for such inefficient allocations. Higher reporting quality can reduce the occurrence of adverse selection and its effects. Biddle et al. use the Fog Index to measure reporting quality and find a positive relationship between increasing reporting quality and decreasing over- or underinvestment (Biddle et al., 2009, pp. 113–114).

Not only the general allocation efficiency can be related to readability, but also individual trading behavior. Miller finds that shares of companies with less readable reports are traded less frequently. This effect is most evident among small investors and can be explained by the higher cost of information acquisition, which is particularly important for such investor groups (Miller, 2010, pp. 2108, 2114, 2138). Lawrence found similar results in that investors are more likely to hold on to shares of companies with more readable financial disclosures. For the increase of one standard deviation in readability, stock returns increase by 91 basis points on average (Lawrence, 2013, pp. 131, 135, 141–142, 144). These two studies use the Fog Index and text length as readability measures.

Readability research has also provided insights in the domain of accounting. Chychyla et al. found a relationship between reporting complexity and accounting expertise within companies. They approximate accounting complexity by various parameters, including firm characteristics such as firm size and number of segments covered, as well as financial reporting variables such as the number of words in 10-Ks and their readability. The level of accounting expertise is approximated through boards of directors and audit committees. More specifically, the number of accounting experts[6] in these functions represent the level of accounting expertise within a company. Chychyla et al. argue that companies with a high level of reporting complexity also have a higher level of accounting expertise. This expertise should counteract the negative effects of accounting complexity and is expected to actively manage accounting complexity (Chychyla et al., 2019, pp. 227–229, 233–236, 247–248).

Another example of how companies can influence their own reporting is the study by Chakrabarty et al. on the relationship between executive compensation and disclosure transparency. The study concludes that firms with managers receiving higher risk incentives, measured by the stock option compensation, produce less comprehensible 10-K reports. This is because these incentives encourage managers to undergo risky projects with higher rewards, which may not be in line with the company's strategy. Management attempts to camouflage the undertaking of such projects by making the reporting less readable. Here, readability is assessed through the size of 10-K reports, as evidenced by Loughran and McDonald (2014). The result shows that companies in the top quartile of the stock option vegas[7] publish reports that are 15.4 % larger. The results were tested for robustness via variables such as firm complexity, while other testing, such as measuring readability via the Fog Index also supported the results (Chakrabarty et al., 2018, pp. 3, 5–7, 10–11, 13, 25).

A recent study by Dorfleitner et al. examines readability, among other issues, in a setting similar to the one in this thesis. Dorfleitner et al. investigate the impact of the General Data Protection Regulation (GDPR) on privacy statements. Just like the NFRD, the GDPR was published as a directive in the EU and became binding law in the form of a regulation in 2018. Using methods similar to the Fog method, privacy statements were tested for readability. The result was a worsening of readability due to the introduction of the GDPR. Even when considering the number of words as a readability measure, there was a decrease in readability due to an increase in the length of privacy statements (Dorfleitner et al., 2023, pp. 1–2, 4, 10–12).

The papers presented round off the literature review in the field of finance and accounting for the application area of readability, with the research area being constantly expanded and, above all, newer state-of-the-art methods being increasingly used.

3.2. Sentiment analysis

In the context of textual analysis in accounting, sentiment analysis finds even more interest than the topic of readability (Bochkay et al., 2023, p. 797). In sentiment analysis, texts are examined to determine whether they have a positive or a negative tone. This has already produced findings in a wide variety of research areas, even in far unrelated fields.

For example, Chevalier and Mayzlin examine the sentiment of customer reviews for books in the two largest online bookstores using a differences-in-differences approach and find that reviews with positive (negative) sentiment lead to significantly higher (lower) sales on the respective site. They also find that reviews with negative sentiment have a

---

[6] An individual is considered an expert if he or she is a certified public accountant (or similar) or has professional experience in relevant areas such as treasury or auditing.

[7] Vega measures how the value of a stock option changes as the volatility of the underlying asset changes (Black & Schloes, 1973, pp. 638–639). The vega parameter is used because it is expected that as volatility increases, management will take on riskier projects in order to increase the value of their own options.

stronger impact than reviews with positive sentiment (Chevalier & Mayzlin, 2006, pp. 345–346, 350).

In financial context, sentiment analysis has been successfully used to predict price movements in capital markets. Chen et al. find that the sentiment of opinion articles on the social media platform Seeking Alpha can be used to draw conclusions not only about stock performance, but also about the development of company earnings. With the help of sentiment analysis, they were able to identify crowd knowledge that contains not only capital market-relevant information but also real economic information that has not yet been included in the stock price (H. Chen et al., 2014, pp. 1368, 1382–1383, 1391–1392, 1400). Long et al. found similar results in predicting the price movements of so-called *meme stocks* by developing a sentiment score dictionary customized for the social media platform *Reddit*. They assigned weightings to words that have a particular meaning in a given context, so that meaningful words have a disproportionately strong influence on the sentiment of a sentence or text (Long et al., 2023, pp. 22, 25–27, 33–34).

In addition to prices, sentiment can also be used to determine other metrics such as liquidity. Agrawal et al. found that social media activity on platforms such as Twitter and StockTwits can be used to determine liquidity developments. For example, peaks and troughs in intraday liquidity can be identified. Analogous to the results of Chevalier and Mayzlin in a different context, they also show that negative sentiment has a much stronger influence than positive sentiment (Agrawal et al., 2018, pp. 86, 89, 93).

Next to social media, other sources can be used for sentiment analysis. Kothari et al. perform sentiment analysis on reports from corporate management, analysts, and news services to determine the impact on firms' cost of capital, stock return volatility, and analysts' earnings forecasts. The results confirm that positive or negative sentiment has an impact on each of the indicators examined, with the result depending on the credibility of the source. Since management is interested in presenting itself well, the impact of positive news from management is significantly weaker than that of negative news or positive news from other sources (Kothari et al., 2009, pp. 1641–1642, 1653, 1657, 1664). This result is of particular interest for this thesis, since sustainability reports are written by the companies themselves and are therefore subject to a fundamental sense of skepticism.

Huang et al. further illustrate that the words of management should not be taken at face value. By analyzing earnings press releases, they examine the tone of these releases and find that an abnormally positive tone predicts negative future earnings. The same content in an earnings release can be expressed in different ways. Sentiment analysis can be applied to distinguish whether earnings releases are expressed in a positive or negative tone, by measuring the ratio of positive to negative words. A neutral tone corresponds to describing the available fundamental information about a company, while an abnormally positive tone is indicated by too many positive words not related to the fundamentals. A profitable, growing company is not assumed to have an abnormally pos-

itive tone despite a high number of positive words, whereas poorly performing companies with the same number of positive words would be assigned such a classification. Huang et al. find that not only is an abnormally positive tone inconsistent with fundamentals, it is actually an indicator of negative future earnings and cash flows. An unusually positive tone is most likely to occur when a company is about to meet or exceed the previous year's results or analysts' forecasts. Conversely, earnings releases can also have an abnormally negative tone, especially if a significant portion of executive compensation consists of stock options, giving them an incentive to reduce the share price in the short term in order to buy shares at a favorable price later on. In both cases, management is distorting the company's situation for its own benefit and to the disadvantage of investors. This behavior can be revealed by sentiment analysis of earnings press releases (X. Huang et al., 2014, pp. 1084–1086, 1090–1091, 1094, 1103, 1111).

3.3. Disclosure quantity and similarity

Readability and sentiment analysis account for over 60 % of the textual analysis papers published in the top accounting journals[8] over the last decade (Bochkay et al., 2023, pp. 795, 797). Other important topics are disclosure quantity, text similarity, and topic discovery. These areas can be considered separately, depending on the research question. However, it can also be reasonable to consolidate them. The measurement of the quantity of content, the discovery of topics or the assignment of textual data to a topic is typically performed under the overriding interest of similarity and comparability studies. These areas of textual analysis also yield various findings.

Frankel et al. examine the characteristics of earnings calls, in which public companies discuss their financial performance, and find that earnings calls of companies that miss analysts' expectations by just a penny are disproportionately long. The average length of a call in the study sample is just over 50 minutes. Calls of companies that miss earnings expectations by a penny last 1.1 minutes longer. This deviation is significantly larger than, for example, a one-penny overshoot of expectations or the delta from a one-penny miss to a two-penny miss. Frankel et al. were thus able to demonstrate that the quantity of information is abnormally deviant in such cases. However, this result is particularly interesting because a parallel study of the sentiment of earnings calls found that these unusually long calls did not show any noticeable shifts in their tone. In general, calls that miss analysts' earnings expectations have a more negative tone than those that meet expectations. However, a one-penny miss does not lead to a noticeable difference in tone. Thus, in this case, the sentiment analysis of the data is inconclusive, but the quantity analysis does reveal new evidence (Frankel et al., 2010, pp. 221–222, 227, 230, 240).

---

[8] The papers which have been under consideration are *The Accounting Review, Journal of Accounting Research, Journal of Accounting and Economics, Contemporary Accounting Research, Review of Accounting Studies, Accounting, Organizations, and Society, and Management Science*.

In another study, Huang et al. address earning calls, but instead of examining the information quantity of those calls, they focus on the closely related topic of similarity. Huang et al. use textual analysis to compare earning calls with analyst reports based on those calls. In this context, analysts are expected to gather information from earnings calls and interpret them in a way so that investors can utilize their reports to make investment decisions. Latent Dirichlet Allocation (LDA) is used to determine which content of analyst reports corresponds to the topics of the earnings calls. LDA is a textual analysis method that identifies topics within text by capturing statistical correlations of words. Using their method, Huang et al. discovered that 31 % of the analyst reports only briefly addressed topics that appeared in the earnings calls, while the remaining 69 % directly corresponded to the topics of the earnings calls. Using similarity analysis and topic discovery within textual analysis, it was therefore possible to quantify the value added by analysts. The 31 % of analyst reports content that is not included in the earnings calls can be argued to offer added value in terms of information discovery (A. Huang et al., 2018, pp. 2833–2835, 2840, 2848).

However, similarity can be examined not only for earning calls. Gaulin and Peng use textual similarity analysis to compare compensation disclosure. Compensation disclosure is a highly regulated area. It is therefore appealing to explore the extent to which the disclosures of companies in different domains vary and where there is a high degree of similarity. Gaulin and Peng disregard traditional textual analysis methods and apply innovative machine learning techniques instead. A novel algorithm, trained on company disclosures, is designed to detect relationships that remain undiscovered by traditional methods. These traditional methods, which are examined in more detail in Chapter 4.2 of this thesis, have a significant weakness in that the similarity outcome is heavily reliant on the text length of the disclosure, which in turn is strongly correlated to the size of the company. New natural language processing (NLP) methods (described in Chapter 4.3 of this thesis) such as the novel algorithm can overcome these weaknesses. Gaulin and Peng also apply the traditional methods and recognize that their state-of-the-art methodology outperforms those methods. The study differs from many others in this domain in that it explicitly focuses on the narrative of the disclosures rather than the quantity of them. The results show that companies of comparable size, companies in the same industry or companies using the same compensation consultants show similar disclosures (Gaulin & Peng, 2022, pp. 1, 3, 4, 6, 21, 25–26). Although these findings are not relevant to this thesis, the results of the methodology highlight an important aspect and valuable research applications can be drawn from them.

In the accounting domain, Brown and Tucker perform a similarity analysis on Management Discussion and Analysis (MD&A) disclosures and examine how they are changing relative to real economic changes. MD&A disclosures are a mandatory part of reporting for U.S. companies, in which business-related topics such as earnings, liquidity, and ma-terial risks are presented from the perspective of management according to the management approach. Although the content of the topics is predefined, the form in which they are disclosed offers a huge degree of freedom, which is why an examination of these disclosures can provide interesting findings. Brown and Tucker develop a modification score for MD&A disclosures to measure the similarity of such documents across time and find that the score decreases over time as the length of disclosures increases. These results suggest that companies are increasingly using boilerplate language, i.e., standardized language that is not firm-specific or adapted to economic circumstances. At the same time, they also find that MD&A disclosures change more when economic changes are more pronounced. Brown and Tucker's similarity analysis is a methodological approach that complements other textual analysis methods such as readability and sentiment analysis and has made it possible to determine the usefulness of MD&A disclosures for investors or other stakeholders over time (S. Brown & Tucker, 2011, pp. 310, 312–313, 315–317, 327, 341).

Lang and Stice-Lawrence conduct similar studies, but instead of focusing on MD&A disclosures, they examine entire annual reports using a variety of analytical techniques. They find that reporting quality affects real economic variables such as liquidity, analyst coverage, and ownership structure. Their study covers several domains: reporting quantity in terms of the length of the annual report, readability as measured by the Fog Index, the proportion of boilerplate language, and the domains of comparability and similarity. The authors argue that the information content increases with the length of the annual reports, while a higher proportion of boilerplate language reduces the information content. Comparability between annual reports is measured not only on the basis of visual similarity, but also on the basis of content similarity. For this purpose, the cosine similarity is used as a measure, which was also used by Brown and Tucker for the similarity score and is discussed in more detail in Chapter 4.2.3 of this thesis. In their research, Lang and Stice-Lawrence observed the adoption of IFRS accounting by some companies and, in addition to the findings that reporting quality has an impact on real economic variables, they also found that companies with high reporting quality in particular benefit from the adoption of IFRS standards (Lang & Stice-Lawrence, 2015, pp. 110–113, 131). A similar application is also conceivable in the area of non-financial reporting and can help to address the research objectives of this thesis.

4. Presentation of methods in textual analysis

4.1. Overview

After the previous chapter has presented the relevant literature categorized according to the different fields of application, the focus now shifts towards the functionality of the subject areas. First, the traditional methods that form the foundation of textual analysis are reviewed. Before then introducing the state of the art methods, the functionality

of NLP and machine learning in the field of textual analysis will be thoroughly covered. These methodological principles help to better comprehend the new methods. This is followed by a presentation of those state-of-the-art methods, which have been used especially in recent academic research and which complement and further develop the traditional methods. The detailed consideration of all methods on the one hand represents an up-to-date overview of the possibilities of textual analysis in the field of accounting. On the other hand, it ensures that the appropriate methods are identified for the research questions of this thesis and that the risk of overlooking potential applications is minimized. The methods analyzed are listed in *Table 2* for ease of reference.

4.2. Traditional methods

4.2.1. Readability

Beginning with the subject of readability, the Fog Index is indispensable. This index, developed by Robert Gunning in 1952, is not only one of the older readability measures, but is still used in academic research today. The Fog Index has been used in well over 100 accounting studies, mostly in the highest ranked papers (Efretuei & Hussainey, 2023, p. 322). Its simplicity and straightforward nature make it one of the most widely used readability measures. The result of the Fog Index equation is a simple number that indicates how many years of education a reader of average intelligence needs to comprehend a certain text.

$$Fog = (words\ per\ sentence + complex\ words\ in\ \%) * 0.4 \tag{2}$$

The only two variables of *Equation 2* are the average number of words in a sentence within a text and the percentage of complex words that are defined as words with three or more syllables. The sum of these two factors is multiplied by the constant 0.4. The result represents the number of years of education (Li, 2008, p. 225). Depending on the educational system, a Fog Index < 12 indicates that schooling up to high school graduation is sufficient to understand a text, a Fog of up to 15 requires a bachelor's degree, a Fog of up to 17 requires a master's degree, while an even higher Fog indicates that the text is incomprehensible.

The Fog Index is widely used in research and is considered by regulators in the context of corporate disclosure (Efretuei and Hussainey, 2023, p. 319; Loughran and McDonald, 2014, p. 1644). However, it is not the only readability measure. Guay et al. investigate the complexity of financial statements in the context of the voluntariness of reporting elements and measure readability with a merged index, which consists of six individual measures, one of which is the Fog Index. The other measures are the Flesch-Kindcaid Index, the LIX Index, the RIX Index, the ARI Index and the SMOG Index. Each of these measures readability as a function of the average number of words, syllables, or characters in a text using similar calculation methods (Guay et al., 2016, p. 18). As a result, the measures are strongly positive correlated with each other.

In their study, Guay et al. measured individual correlations of at least 0.84 to 0.99 (Guay et al., 2016, p. 70).

The Fog Index, and by default all similar indices, has been subject to severe criticism. For one thing, the first component of the Fog Index, the average number of words in a sentence, is less accurate for measuring readability in a business context than it is for general language texts, but it is the second component, which deals with complex words, that has been criticized in its application to financial and accounting texts in particular. Half of the weight of the Fog Index falls on complex words, which are defined only by their number of syllables. However, in a business context, multi-syllable words are quite common, which automatically inflates the result of the Fog Index. In addition, many of these words are not particularly difficult to read, even though they are long. Having a few different long words that make up a high proportion of the absolute complex words also argues against the composition of the Fog Index, because the repetition of these words makes them easy to read. Nevertheless, these words increase the index (Loughran & McDonald, 2014, pp. 1644–1645).

To overcome these problems, Bonsall et al. develop the Bog Index, which considers not only word and sentence length, but also more deeply the language characteristics. The Bog Index consists of three variables:

$$Bog = sentence\ Bog + word\ Bog - Pep \tag{3}$$

The first variable *Equation 3* is similar to the first variable of the Fog Index. The average sentence length of a text is squared and divided by a fixed long sentence limit of 35. Thus, longer sentences increase the Bog Index, analogous to the Fog Index. The second variable *word Bog* differs significantly. Here, not the number of syllables in a word determine complexity, but several parameters such as word difficulty, abbreviations, wordiness, passive verbs and stylistic issues that are taken into account. A set word list awards penalty points between zero and four to complex words depending on the parameters. These are multiplied by the factor 250 and divided by the total number of words. Thus, words only affect the index if they are actually classified as complex according to the parameters and not just according to the number of syllables. The third variable *Pep* has the special feature that it decreases the Bog Index. The Fog Index does not contain a comparable variable. *Pep* rewards certain characteristics of a text that make it easier to read. These include names, interesting words and personal pronouns. The sum of these words is multiplied by the factor 25 and divided by the total number of words in the text. This means that supporting words that make a text more readable are weighted less heavily than complex words, but they still have an impact on the index. Finally, a variation in sentence length has a positive effect on the *Pep* variable. Alternating short and long sentences improves the reading flow. Higher standard deviation is accounted by an additive factor in the Bog Index (Bonsall et al., 2017, pp. 12–14). The Bog Index is based on the functionality of the software program StyleWriter[9], which among

---

9 The exact composition of the Bog Index is published on the website of

Table 2: Readability measures overview

	Readability	Sentiment analysis	Disclosure quantity/ similarity
Traditional methods	Fog Index Bog Index Similar indices[a]	Word book approach	Vector Space Model
State-of-the-art methods	File Size Machine Learning Key Figure Combination Large Language Models	Traditional Machine Learning (supervised) Deep Learning (Artificial Neural Networks) Large Language Models	Traditional Machine Learning (bag of words) Advanced Machine Learning (word embedding) Large Language Models

[a]Flesch-Kindcaid Index, LIX Index, RIX Index, ARI Index and SMOG Index.

other things is designed to improve text readability. The software works with various applications, for example a list of 200,000 words that are used in the punishment of complex words in the functionality of the Bog Index. The software has also been used in other studies to investigate the readability of texts (Miller, 2010, pp. 2114, 2140).

The Bog Index overcomes some of the weaknesses of the Fog Index, but it also has some shortcomings of its own. For instance, the Bog Index is fundamentally more complex and less easily replicable, mainly because the word list used is not publicly available. In addition, the Bog Index focuses on writing style rather than readability, which are very similar but not identical fields of application (Loughran & McDonald, 2020, pp. 25–26).

In summary, there are several methods to determine the readability of a text. The Fog Index is the most used (Loughran & McDonald, 2014, p. 1645), although other indices can complement and improve the Fog Index. However, these methods suffer from weaknesses, which is why additional methods are discussed in Chapter 4.4.1 of this thesis.

4.2.2. Sentiment analysis

Sentiment analysis has become more prevalent in textual analysis than readability research (Bochkay et al., 2023, p. 797). The majority of sentiment analysis studies use the bag of words method, which represents the information of a text as a vector containing the count of each occurring word (Loughran & McDonald, 2011, pp. 36–37). As explained in Chapter 2.4, this technique results in a substantial reduction of text dimensionality, which simplifies text processing, but also results in a loss of information. To determine the sentiment of a text, the vector is mapped to a word list that assigns a sentiment score to each word (McGurk et al., 2020, p. 463). For example, to determine whether the tone of a text is positive or negative, all positive and negative words in a text are aggregated. Thus, the number of different positive

or negative words affects sentiment, as does the frequency of those words. The total number of positive and negative words is then contrasted and an overhang indicates the type and strength of the sentiment.

In this type of study, the vector is derived from the text under investigation and is thus exogenous. The world list used, on the other hand, can influence the result of the analysis. It is in the eye of the observer whether a word expresses a positive, negative or no sentiment at all. Many studies use the Harvard Psychosociological Dictionary or Harvard-IV-4 Tag-Neg (H4N). This list of words was designed for research in sociology and psychology and contains an extensive division of words into 182 different categories such as *strong, weak, active, pleasure* and *pain*. However, the most commonly used categories are positive and negative words. For example, the study by Tetlock et al. found that a higher number of H4N negative words in the press predicted lower company earnings and that such words also have a significant impact on stock returns (Tetlock et al., 2008, pp. 1464–1465).

The H4N word list is frequently used in sentiment analysis given the fact that it is publicly available and not proprietary (Loughran & McDonald, 2011, p. 38). By utilizing the dictionary, researchers have no control over the sentiment to which each word is assigned. This makes the word list an exogenous variable (Loughran & McDonald, 2011, p. 38). However, the H4N was not intended for use in business contexts, resulting in poor word classification. Loughran and McDonald discovered that almost three quarters of all negative words in the H4N word list are not considered negative in a financial context. They found this by counting negative words in corporate financial statements and running a regression with corporate earnings. For words like *tax, cost, capital, board, liability, foreign*, or *vice* there is no correlation between increasing word count and decreasing returns. In common language, the negative connotation of these words is clear. However, within financial statements, such words are used without negative implications (Loughran & McDonald, 2011, pp. 35–36).

To address this issue, Loughran and McDonald created wordbooks specifically designed for financial and account-

the company behind StyleWriter (https://www.stylewriter-usa.com/stylewriter-editing-readability.php).

ing studies, generated from textual data of over 50,000 financial statements. These are six separate lists covering the following sentiments: *negative words, positive words, uncertainty words, litigious words, strong modal words* and *weak modal words*. Most of these lists were created by including all words that occur in at least 5 % of the sample and are therefore part of the more frequently used language. The correlation between frequency and return was then measured for these words. In addition, Loughran and McDonald considered negations for positive words, so that words were not considered positive if they were preceded by negation words[10]. This consideration was not applied to negative words, since the authors assume that negative negations rarely occur. As a result, the list of negative words consists of 2,337 words, of which 1,121 match the H4N list. A total of 2.5 billion words are classified in the study, of which 3.79 % are classified as negative by H4N and only 1.39 % are classified as negative by Loughran and McDonald's negative word list. Many of the words from the H4N list are either not negative in the financial context (e.g., *claims* or *litigation*) or because they appear in the financial statements of particular industries (e.g., *cancer* in the pharmaceutical industry or *tires* in the automobile industry) (Loughran & McDonald, 2011, pp. 49–50). The appropriateness of Loughran and McDonald's word list for financial statements is demonstrated in *Figure 1*.

The sample is divided into five quintiles according to the number of negative words occurring. It is expected that companies with more negative words on average have a greater negative access return. This relationship is clearly visible in the word list of Loughran and McDonald (Fin-Neg), while the H4N word list (H4N-Inf) does not show the expected monotonically decreasing trend. Further, the companies from the quantile with the most negative words from the H4N word list also show the almost lowest negative excess returns, which is the opposite of what would be expected (Loughran & McDonald, 2011, p. 51).

4.2.3. Disclosure quantity and similarity

The subject of disclosure quantity and similarity has been the focus in a variety of studies, such as analyzing earnings calls (Frankel et al., 2010), identifying analyst value-added for such earning calls (A. Huang et al., 2018), comparing disclosures in general (Gaulin & Peng, 2022; Lang & Stice-Lawrence, 2015), or in specific areas like MD&A (S. Brown & Tucker, 2011). The consideration of these areas may also be relevant to this thesis. For instance, S. Brown and Knechel (2016) have used textual analysis methods to examine certain similarities between companies and their auditors.

Many of these and other studies determine similarity using the Vector Space Model (VSM). This model is also utilized by search engines, for example, to respond to search requests with matching websites. In the VSM, a text is represented as an *n*-dimensional vector, where *n* is the number of different

words and the value of the vector represents how often each word occurs in the text (S. Brown & Tucker, 2011, p. 315). This procedure is equivalent to the bag of words method, which represents the information of a text in the same way.

Similarity is calculated as the cosine of the angle θ (therefore, the model is also referred to as cosine similarity) between two vectors v_1 and v_2, using *Equation 4* (S. Brown & Tucker, 2011, p. 316):

$$Similarity = \cos\theta = \frac{v_1}{\|v_1\|} \cdot \frac{v_2}{\|v_2\|} = \frac{v_1 \cdot v_2}{\|v_1\|\|v_2\|} \quad (4)$$

v_1, v_2 = vectors
$\|v_1\|, \|v_2\|$ = vector length
θ = angle between vectors

The vectors and the vector length determine the similarity of two sentences. The vector length is calculated by the square root of the sum of all squared dimensions of a vector. The dot product of the vectors forms the numerator, while the product of the vector lengths forms the denominator. The following example, which consists of two short sentences, illustrates the concept (word counts are listed in Table 3).

> *Sentence 1: Sustainability is as important as company earnings, therefore we focus on sustainability.*
>
> *Sentence 2: Sustainability impacts our earnings and thus sustainability is important for our company.*

$$
\begin{aligned}
Similarity_{example} = \cos\theta &= \frac{v_1}{4} \cdot \frac{v_2}{3,606} \\
&= \frac{8}{14,4224} = 0,5547 \quad (5)
\end{aligned}
$$

Vektor v_1 = (0,2,1,1,1,0,0,1,1,1,0,2,1,0,1)
Vektor v_2 = (1,0,1,1,0,1,1,1,1,0,1,2,0,1,0)
Vektor length $\|v_1\|$ = 4
Vektor length $\|v_2\|$ = 3,6056

At first glance, the sentences seem to have some similarity. Certain words appear in both sentences, while others appear in only one. In both sentences, the word *sustainability* appears twice. A cosine similarity score of 0.55 is calculated for the sentences. Scores between 0 and 1 are possible, where two vectors of the same direction result in a score of 1 and two orthogonal vectors result in a score of 0 (A. Huang et al., 2018, p. 2853). The result itself is not conclusive for such a small data set and without any reference results. Nevertheless, it is interesting to see how the score is calculated. For example, half of the similarity score can be attributed to the word *sustainability*, since this word increased the dot product of the vectors from 4 to 8.

Cosine similarity also finds other applications such as plagiarism detection (Bochkay et al., 2023, p. 771). In order to

---

[10] Negation words considered are *no, not, none, neither, never, nobody*.
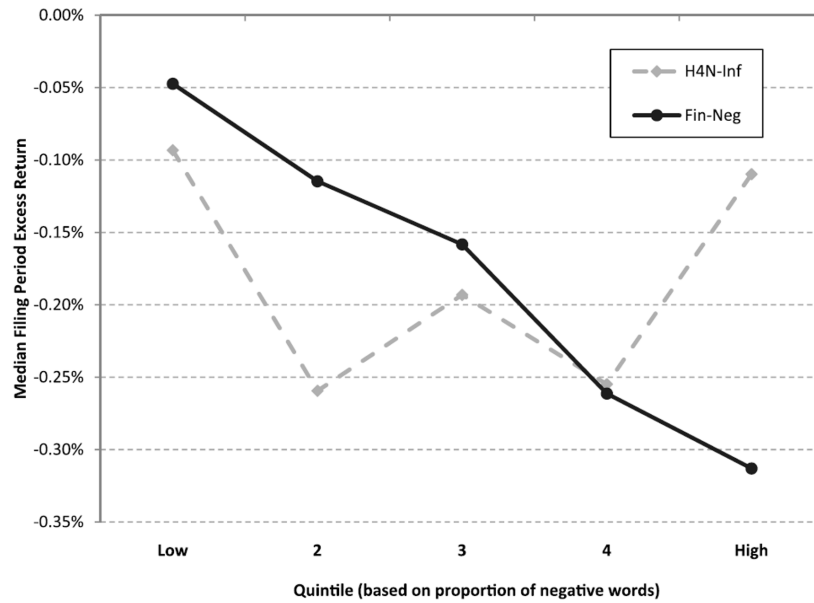
Figure 1: Median excess returns by quintile based on proportion of negative words (Loughran & McDonald, 2011, p. 51)

Table 3: Word count of sentences

word	v$_1$ count	v$_2$ count
and	0	1
as	2	0
company	1	1
earnings	1	1
focus	1	0
for	0	1
impacts	0	1
important	1	1
is	1	1
on	1	0
our	0	1
sustainability	2	2
therefore	1	0
thus	0	1
we	1	0
Total	**12**	**12**

open the model to further research and to improve it, several adjustments may be made. A first step is usually stemming, where words are reduced to their stem to lower the dimensionality of the vectors (Porter, 1980, p. 130), as described in Chapter 2.4. Reducing the dimensionality leads to more efficient processing of the data (S. Brown & Knechel, 2016, p. 770). Most importantly, this simplification is also helpful because in the vast majority of contexts, variations of the root word do not change the content. Therefore, it is reasonable that different variations of the same word increase text similarity.

Besides stemming, word weighting is another important customization option. Without any form of weighting, the VSM does not differentiate between words. One possible approach is to underweight common words and overweight less common words, as these are considered to be more relevant to the content. Often, the dimensions of the vectors, which reflect the number of individual words in the text, are multiplied by the logarithm of the function *M/m*. *M* represents the number of all texts compared in the sample and *m* represents the number of texts containing the corresponding word. This reduces the weight of frequently occurring words. Since *log(1) = 0*, words that occur in all texts (*M=m*) have a weight of zero and do not influence the similarity analysis (S. Brown & Tucker, 2011, pp. 316–317). Some studies even go a step further and not only reduce the weight of common words,

but discard them altogether if they occur in a larger fraction of the sample (Hoberg & Phillips, 2010, p. 3782).

Finally, it is crucial to consider the text length. The greater the length of the texts to be compared, the higher the likelihood of common words occurring in both texts, thus increasing their similarity (S. Brown & Tucker, 2011, p. 317). Therefore, longer texts will naturally have a higher similarity than shorter ones. This can be counteracted by integrating a correction variable adapted to the respective study (S. Brown & Tucker, 2011, pp. 343–344) or by normalizing the vectors so that all vectors of a study have the same length (Hoberg & Phillips, 2010, p. 3809). Text length itself can also be used as an indicator of similarity. Brown et al. examine spillover effects in qualitative corporate disclosures. Specifically, they find that companies change their disclosures more if the industry leader, direct competitors, or an industry peer with the same auditor receives comments from regulators, even if their own disclosures were not criticized (S. Brown et al., 2018, pp. 623–625). To get to this finding, Brown et al. compared the absolute change in the number of words in risk disclosures from one year to the previous year, assuming that a change in the number of words also indicates a change in the information contained (S. Brown et al., 2018, pp. 631, 636).

Chapter 4.2 outlined the fundamental practices of traditional textual analysis. The following chapter establishes the methodological principles of NLP and machine learning for a deeper understanding of the subject before a similar presentation of the state-of-the-art methods is provided in Chapter 4.4.

4.3. Development of natural language processing and machine learning

Textual analysis has been utilized in academic research for a long time, but the advantages offered by NLP have brought the field to an advanced stage. Not all state-of-the-art methods make use of NLP, but it forms the basis for many newer methods. Therefore, before listing the state-of-the-art methods in the areas of readability, sentiment analysis, and disclosure quantity and similarity, the framework around NLP and related concepts will be further examined.

NLP offers the possibility to work with text in various ways. In general, NLP models function by taking given textual data as an input, transforming it, and presenting a new output as a result. In this transformation, NLP models differ in the way they operate. A first category includes rule-based models. The transformation of a text in these models is performed by manually developed rules. For instance, these rules may count the number of certain words or text elements. Keywords can be counted to identify specific contents of a text. Next to them, words defined as complex or the number of sentences can be counted. It can also be helpful to count words that have been previously assigned to categories, such as words with positive or negative sentiment (Bochkay et al., 2023, p. 769). These simple transformations are thus structured similar to traditional models like the Fog Index or traditional sentiment analysis methods.

More complex are models like the VSM. Here, the input is modified by representing textual data as a vector, which is then transformed in a rule-based manner in a second step, for example to perform a similarity analysis (Bochkay et al., 2023, p. 771). However, NLP is not restricted to these specific applications, but also facilitates innovative applications utilizing machine learning models that exceed the current ones presented.

Machine learning is a process where an algorithm generates a model from pre-existing data. The input data and desired output data are defined, and the model attempts to match the input data to the corresponding output data using defined rules. Once trained on the given training data, the model is expected to be capable of applying this process to new data sets. The training data is typically formed of a small but representative portion of the overall data set to ensure that the machine learning algorithm works well on all data (Zhou, 2021, pp. 3–4). Machine learning is thus classified as artificial intelligence, although, unlike many other artificial intelligence applications, it relies on historical data or training data. From this data, it is possible to identify patterns that can be used for event prediction or classification tasks (Alloghani et al., 2020, pp. 3–4).

There are various machine learning models that are applied in the domain of textual analysis. One of them is the Naive Bayes model. The Naive Bayes model is a probabilistic generative model that calculates outputs based on conditional probabilities. It is mainly used for text classification or topic detection, which is an area of analysis that was not mentioned in the traditional methods, listed in Chapter 4.2, but is still used in text analysis. For example, Brown et al. use topic detection to determine whether it is possible to make assumptions about the probability of fraud cases based on company disclosures. They do not refer to measures such as readability or sentiment analysis, but specifically to the content of the disclosures and whether this can be exploited with the help of machine learning techniques to generate robust probabilities for the existence of fraud (N. Brown et al., 2020, pp. 238–239).

In the Naive Bayes model, similar to the bag of words method, a text is considered as a vector. However, in this model, the text is represented as a binary vector, so the frequency of one and the same word is not relevant. The model now requires texts as training data. From this data, the model is able to determine the probability of certain parameters, in this case words, occurring in a category. The probabilities determined in the training phase can be transferred to the subsequent prediction phase in order to assign uncategorized texts to the category that the model considers most likely. This is the category of texts representing most similar vectors. The Naive Bayes model gets its name because it is founded on the *naive* assumption that each probability of the occurrence of a word is independent from the occurrence of any other word. Thus, the joint probability of several specific words occurring is equal to the product of the probabilities of the individual words, which would not be the case in a real setting (Aggarwal, 2018, pp. 123–125).

Another example of machine learning is the nearest neighbor classifier. This model classifies variables such as text or separate text components into categories, similar to the Naive Bayes model. The major difference is that the nearest neighbor classifier does not require a learning phase, but performs its classification decisions based on the training data only. A variable that is not included in the training data set gets assigned to the category in which an already categorized variable is located, which in the case of textual analysis would be the text from the training data set that was previously categorized and has the smallest deviation, thus representing the nearest neighbor. The deviation is calculated using cosine similarity (Aggarwal, 2018, p. 133).

Text regression is another popular machine learning application in textual analysis. Due to the high dimensionality of textual data, as discussed in Chapter 2.4, common regression methods, such as ordinary least squares regression, are not suitable. The large number of different English words, which represents the number of parameters in a regression, usually even exceeds the number of observations in a sample. Instead, nonlinear regressions can be performed. The so called classification and regression trees model is constructed by iterating a text through all available branches of the decision tree. The text is stripped down to the most informative features, which are the words identified as most relevant. This can be done with the help of specific dictionaries. The features are then grouped and iterated through the decision tree, where the algorithm identifies more features that can help with the categorization. At each level of the tree, the algorithm selects features that best contribute to the separation of categories, resulting in increasingly specific criteria for classification. When a new data point, in this case a text outside of the training data, is added for classification, it travels along the branches based on the presence or absence of certain criteria, in this case specific words, and ends up at the end of a branch that determines the classification. In some models, the data point can also land at multiple ends, which are then weighted (Bochkay et al., 2023, pp. 771–772). Such classification and regression trees can be used in sentiment analysis, for example. The classification and regression tree model enables the detection of correlations in the form of a nonlinear regression by dividing variables into domains in which they are homogeneous. Relationships are not measured along one variable, but rather by discrete features. In the case of textual analysis, these features are words and are evaluated within the context of an association, such as sentiment.

The models presented so far belong to the supervised machine learning group. This means that the models operate in such a way that the training data is already correctly labeled and the models therefore have a blueprint to which they can refer. In contrast, there is unsupervised machine learning, in which case the model has to recognize patterns without classified training data (Alloghani et al., 2020, p. 4).

Topic modeling is one of the unsupervised machine learning models used in textual analysis. The most popular subset is LDA, which was briefly introduced in Chapter 3.3. In this unsupervised machine learning model, the algorithm detects topics within a text by using probabilistic methods to identify words that are related to a topic. The algorithm is therefore used in topic detection within texts, but also for similarity analysis, since texts with similar identified topics are assumed to have a higher similarity (Bochkay et al. 2022: 772).

All of these supervised and unsupervised models are traditional models of machine learning. They offer advantages over some other textual analysis methods, but also show their own shortcomings. For example, traditional machine learning models have trouble recognizing complex contexts in the learning process. This can result in an incorrect or insufficient algorithm that does not generate valuable outputs. Another weakness is that users manually define the investigated features. For example, for readability, the number of characters or syllables are defined as examination variables. Finally, it is necessary to train the models, which requires both time and the availability of a suitable training data set. Deep learning methods can overcome these weaknesses (Bochkay et al. 2022: 772-773).

At the beginning of this chapter, the functionality of NLP models was described, in which input data, such as textual data, is transformed and subsequently represented in a modified form as output data. The models therefore have three distinct layers: an input layer for the input of the data, a second layer in which a transformation process is applied according to the methods of the models described, and a third output layer for the display of the data.

The process of deep learning is comparable, but varies in the middle of the model structure, between the input layer and the output layer. Instead of a straightforward transformation function, a so-called hidden layer is used. This layer, in turn, can consist of several layers that are interconnected (Aggarwal, 2018, p. 326). The hidden layer represents a mathematical function that computes output values from input values. This function itself is composed of several simpler functions, the individual layers. It is the *depth* of the layers within the model that gives deep learning its name. The more layers a model has, the more complex tasks it can solve. Each layer performs a unique function in the overall transformation (Goodfellow et al., 2016, pp. 5, 8). *Figure 2* shows a simplified deep learning model where a specific output parameter is determined from various integer variables. An example use case would be the categorization of textual data. The hidden layer here has a depth of two and can be extended many fold in more complex models.

Such models are also called Artificial Neural Networks (ANN) because they resemble the neural network of the human brain (Bochkay et al., 2023, p. 773). The intersections between layers are connected to form a network through which information passes. Deep learning methods consisting of ANNs find application in the processing of visual material such as images and videos, audio material such as audio tracks, and also In the processing of text and speech. Especially in textual analysis, Deep Learning offers enormous possibilities for the future, by considering words and sentences
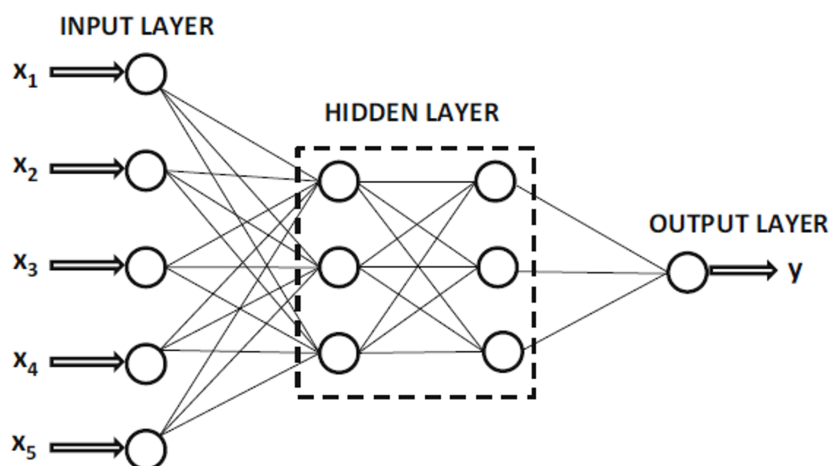
Figure 2: Multilayer neural network example (Aggarwal, 2018, p. 327)

in the context of the whole text (LeCun et al., 2015, pp. 436, 442).

The ANNs can be designed to process textual data as a simple vector. A more reliable use, taking into account the context of individual words, can be achieved by integrating loops into the structure of the ANNs. Inputs and outputs are not considered as single variables (words), but as dependent sequential variables (sentences or text segments). Such models are useful, for example, in translation applications or the in design of an artificial intelligence which is able to answer questions (Aggarwal, 2018, pp. 342–343, 350–351). In addition, there are models that calculate output via so-called *attention*. Here, the similarity of the input to different vector series which contain information is calculated first. The higher the similarity, the higher the assigned weight. The sum of the weighted vectors then provides information about the measure of attention, allowing the model to focus on certain parts of the text depending on which information is important for the given input. Vaswani et al. propose that attention weighting provides better output predictions than using loops in recurrent neural networks (Vaswani et al., 2017, pp. 2, 3, 5, 9).

The attention mechanism is used in state-of-the-art large language models (LLM). LLMs are NLP models that have large neural network architectures and are trained on large sets of textual data. Open AI's generative pre-training (GPT) language model *ChatGPT* is receiving tremendous attention. Immediately after its launch in November 2022, it was the fastest growing consumer application at the time and is now among the top 20 visited websites worldwide with 1.5 billion monthly users (Reuters, 2023, p. 1). Such GPT models are able to perform similarity assessments or to classify texts, but most of all they are known for their ability to answer questions through text generation. The models are built using a combination of unsupervised pre-training and supervised fine-tuning. The unsupervised pre-training is performed by taking a large amount of unlabeled texts as training data and transforming them into outputs using a multi-layer trans-

former decoder. The multi-layer transformer decoder works according to the attention mechanisms described before, where the transformation takes place over several layers in order to perform a step-by-step refinement of the interpretation of the text, from simple to complex contextual relationships. Finally, the fine-tuning is carried out with labeled textual data for the different tasks of such a model. The combination of unsupervised pre-training using the attention mechanism and supervised learning at the task level helps to bring the performance of GPT models to a new level (Radford et al., 2018, pp. 2–4, 8).

Next to ChatGPT is the Bidirectional Encoder Representations from Transformers (BERT). BERT is an LLM with versatile application possibilities. Like ChatGPT, BERT is built in two steps. The first step of pre-training is done using a multilayer bidirectional transformer. The main difference between the models is the *direction* in which they generate text. In ChatGPT, the text is generated token[11] by token or word by word from left to right, as a human would read it. BERT uses the Masked Language Model (MLM) instead. In the MLM, random tokens or words are *masked* in pre-training, making them unrecognizable to the model, so that they can be predicted based on the surrounding words. The advantage of MLM is that texts are not only generated from left to right so that only the preceding words in the pre-training influence the predictions, but also the following words. The second step of fine-tuning is performed as in the GPT models, using labeled textual data that is required for the particular application. The pre-trained version of BERT is designed so that fine-tuning can be performed by adding a single additional layer to the ANN, allowing it to be built on top of the base model with minimal effort (Devlin et al., 2019, pp. 4171–4174).

Both models are pre-trained with a very large amount of data and thus can be referred to as LLMs. There is no

---

[11] Tokens are sequences of letters that are somewhat similar to words. On average, 100 tokens correspond to approximately 75 English-language words (https://platform.openai.com/tokenizer).

clear boundary at which NLP models are considered as a LLM. Chelba et al. have designed a benchmark for language modeling that contains one billion words (Chelba et al., 2013, pp. 1–5). When using such a huge benchmark, it is reasonable to describe a model as an LLM. ChatGPT uses the BooksCorpus[12] database for pre-training, which contains about one billion words, comparable to the Chelba et al. benchmark. BERT is pre-trained with the BooksCorpus database as well as with English Wikipedia and thus has access to well over three billion words. Both models do not use the Chelba et al. benchmark because it provides a shuffled sentence-level corpus. The sentences and words within the database have been randomly distributed, so that the models that access the benchmark only consider the actual relationship between the words, and not the natural order of those words (Chelba et al., 2013, p. 2). However, this order is fundamentally relevant in the case of ChatGPT and BERT. Throughout the use of BookCorpus and Wikipedia, it is possible for the models to investigate long contiguous sequences (Radford et al., 2018, pp. 4, 5; Devlin et al., 2019, p. 4175).

4.4. State-of-the-art methods

4.4.1. Readability

The previous chapter introduced the principles of NLP models. First, rule-based models were briefly presented, followed by machine learning models, including supervised and unsupervised models. Finally, ANNs were discussed and it was shown how they are applied in popular LLMs. Based on this foundation, the state-of-the-art models in the areas of readability, sentiment analysis, and disclosure quantity and similarity are presented now to complete the detailed overview of textual analysis methods. A comparison with the traditional models as well as an in-depth methodological insight then allows to identify the methods suitable for the research questions of this thesis.

In the area of readability, the Fog Index has been very popular. Weaknesses such as insufficient applicability to business texts or the classification of words as complex, when they actually tend to be easily readable, have been identified and countered by alternative measures such as the Bog index.

Loughran and McDonald find another measure that outperforms traditional readability indices: the 10-K document file size. The authors look at the file size of 10-Ks filed with the SEC. These files are highly standardized and presented in HTML format. Loughran and McDonald find that larger file sizes are associated with lower readability. The results are both strongly correlated with traditional readability measures and consistent with Loughran and McDonald's definition of readability that higher readability leads to less ambiguity in valuation, which the authors demonstrate in their research.

File size as a readability measure is as simple as one can imagine and requires very little adjustment before use, making it less prone to errors than other measures. However, it is questionable whether this measure can be applied to other texts such as sustainability reports. Given that readability is a measure of the ease with which value-relevant information can be extracted, file size works mainly on the simplistic premise that a higher quantity of textual data makes it more difficult to extract relevant information (Loughran & McDonald, 2014, pp. 1646, 1650, 1658–1658, 1667–1668).

Sustainability reports are very heterogeneous. The large variation in report length could yield significant results in the readability analysis, but it is debatable whether a longer sustainability report increases the difficulty of extracting value-relevant information or whether it just contains more information. It is also possible for the same information to be presented differently in two reports, one with a brief version and one with a more detailed version. While the longer version may be easier for the reader to understand, it would reduce readability in this model due to the increased file size (Bochkay et al., 2023, p. 779).

The approach of Loughran and McDonald is a method that does not take advantage of the developments in the field of NLP and machine learning that are described in Chapter 4.3. However, other state-of-the-art readability methods increasingly rely on them. Machine learning can be utilized to build an accurate model from available components that best fit a particular research question. *Table 4* lists different features that can be used in readability analysis, divided into categories.

Shallow features, such as the length of words or sentences, the ratio of simple words, or the ratio of different terms, are used in traditional models and form the basis of readability analysis. Morphological features capture how words are used in relation to their stem words, and thus can capture complexity and grammatical features. These features get lost in many traditional models because stemming is used to reduce the dimensionality of such words back to their root. Syntactic features capture the frequency of certain word combinations or sentence structure, which also often get lost because of the use of the bag of words approach. Semantic features evaluate readability at the content level, going beyond other methods. For example, the use of many synonyms decreases readability, as a low reading level audience is more likely to require a simplified vocabulary. Another semantic feature is cohesion, which uses similarities to measure how well sentences merge into each other. An easy transition through a higher similarity of the last words of one sentence to the first words of another sentence increases the readability of a text (Madrazo & Pera, 2020, pp. 4–6).

Once the analysis methods have been grouped, machine learning can be applied to determine the most effective methods for a particular use case. This can be done by training the model with only one category of analysis methods at a time and then comparing the results. Such a comparison can show, for example, that the shallow features are more accurate than the morphological features, or that the semantic

---

[12] BookCorpus is a database of novel books written by unpublished authors and contains over 11,000 books in genres like romance, history, and adventure (BookCorpus, 2023).

Table 4: Textual features (for definitions of terms see Madrazo and Pera (2020, pp. 4–6)

Shallow Features	Morphological Features	Syntactic Features	Semantic Features
Word length	Inflection ratio	Part of speech ratio	Synonym usage
Sentence length	Morphological phenomena frequencies	Dependency tree complexity	Semantic closeness
Ratio of simple terms			Cohesion
Ratio of different terms			

features are less accurate than any other group of features. Furthermore, it can also be determined which features within the categories have the greatest influence, so that, for example, the outcome of the shallow features predominantly depends on the result of the individual features word length and sentence length (Madrazo & Pera, 2020, pp. 4–6). Accordingly, the machine learning process does not consist of a single process in which the textual data passes through a very large number of layers. Instead, it is divided into several sub processes, each with a fewer amount of layers. On the one hand, ineffective criteria can be filtered out to reduce the computational effort compared to an all-encompassing process. At the same time, the accuracy of the analysis can be improved by eliminating features that take the wrong path in the learning process and lead to uninformative results.

Another way to apply machine learning in readability analysis is to compare not only criteria, but also entire models. Such comparisons would not be feasible without the automation possibilities offered by machine learning due to the high engineering costs. Comparing models works similarly to comparing analysis features. All models are fed the same textual data to ensure comparability, the results are compared with each other in terms of the output or classification accuracy, and only the best model is used in actual research beyond the training data set. To go one step further, the models can then be combined with each other. For example, it may be found that one model, e.g. BERT, has a word prediction accuracy of 90 %, and another model, e.g. GPT, has an accuracy of 85 %, but using both models in combination achieves an even higher accuracy than either model separately, because the strengths of one model compensate for the weaknesses of the other. By having multiple models work together and combining their predictions, an overall more robust and powerful result can be achieved. Combining models can be performed through different approaches, such as categorizing the input text into the category predicted by the majority of models (if more than two models are combined), or weighting the results of the models according to their individual accuracy (Filighera et al., 2019, pp. 335–336, 338–340, 344–345).

Readability models are being criticized for not being transferable between different types of text (Bochkay et al., 2023, p. 780). It is not worthwhile evaluating metrics that are of little importance to a text's target audience (Loughran & McDonald, 2020, p. 28). Schoolbook texts should be accessible to students and adapted to their experience and reading ability. However, financial statements or earning call transcripts are not likely to be read by lower-level students,

but by more experienced readers who can be expected to comprehend a certain level of complexity.

Martinc et al. show that supervised and unsupervised NLP models are able to assess readability across different audiences. Using methods similar to those of Madrazo et al. and Filighera et al., they prove this by using diverse training data sets. Martinc et al. use text sources, such as educational materials, which are classified by reading ability, age group, or grade, but also large databases, such as Wikipedia. These databases are classified into different readability levels, such as simple, balanced, or normal. Readability can then be measured by an adjustable score that takes into account the reading skills of the respective audience (Martinc et al., 2021, pp. 241, 152, 166–169, 172–175).

Technological advances in NLP and machine learning allow for multifaceted readability research, partly through a more efficient evaluation of traditional metrics and partly through new developments. Measuring readability can provide valuable information to companies. It allows them to assess their qualitative disclosures to determine if those disclosures are comprehensible for their stakeholders. At the same time, legislators, internal and external regulators and other readers of disclosures can benefit from the results of such measures.

However, the level of readability must be relevant to the research question. Otherwise, it represents nothing more than an indicator without any particular meaning, which at worst is a reflection of the complexity of the company (Loughran & McDonald, 2020, p. 28).

4.4.2. Sentiment analysis

Various applications of sentiment analysis were introduced in Chapter 4.2.2. Traditional methods measure sentiment by counting the number of words in a text, which are classified into sentiment categories using dictionaries. The greatest potential for improvement in these methods lies in the improvement of these dictionaries. The creation of a dictionary specifically for the finance and accounting domain, instead of the commonly used H4N, has had a major impact on sentiment analysis research (Loughran & McDonald, 2011, pp. 61–62). The application of machine learning to the field is likely to be even more significant. Machine learning methods eliminate the need for dictionaries to assess sentiment. Instead, the classification of texts or text segments is performed by an algorithm that is trained on data samples to detect the tone of a text. This approach promises a more accurate classification than methods that rely on dictionaries

(Hartmann et al., 2023, pp. 76, 78).

Traditional machine learning works in the same way as supervised learning described in Chapter 4.3. The algorithm receives texts as training data that are pre-labeled with the corresponding sentiment. This approach is used, for example, by Azimi and Agrawal to extract information from the sentiment of 10-Ks. They find that both positive and negative sentiment can predict abnormal returns. Chen et al. already had similar findings in 2014 when analyzing SeekingAlpha articles (see Chapter 2.4), but Azimi and Agrawal's results differ in that they look at a different dataset with 10-Ks and that they analyze a much larger sample with over 200 million sentences. At the same time, their results are also significant for positive sentiment, in contrast to those of Chen et al. who could not find significant results for other sentiments besides negative tone (Azimi and Agrawal, 2021, pp. 2, 10, 20–21, 32; H. Chen et al., 2014, p. 1337). This might be because the machine learning approach is capturing relationships that are not apparent through the wordbook approach, but there also may be other reasons for this.

Machine learning has a significant advantage over dictionary approaches, as it is capable of consistently capturing sentiment over multiple periods. This is possible due to the volume and timeliness of the training data. Dictionaries can only capture a status quo and may have a lack of actuality.[13] Therefore, state-of-the-art methods are often preferable to dictionary methods. Nevertheless, traditional dictionary methods can be used if the temporal context does not matter and it is only the occurrence of individual words that is crucial for the research question, or if the cost of the more complex implementation of machine learning exceeds the benefit of more accurate classification (Frankel et al., 2022, pp. 5515, 5522–5524, 5529).

Even more accurate than traditional machine learning methods is the application of contextual deep learning to sentiment analysis. Although classical machine learning outperforms the dictionary approach, these methods, such as VSM or Naive Bayes, represent texts as bag of words and are thus subject to the problems described earlier. Algorithms that capture contextual information from word embedding, as in ANNs, can also capture the surrounding context and associated sentiment (Heitermann et al. 2023: 79). This is facilitated through the attention mechanism discussed in Chapter 4.3.

Sentiment analysis is also being used in areas other than financial and accounting, such as economics, political science, and medical research. A multidisciplinary study by Colón-Ruiz and Segura-Bedmar finds that LLMs have the highest accuracy for sentiment analysis. While traditional machine learning models, such as VSM, perform well especially with a large amount of training data, LLMs dominate the field, in particular the BERT algorithm. It delivers slightly better results than competing models, but at the expense of

higher computational costs (Colón-Ruiz & Segura-Bedmar, 2020, pp. 1, 5–6, 9–10).

Since BERT is a pioneer in the field of LLMs, the model will now be the subject of a more detailed discussion. BERT is a pre-trained model, simplifying its use for users by eliminating the need to navigate through the underlying complexity. In order for BERT to be able to precisely adapt the analysis to research questions, only the fine-tuning of the model has to be performed. Here, BERT can achieve better results than traditional approaches even with only a few hundred training samples (Siano & Wysocki, 2021, pp. 6, 27–28). BERT is pre-trained according to MLM, enabling the model to predict missing *masked* words or to predict subsequent sentences. BERT is publicly available at no cost. While the algorithm requires high computational power, Google allows free use of online graphics processing units to operate BERT, so the model has few barriers for usage (Siano & Wysocki, 2021, pp. 7, 17, 22).

In contrast to dictionary models, the operation of LLMs is more complex and difficult to comprehend. However, it is feasible to verify that such models actually capture sentiment from the context of information in a text, as they are intended to do, by deleting or changing words in manual tests. Siano and Wysocki have performed such tests and found that BERT still performs better than traditional models even when key words that would have influenced sentiment in the wordbook approach are deleted. Although the accuracy decreases, this evaluation indicates that BERT generates its predictions based more on the context of a text than on the word count, as in the case of wordbook approaches. Furthermore, BERT loses much of its predictive power when words in a text get randomized, which again suggests that the model delivers on its promise and, unlike bag of words models, extracts information from the structural organization of a text (Siano & Wysocki, 2021, pp. 20, 25–26).

In addition to its many advantages, BERT also has some limitations. The biggest one is probably the limitation of tokens. Currently, texts with a maximum of 512 tokens can be analyzed. A token usually corresponds to a word or, depending on the tokenization, to only a fraction of a word. Therefore, lengthy texts, which would certainly include sustainability reports, cannot be analyzed as easily with BERT. Researchers can apply workarounds by selectively or randomly analyzing individual text components, or by analyzing each text component one at a time in a scrolling pattern. However, advances in machine learning and general technological progress offer hope that computational power will increase and these limitations will fade (Siano & Wysocki, 2021, pp. 9–10, 30).

BERT has been used and developed by researchers in various fields. One of the most important developments is FinBERT, a fine-tuned version of BERT specialized for the financial domain. Loughran and McDonald have already identified that the financial domain language differs significantly from general language and have revolutionized textual analysis in this field with their own dictionary (Loughran & McDonald, 2011, pp. 49–50). Huang et al. follow this example

---

[13] An example of this are the results of Long et al. (2023) presented in chapter 3.2, which could only be achieved by the authors creating a new dictionary adapted to time and context.

by adapting the new state-of-the-art to the financial domain. They do this by pre-training BERT with a large number of texts with financial context like corporate disclosures, financial analyst reports and earnings conference call transcripts. These texts help FinBERT to better process tasks related to financial information. In total, 4.9 billion tokens are used for fine-tuning, which even exceeds the population of the pre-training for the plain BERT version. FinBERT has been compared to other LLMs as well as traditional text analysis methods and outperforms them, as well as untrained BERT, when applied to finance-specific texts, but also when applied to texts related to the Environmental, Social and Governance (ESG) domain (A. Huang et al., 2022, pp. 8–9, 19).

Sentiment analysis has benefited from machine learning and NLP developments, which have led to new techniques and models that can significantly improve the accuracy in this field. The third main area of textual analysis considered in this thesis, disclosure quantity and similarity, also benefits from these developments.

4.4.3. Disclosure quantity and similarity

While traditional methods determine similarity, using the bag of words approach, researchers are now increasingly utilizing machine learning techniques to determine similarities between texts. In traditional methods, similarity is mainly assessed by overlap in word usage. Matching words or tokens in two texts increase the similarity score. Instead of single words, sequences of words can also be considered. Thus, the similarity score increases when word sequences, usually consisting of two to four words, appear in the texts to be compared. These traditional techniques can be further adapted, for example by applying frequency weighting. Here, less frequent words are given a higher weight under the assumption that they contain more information. The similarity between documents increases, especially when rare words or word sequences overlap (Gaulin & Peng, 2022, pp. 2–3, 12–13).

With the help of deep learning, word embedding algorithms are able to recognize similarity in texts without being limited to the occurrence of individual words or word sequences. For this purpose, the algorithm uses a sophisticated method in which it scans the text for predefined words and builds vectors from the surrounding words that are *near* the searched word. This *nearness* can be defined by a certain distance, e.g. up to ten words before or after the target word. These words are context words and are used to capture the relationship of the target word to its environment. The vectors of these context words are placed in the same vector space as the searched word, so that both grammatical and semantic relations between words can be captured. This allows for a deeper and more nuanced representation of textual content (Gaulin & Peng, 2022, p. 34).

When used in combination with cosine similarity (described in Chapter 4.1.3), word embedding algorithms are a powerful tool for accurately measuring disclosure similarity. Traditional methods based on the bag of words approach can still provide decent results if the research question is primarily based on word choice and less on the context of the texts

(Bochkay et al., 2023, p. 781). In summary, however, this area of textual analysis also benefits from the new technical possibilities offered by NLP.

The literature review of the finance and accounting domain in Chapter 3 and the comprehensive presentation of traditional and state-of-the-art methods in Chapter 4 form the first main part of this thesis. The insights obtained from this study are significant for the following second main part of the thesis. This section will present a textual analysis application to a case in the accounting domain. This case is covered in the following chapters.

5. Hypotheses development

5.1. The relationship between auditing and compliance with regulatory requirements

At the outset of this thesis, it was noted that sustainability reporting varies greatly from company to company. Furthermore, according to the NFRD, EU member states still have the opportunity to opt out of mandatory external audits for sustainability reporting. In addition to heterogeneity in terms of content and structure, the audit of sustainability reports is another criterion for differences in some EU countries, as many companies voluntarily have their reports externally audited with limited assurance, some even with the higher assurance level of reasonable assurance.

To address the issue in more detail, the fundamental theories in the areas of sustainability reporting and auditing were examined first, followed by an extensive discussion of the textual analysis methodology. This included a summary of the principles of the methodology and a literature review in the financial and accounting domain. The fundamental theories considered in the area of auditing have been narrowed to the essential principles and have further emphasized the effects of the audit on the reliability of disclosures.

Literature indicates that auditors can also serve as intermediaries to support company compliance with regulations. This is because they possess comprehensive knowledge through their activities and their diverse structure (Walker, 2014, pp. 214–215). Therefore, the role of the auditor can not only increase regulatory compliance, but also increase its effectiveness in general (King, 2007, p. 213).

In qualitative research, Walker found that companies in the Australian trucking sector that participated in a voluntary compliance program achieved better performance and generated higher social value if they involved auditors in this process (Walker, 2014, pp. 215–216, 221). This example is not directly related to the thesis content wise, but the underlying structural relation is the same. Similar as in the Australian trucking sector case, European companies have the option to involve external auditors in a process voluntarily. Submitting reporting components from the non-financial reporting to an audit imposes additional auditing fees for companies, but can also provide benefits such as potentially increasing the reliability of the reporting in accordance to attribution theory or achieving a higher level of compliance with legal reporting

requirements, which is desirable for both the company and its stakeholders. From the related example and the theories presented, the following hypothesis can be stated regarding the impact of an external audit on the quality of sustainability reporting:

> *H1: Audit assurance for sustainability reports increases their compliance with regulatory requirements.*

In Chapter 6.2, this is addressed by a more detailed examination of the requirements of the EU taxonomy as well as currently applicable and forthcoming auditing standards and the determination of the relevant dependent variables.

5.2. The relationship between the extend of corporate sustainability and reporting quantity and audit demand

In addition to the influence of the audit on the quality of sustainability reporting, there may be other factors that influence both reporting and the circumstances whether an external audit takes place. Chapter 2.2 discussed the major theories that determine whether and to what extent companies are willing to engage in voluntary reporting. The voluntary disclosure theory suggests that companies will only voluntarily disclose information if their benefits outweigh their costs. There is already much evidence within this theory. For instance, research has shown that firm characteristics significantly drive corporate disclosure. Firm size, for example, has a generally positive impact on disclosure as reporting expertise usually increases with growing firm size, but also because larger firms are subject to greater public exposure and have to legitimate themselves to a greater extent. Other firm characteristics, such as the degree of internationalization, board size, or media exposure, also affect voluntary corporate disclosure (Zamil et al., 2023, pp. 247, 249, 252).

Corporate sustainability is a comparatively less studied driver in this context. However, it is possible that sustainable companies report on their sustainable activities overproportionally in order to benefit from it. To address this research gap, the following hypothesis is posed:

> *H2: Companies that are acting sustainable disclose a higher quantity of information in their sustainability reports.*

The degree of sustainability of companies' actions here is defined in a simple manner using existing sustainability ratings. The quantity is measured using the file size of sustainability reports in an adjusted form, based on the methodology of Loughran and McDonald (2014). The detailed research design and and use of the variables is presented in section 6.3.2.

Reporting requirements have an undeniable influence on this as well. When regulatory bodies impose mandatory disclosures, these disclosures are more likely to be made (Duran & Rodrigo, 2018, p. 14). The implementation of voluntary requirements, such as the GRI, can be a significantly driver

in the reporting landscape as well (Dissanayake et al., 2019, pp. 102–103).

A less studied influence is the impact of auditing. As voluntary disclosure is performed only if a company's benefits outweigh the related costs, this theory could also be applied to voluntary audits of disclosures. According to attribution theory, positive information is more likely to be doubted than negative information. Therefore, it would be more reasonable for companies to undergo a voluntary audit if the information contained in their disclosure is predominantly positive, which leads to the following final hypothesis:

> *H3: Companies that are acting sustainable are more likely to demand voluntary assurance of their reports.*

This hypothesis expands on the voluntary disclosure theory by shifting the focus from disclosure itself to the voluntary submission of voluntary disclosures as well as non-voluntary disclosures to an external audit.

H1 represents the central hypothesis of this thesis. The secondary hypotheses H2 and H3 are indirectly related to it and can provide further insights into the research area of sustainability reporting. However, they will only be addressed to a more limited extent.

The next chapter first describes the data gathered to address the hypotheses. This is followed by an exposition of the underlying research design. Next, the focus shifts to the determination of the dependent variables in regard to the hypotheses under consideration. Finally, the results are discussed.

6. Data and research design

6.1. Sample data

The sustainability reports of a subset of companies required to report under the NFRD, which are large companies within the EU with an average number of at least 500 employees (European Union (EU), 2014, p. 4), are now examined in order to investigate the three hypotheses of this thesis. In total, the requirements of the NFRD affect approximately 10,000 companies. The CSRD will extend the scope of application by including medium-sized companies to approximately 50,000 companies (KPMG, 2022, p. 37), beginning from financial year 2024. Also crucial for the verification of the hypotheses is the distinction that an audit with limited assurance is mandatory under the CSRD, whereas under the NFRD there is still an option at EU member state level to exempt companies from this requirement. Due to time constraints, this thesis does not examine all companies affected by the NFRD, but only a subsample, which consists of all companies listed in the German Stock Index (DAX) and the Midcap DAX (MDAX). This subsample contains 90 companies, which corresponds to about one percent of the overall affected companies, so that the results may not be unconditional replicable at the EU level. Germany was chosen as the country of analysis, as it is the country with the most

G250 companies within the EU[14] (KPMG, 2022, p. 75) and could therefore take on a pioneering role in reporting issues. Furthermore, Germany has exercised its right to opt out of the mandatory audit of sustainability reporting. Only in this way is it possible to verify the hypotheses presented. The assurance rate in the sample is 77 %, which is slightly higher than the G250 overall (63 %) (KMPG 2022: 24). *Appendix B* presents additional descriptive statistics on the sample data.

The dependent variables are gathered with the help of textual analysis methods outlined earlier in this thesis. Chapter 6.2 discusses the research design and the associated alignment of the dependent variables, while the actual gathering of the variables is described in Chapter 6.3.

6.2. Research design

To analyze H1, it is first necessary to define how compliance with regulatory requirements can be assessed. It is then important to determine which of the textual analysis methods, presented in Chapter 4, are appropriate for the assessment.

There is no clearly defined benchmark for reporting requirements compliance. This is because the reporting landscape itself is complex, ambiguous and sometimes even contradictory. Interregional standards such as the GRI Reporting Framework are opposed to the first drafts of sustainability standards from the International Sustainability Standards Board, supplemented by national regulations within the individual countries. The EU's attempt at harmonization further adds to the complexity. The requirements of the NFRD could not provide the desired effects. The inadequate specification of the directive has resulted in a lack of information within the reported data. The options of the EU member states, such as the requirement for an audit, but also the disclosure options that allow to disclosure sustainability reports within or outside the management report, make it difficult to compare information between companies. The recently enacted EU taxonomy regulation imposes further requirements on companies (Velte, 2023, pp. 1–2).

Reporting quality cannot only be derived from the regulatory requirements themselves. The relevant auditing standards may also be informative. Auditing standards extensively discuss regulatory requirements and provide guidance to auditors on how they can perform audit procedures.

While there are numerous auditing standards covering a variety of areas in financial reporting, the ISAE 3000 (Revised) in particular provides comprehensive coverage of the subject of non-financial reporting. The majority of companies in the sample refer to the standard in various places within their sustainability reports. The ISAE 3000 (Revised) explicitly covers all assurance engagements that do not include historical financial information, which also goes for

the non-financial reporting, and has the objective of providing reasonable or limited assurance on that information (International Auditing and Assurance Standards Board, 2013, pp. 5–6). The auditing standard is extensive. It describes the requirements for complying with the standard, including areas such as audit planning, the determination of materiality and the required content of the auditor's report. Because the ISAE 3000 (Revised) covers such a wide range of topics, it does not provide many specific audit guidelines or requirements in terms of the content of the auditor's report. However, it does give some guidance for determining when reporting can be considered compliant. First, in its objectives, the standard states that limited or reasonable assurance can be obtained when the subject matter information is free of material misstatement (International Auditing and Assurance Standards Board, 2013, p. 6), as is the case with other auditing standards. It also defines the mandatory characteristics of *relevance, completeness, reliability, neutrality* and *understandability* for published information (International Auditing and Assurance Standards Board, 2013, p. 12). Using these characteristics as evaluation criteria, compliance can be more specifically defined. In addition, the ISAE 3000 (Revised) states that inconsistencies indicate material misstatements (International Auditing and Assurance Standards Board, 2013, p. 20), so inconsistent information within sustainability reporting or inconsistencies between financial and non-financial reporting may also indicate a lower level of compliance.

Despite its naming, the ISAE 3000 (Revised) is in need of improvement. When it came into force a decade ago, the area of non-financial reporting covered by it was much smaller and less complex. Furthermore, the importance of this information has increased dramatically over the years. As a result, new auditing standards are being developed, that will eventually replace the ISAE 3000 (Revised). For the German market, the Institute of Public Auditors (Institut der Wirtschaftsprüfer: IDW) has published two drafts for new auditing standards. These drafts address the substantive audit of non-financial reporting with reasonable assurance and limited assurance, respectively.

The drafts are based on the ISAE 3000 (Revised), but are subject to considerable uncertainties of interpretation and therefore may not be used by auditing firms for current audits, also due to their status as drafts and not as finalized auditing standards (IDW Verlag, 2022b, p. 1; IDW Verlag, 2022a, p. 1). The drafts do, however, reveal a certain direction in which the audit procedures for ensuring the quality of sustainability reporting are being intensified and on what they are based. For example, the drafts IDW EPS 990 and IDW EPS 991 refer to the requirements of the EU taxonomy in many places, starting with the scope of application of the future standards to companies included within the EU taxonomy (IDW Verlag, 2022a, p. 4) to the performance of audit procedures according to the information categories of the EU taxonomy (IDW Verlag, 2022a, pp. 26, 29). Furthermore, the drafts explicitly state that the absence of information required by the EU taxonomy is generally to be considered as a

---

[14] In Germany there are 13 G250 companies. There are also 13 G250 companies in France, although France has not exercised the option for EU member states to be exempt from the audit, and therefore sustainability reports of companies that meet the size criteria are required to undergo an external audit (Reuters, 2021, p. 2).

material misstatement (IDW Verlag, 2022b, p. 31; IDW Verlag, 2022a, p. 30). Other sections focus on the assessment of the process for the identification of taxonomy-eligible economic activities.

Measuring regulatory compliance is challenging, as there are many requirements from different regulatory bodies. The requirements of the NFRD are currently in force but are almost obsolete. The CSRD, which is supposed to replace the NFRD, has not yet come into force. GRI standards exist in parallel and the IFRS Foundation is working on separate new standards. As far as auditing standards are concerned, companies mostly refer to ISAE 3000 (Revised), which is effective but also somewhat outdated. New auditing standards are still being implemented. The EU taxonomy, on the other hand, differs from other regulatory requirements. Its formally adoption in 2021 is relatively recent while it is also already effective for reporting of the recent financial year, 2022 (European Union (EU), 2020, p. 18). The frequent reference of the IDW in new auditing standards underlines the relevance. Due to these factors, this thesis employs the EU taxonomy requirements as a benchmark for regulatory compliance in general.

The EU taxonomy has been applied on a mandatory basis for the second time in the last fiscal year of 2022. In this year, non-financial companies were required to report on eligibility and alignment of their activities for the first two of the six taxonomy objectives. At the same time, financial companies were only required to report on the eligibility of their activities, but not on their alignment. The reporting requirements will gradually increase until the financial year 2025, at which point companies will be expected to report fully on all six environmental targets. This reporting includes the identification of eligible activities, an assessment of whether these activities contribute to at least one of the six objectives while not harming any other objective, and the compliance with the minimum safeguards set of the taxonomy. This ensures a consistent identification of activities to be considered sustainable for the purpose of determining the relevant indicators (PricewaterhouseCoopers, 2023, p. 10).

The EU taxonomy demands, on the one hand, information on the proportion of a company's turnover as well as its investment and operating expenditure, which can be classified as sustainable according to the taxonomy (PricewaterhouseCoopers, 2023, p. 23; European Union (EU), 2020, p. 17). Disclosing these metrics provides insight into the current contribution to environmental goals as well as projecting future contributions. On the other hand, qualitative information must also be provided explicitly. Both the computation logic and the key elements of the indicators need to be disclosed. This qualitative information highlights the transition process from taxonomy-eligible activities to taxonomy-aligned activities (European Commission, 2022, pp. 7–8, European Commission, 2021, p. 4).

The definition of regulatory compliance proves to be difficult due to the many different regulatory bodies involved, although the requirements of the EU taxonomy were identified as a suitable quality characteristic as they are in use

today and not going to be superseded by new regulations in the near future. The mandatory requirements for the first two objectives of the taxonomy, *climate change mitigation* and *climate change adaptation*, are appropriate for the analysis of this thesis, since in addition to the key figures, qualitative information is explicitly required, which can be evaluated with the help of textual analysis methods. However, it should be noted that these do not represent an exhaustive quality feature of sustainability reporting. Other approaches to measuring the quality of sustainability reporting are also conceivable.

In order to analyze H1, it is crucial to identify not only the contents to be considered, but also the method most suitable. The detailed presentation of known methods in Chapter 4 serves this purpose. These methods can be divided into three main categories: *readability, sentiment analysis* and *disclosure quantity and similarity*. Within these main categories, the compatible individual methods can then be determined on the basis of the correspondence between the objectives of the method and the research question, as well as on the basis of restrictions, e.g. due to lack of time, computing power or other limited resources.

The measure used to assess the quality of non-financial reporting is the extent to which the relevant sections of the reporting comply with the requirements of the EU taxonomy. To assess those extracts, not only their content but also their characteristics are evaluated, more precisely the characteristics that are also listed in the currently relevant auditing standard ISAE 3000 (Revised) and which are also relevant for various other contents in financial and non-financial reporting: *relevance, completeness, reliability, neutrality* and *understandability* (International Auditing and Assurance Standards Board, 2013, p. 12). The fulfillment of these characteristics indicates reporting quality. Trying to link the characteristics with textual analysis methods (overview in *Table 2*), *understandability* can intuitively be covered by readability measures. A text that is easily readable may not always be understandable. Still, high readability facilitates the reader's comprehension, while poor readability makes reporting more difficult to understand. Next, *neutrality* can be assessed by various methods of sentiment analysis by examining whether the extracts show certain sentiments, such as positively formulated language, which indicates a lack of neutrality. Thus, *understandability* can be analyzed quite well with readability measures and *neutrality* can be analyzed with sentiment measures. *Relevance, completeness* and *reliability* tend to be less intuitive. It is reasonable to argue for analysis methods from the group of disclosure quantity and similarity to compare the extracts with the requirements of the EU taxonomy, but such an approach is likely to be less precise than the assessment of the characteristics of *understandability* and *neutrality,* where the methods correspond to the research problem more well.

To overcome this problem, the analysis in this thesis is carried out using an exhaustive method through the application of an LLM. In *Table 2*, it can be seen that LLMs are among the state-of-the-art methods covering all methodological areas. The developments in NLP and machine learning make

LLMs appealing for research. Especially text-generating LLMs have become very popular due to their low barriers to application and their text comprehension ability (de Kok, 2023, p. 2; Kim et al., 2023, p. 6). Chapter 4.3 describes the most relevant types of models, namely GPT models and BERT models. Both types are alike in that their neural networks consist of a large number of parameters, which allows them to have a human-like *world understanding*. Moreover, both model types operate in the same way, taking natural language as an input and delivering their output in natural language as well (de Kok, 2023, p. 5). A major difference, however, is that BERT models require fine-tuning via training data for most applications, which is not necessarily the case for GPT models. The time constraints of this thesis are the reason why the analysis is performed with a GPT model rather than a BERT model. Another factor is the context window, which for BERT is only 512 tokens. The size of the sustainability reports requires much larger context windows. Current GPT models can process the context of 4,000 to more than 32,000 tokens at once[15], making them more suitable for the analysis of sustainability reports, although as the number of tokens increases, the processing requirements and time required increases correspondingly (de Kok, 2023, pp. 7–8; Kim et al., 2023, p. 7).

Even though GPT models are relatively new, they have already had some use in accounting research. As an example, Bai et al. use ChatGPT to examine the information content of earning calls. They compare responses given by company representatives to responses given by LLMs, including ChatGPT, to the identical questions. The LLMs were given information about industry and company conditions. The answers given by company representatives could then be compared to those of the LLMs using semantic similarity or cosine similarity. These methods were explained in Chapter 4.4.1. and 4.2.3. With the help of such comparisons, investors can recognize when company representatives are actually revealing new information and when answers are merely conveying already known information (Bai et al., 2023, pp. 3–4, 16–18, 26). Kim et al. have also used ChatGPT to identify and quantify risk exposures from earning call transcript information (Kim et al., 2023, pp. 4, 9–12).

GPT models offer some advantages over BERT models. Due to the absence of fine-tuning and a different mode of operation that does not analyze text from both directions, the results of GPT models are sometimes not quite at the level of BERT models. Nevertheless, the models are able to achieve high quality results at a comparable degree (Hu et al., 2023, pp. 12–13, 17), which makes them vulnerable for some use cases like the one of this thesis.

6.3. Processing of dependent variables
6.3.1. Determination of reporting compliance

The previous chapter concluded that sustainability reporting quality can be evaluated by comparing the consis-

tency of the qualitative reporting required by the EU taxonomy with the International Auditing and Assurance Standards Board characteristics that are critical to non-financial reporting. Furthermore, the utilization of an LLM, specifically a GPT model, proves to be the most appropriate for the purposes of this thesis, as it enables a holistic assessment within the given time and resource constraints. As already noted, BERT models are limited to a context of 512 tokens for their analysis while GPT models can capture much larger contexts. However, sustainability reports are still so extensive that they surpass the capabilities of the models completely. Many sustainability reports contain over 100,000 tokens and over half a million characters. In order to evaluate the reports, the context per report has to be greatly reduced. Therefore, the sustainability reports were scanned for keywords indicating relevant passages. All passages were classified as relevant if they contained the term *EU taxonomy* or a related term and additionally at least one term related to the two goals of the EU taxonomy nearby. The list of terms and the code used for this purpose is presented in *Appendix F*. The length of each section is limited to 400 words (about 500 tokens), which on the one hand ensures that the sum of all sections of a report does not become too large for processing it with a GPT model. It also allows for the potential implementation of BERT models in later studies analyzing the relevant sections.

After this selection, a text file containing the relevant sections is obtained for each sustainability report. The sections are self-contained, although this procedure cannot completely prevent the loss of context between individual sections. Nevertheless, this method ensures a drastic reduction in the total amount of information, with as little loss of relevant information as possible. Of the original 90 companies in the sample and 89 sustainability reports that could be analyzed[16], no text sections were identified for twelve reports that did not meet the filter criteria. A manual evaluation indicated that the companies concerned had provided little or no relevant information on the objectives of the taxonomy to be considered. This may be because no information was actually provided or, more likely, because the information was provided outside the sustainability report in the annual statements (PricewaterhouseCoopers, 2023, p. 17). As this thesis explicitly examines sustainability reports, the twelve companies from the sample were excluded for most of the analyses, leaving 77 reports to be further examined[17].

The GPT 3.5 model, which was available free of charge at the time of the study (November 2023), captures a context of just over 8,000 tokens. While there were other fee required models that are not only more powerful and capa-

---

[15] For an recent overview see: platform.openai.com/docs/models/overview

[16] The company HELLA GmbH & Co. KGaA did not publish a sustainability report in fiscal year 2022 due to a previous acquisition.

[17] Five of the twelve samples were audited by an external auditor with limited assurance, while 7 samples were not externally audited. Accordingly, for the sub-sample there is no indication that the disclosure of EU taxonomy related information outside the sustainability reporting is related to the presence or absence of an external audit of the sustainability reporting.

ble of capturing more context, but also promise significantly less effort due to their combinability with programming interfaces, their use is not feasible for this study. As their costs are calculated not only on the basis of output tokens, but also on the basis of input tokens, their use would become very costly when analyzing long sustainability reports or excerpts from sustainability reports. However, manual use of the free version without a programming interface allows each text file to be analyzed individually. The only restriction is the total number of tokens of an analysis, including input and output, must not exceed 8,000 tokens, otherwise, the context will surpass the model's limit.

Of the 76 text files, 70 could be analyzed directly. The remaining six files contained too many relevant text segments and had to be reduced by up to 2,000 tokens. This was performed by manually discarding apparently irrelevant or recurring elements of the sustainability reports.

However, the text alone is not sufficient. To analyze text files as desired, the model requires a *task*. This task is reflected in the prompt, which represents the input parameter for the LLM. The prompt has a direct and substantial influence on the output received. It is designed to communicate with the LLM and provide all the necessary information needed to run the analysis. Prompts usually consist of three or four components: The actual instructions to the LLM (*What to do?*), the relevant context (*What to involve?*) and the actual data (*What to apply to?*) are essential. Depending on the approach, the prompt may also include one or more examples as a fourth component (de Kok, 2023, p. 14).

The prompt has a very strong impact on the output and thus a correspondingly strong impact on the research results. At the same time is relatively complex in structure and offers the researchers a lot of design flexibility. As a result, a whole field of research has been devoted to the design of prompts - the so-called *prompt engineering*. The goal of prompt engineering is to produce a prompt that is as precise as possible while achieving the best possible results (de Kok, 2023, pp. 15–16, 44). In most cases, the prompts are reduced to the most essential content and the instructions are formulated in an unambiguous manner. *Figure 3* shows the prompt used for testing H1 in its unmodified form as well as clustered by components.

The first subsentence provides context to the LLM by assigning a role to the model. This assignment ensures that the model will respond based on not only all available information, but particularly the information in the domains of reporting and auditing. This is followed by a precise instruction to the model to give an assessment in the form of a rating. The third subsentence defines the data to be evaluated. The fourth subsentence again specifies the context against which the rating should be conducted. The following instructional subsentences ensure that the output is as accurate as possible and in a homogeneous format.

The evaluation of H1 will be based on quantitative ratings only. Therefore, no further qualitative information in the form of text is needed. Models such as GPT 3.5 are generative LLMs that are specifically designed to generate qual-

itative output. Therefore, in order to actively counteract this behavior, multiple instructions can be necessary in such cases where only one specific information is demanded. Finally, the ninth part serves as a placeholder for the text files to be analyzed. The foregoing prompt, without the text file, consists of only 82 tokens.

The specific wording of the prompt allows for a precise evaluation of the model. In particular, the second and fourth subsentences are geared to the purpose of this thesis and ensure that the assessment is focused on the desired content, which is the evaluation of eligibility and alignment disclosures for the first two taxonomy objectives.

The approach used to test H1 is the so-called *zero-shot* method. Here, the analysis is performed without providing any examples to the model. In contrast, the *few-shot* method would include some previously rated text files that would serve as blueprints for the decision-making process of the model. This can improve the quality of the rating, but can also cause the scoring to go in the wrong direction if the example files are of poor quality or the examples do not scale well to the full sample. Finally, there is the *fine tuning* approach, in which the LLM is adapted to the task in advance using the known procedures. The choice of method is always a trade-off between accuracy and effort (de Kok, 2023, p. 13).

Especially when employing zero-shot approaches, the prompt optimization often occurs through trial and error (Kim et al., 2023, p. 25; A. Huang et al., 2022, p. 3). This particular prompt was also optimized in this manner. For example, using the prompt without the instruction in the sixth subsentence resulted in the model not providing a score, with the reasoning that it could not determine the output with complete reliability. However, this behavior of the model is unfavorable since it is intended to derive a rating from the given context and potentially substitute this context for missing information. It also appeared that GPT 3.5 produced more consistent outputs when the initial prompt was placed at the end as well as at the beginning of the text file rather than at the beginning only. This may reflect the fact that the prompt together with the corresponding text files consists of 8,000 tokens, and that the actual task is being forgotten in the overall context of the model, since it represents only about 1 % of the overall prompt. After successful prompt engineering, GPT 3.5 was able to generate a rating for each sustainability report based on the text file, consisting of a number of relevant sections of that report. This rating is supposed to represent the quality of the reporting in the context of compliance with the requirements of the EU taxonomy. Thus, the data for the relevant dependent variable for H1 could be successfully collected. The evaluation of the results is presented in Chapter 7.1.

6.3.2. Determination of reporting quantity and the level of assurance

The research design and data collection for H1 was complex, as it was necessary to specify the content to be targeted and the textual analysis procedure to be applied. The

Original:

As a sustainability reporting and auditing expert, please rate the eligibility and alignment disclosures of this sustainability report abstract with environmental objectives related to climate change mitigation and adaptation. Provide a numerical rating from 0 to 100. Give a rating even if you are unsure. Respond in the format: Score: [number]. Do not provide further information. [Individual text file]

Clustered:

As a sustainability reporting and auditing expert (1), please rate the eligibility and alignment disclosures (2) of this sustainability report abstract (3) with environmental objectives related to climate change mitigation and adaptation (4). Provide a numerical rating from 0 to 100 (5). Give a rating even if you are unsure (6). Respond in the format: Score: [number] (7). Do not provide further information (8). [Individual text file] (9)

Instructions
Context
Data

Figure 3: Prompt applied for testing H1

operationalizing and data collection for H2 and H3 is more straightforward. The two related hypotheses state that sustainable companies disclose more information (H2) and that they are more likely to seek voluntary assurance (H3). One central point of these hypotheses is the classification of which companies can be considered sustainable. A simple and effective way of achieving such a classification is to rely on the assessments of rating agencies. Their ratings allow for a transparent classification without having to carry out a costly assessment independently (Drempetic et al., 2020, p. 354). There are many different rating agencies and ratings. This thesis relies on Bloomberg ratings to classify whether companies are sustainable. Bloomberg ratings are considered to be one of the most important rating frameworks, along with ratings from other agencies such as Thomson Reuters and MSCI (Sorrosal-Forradellas et al., 2023, p. 2). In addition to their popularity, Bloomberg ratings are particularly suitable for the purposes of this thesis because they explicitly incorporate the requirements of the EU taxonomy and other regulations into the evaluation process (Bloomberg, 2023). In addition to the overall score, Bloomberg also includes the individual scores for each of the *environmental, social* and *governance* components. The summary statistics for the scores of the sample are presented in Panel A of *Appendix C*.

Besides determining the degree of sustainability of a company, H2 also involves determining the quantity of information disclosed. Generally, publications such as annual reports or non-financial reports contain information. One could argue that within these reports, the quantity of information can be influenced by whether the authors present the information clearly and to the point, or whether they talk around the subject and stuff the reporting with meaningless sentences without actually revealing any relevant information. Since this problem is a distinct area of research, for the purpose of measuring the quantity of information, it is assumed that all text contains information and that an increase in text length is associated with an increase in information quantity.

To measure the information quantity of sustainability re-

ports, it would be sufficient to count the sentences, words or letters in these reports. Alternatively, this thesis utilizes a measure that has been applied by Loughran and McDonald (2014) in a similar form to measure readability - the file size. File size refers to the size of the reporting document in kilobytes or megabytes. Loughran and McDonald measure this size for files that companies report to the SEC (Loughran & McDonald, 2014, p. 1667). For this thesis, the file size is measured for sustainability reports published on company websites. However, not the Portable Document Format (PDF) file is used, but a converted version that extracts the text from the PDF files.[18] This ensures that the size is only driven by actual text and not by other factors such as formatting or the use of graphics and images, which account for most of the PDF file size. Additionally, there is a distinction between standalone non-financial reporting and integrated reporting. Since the integrated reporting files contain further reporting components, these files are reduced to approximate the portion of non-financial reporting in the total file.[19] Based on the ESG scores and file size values, H2 can be targeted. The evaluation of the results is presented in Chapter 7.2.

H3 suggests that sustainable companies are more likely to undergo a voluntary audit of their non-financial reporting than less sustainable companies. This hypothesis is based on the theoretical foundation of Chapter 2.3 of this thesis. *Table 1* shows that the disclosure of favorable information should be covered by audit assurance in particular in order to achieve an appropriate level of reliability. However, information that does not present a company as sustainable does not require audit assurance as a company would have no interest in publishing incorrect information that presents itself in a poor manner. Conversely, information about sustainable activities requires assurance from external auditors in order to

---

[18] The code used for the conversion is available in *Appendix F*.
[19] The approximation is made using a correction factor of 0.3312, which was determined by dividing the average file size of the non-financial reports in the sample by the average file size of the integrated reports in the sample.

be considered reliable by external parties. According to this theory, companies with better ESG ratings should be more likely to have their non-financial reporting verified by external auditors. The results of H3 are presented in Chapter 7.3.

7. Main results

7.1. Regression results for H1

Following the procedure described in Chapter 6, the results of the analyses are presented below. In addition, the summary statistics and the corresponding correlation matrices are provided in *Appendix C*.

H1 states that audit assurance for sustainability reports increases their compliance with regulatory requirements. To test this hypothesis, ratings are gathered using the procedure described in Chapter 6.3.1. *Figure 4* shows the correlation between the variables *GPT_Rating* and *Assurance_LVL*.

Assurance_LVL 1 represents no assurance from an external auditor, *Assurance_LVL 2* represents a limited level of assurance, and *Assurance_LVL 3* represents a reasonable level of audit assurance. Remarkably, the trendline shows a negative correlation between the rating assigned by the LLM (*GPT_Rating*) and *Assurance_LVL*. This would indicate, ceteris paribus, that an increase in *Assurance_LVL* results in a decrease in the *GPT_Rating* and thus a decrease in the compliance of the reports with the requirements of the EU taxonomy.

The relationship is tested in a regression analysis with *GPT_Rating* as the dependent variable and *Assurance_LVL* as the independent variable. In addition to *Assurance_LVL*, twelve other independent variables are included in the regression. These are *ESG_Score, ENV_Score, SOC_Score, GOV_Score, Market_CAP, Total_ASS, File_Size, File_Size_ABS, Neutrality_Score_ABS, Fog_Index_ABS, Neutrality_Score* and *Fog_Index*. The control variables include diverse Bloomberg ratings regarding ESG disclosures, company data including market capitalization and total assets, as well as significant metrics from traditional textual analysis methods from the areas of readability and sentiment analysis. All variables are defined in *Appendix A*. The full regression results are presented in *Appendix D*. The regression analysis, as well as all subsequent analyses, are conducted on a 95 % confidence level.

Omitting any clearly insignificant variables results in a multiple linear regression with three independent variables and the following regression of *Equation 6*:

$$GPT\_Rating_{it} = \alpha - \beta_1 Assurance\_LVL_{it} + \beta_2 ESG\_Score_{it}$$
$$+ \beta_3 ENV\_Score_{it} + \varepsilon_{it} \qquad (6)$$

i indexes the respective company from the sample and *t* denotes the company's financial year. ε represents an error term. The independent variable *Assurance_LVL* is the variable of interest for H1. However, it shows to be not significant with a t-statistic of -1.49. In addition, *ESG_Score* and *ENV_Score* determine *GPT_Rating*. Interestingly, *ENV_Score* is negatively correlated with *GPT_Rating* and *ESG_Score*

is positively correlated, with *ENV_Score* being a subset of *ESG_Score*. However, *ENV_Score* is not significant (t-statistic: -1.54) in this regression analysis, leaving *ESG_Score* as the only significant variable (t-statistic: 2.06).

The regression in *Equation 6* thus shows that *ESG_Score* is positively correlated with *GPT_Rating* and therefore, companies with a higher ESG scoring are more likely to meet the requirements of the EU taxonomy. This correlation is in line with reasonable expectations. At the same time, *Assurance_LVL* has no significant impact on *GPT_Rating*, hence H1 cannot be confirmed. The level of assurance does therefore not appear to have a significant impact on the compliance of the disclosures with the requirements of the EU taxonomy.

In principle, the regression results should be corrected for the companies' industry. Some industries are naturally more concerned with the issues required by the EU taxonomy. It was examined whether more text in the disclosures has a fundamentally positive effect on *GPT_Rating*. This would have the consequence that companies from industries that naturally have to deal with these issues in more detail would receive unjustified higher or lower ratings. However, no significant correlation has been found (*Appendix D*). Therefore, industry was not controlled for.

Generally, the results of the analysis should be considered in the context of the overall environment and the data used. Although the overall regression is statistically significant, it also has a relatively low coefficient of determination and, most importantly, a small sample size of only 73 observations. The two independent variables, *ESG_Score* and *ENV_Score*, share a correlation coefficient of 0.71 and are therefore highly interdependent. This is a strong signal for multicollinearity. Multicollinearity can result in imprecise regression analysis outcomes. The strong correlation between two independent variables may affect the predictive accuracy of the model as it becomes difficult to determine what proportion of the variation is explained by a particular variable (Kutner et al., 2004, p. 283).

An examination using the widely accepted Variance inflation factor (VIF) has revealed the presence of multicollinearity in this regression (*ESG_Score* VIF: 18.13; *Environmetnal_Score* VIF: 5.62)[20]. In further regression analyzes where one of the two variables was removed in order to deal with the multicollinearity problem, the statistical significance of the regression decreased (*Appendix D*).

Furthermore, the dependent variable *GPT_Rating* is prone to errors. The procedure described in Chapter 6.3.1 ensures that the ratings are of the highest possible quality, but they still contain deficiencies. Although LLMs have been used in previous research to provide ratings on the content of textual data based on defined criteria, the outcome is, to some extent, the product of a *black box*. Traditional textual analysis methods offer more transparency and allow better traceability of results.

---

[20] Multicollinearity is expected when the VIF exceeds ten, thereby strongly impacting the analysis results (Kutner et al., 2004, pp. 408–409).
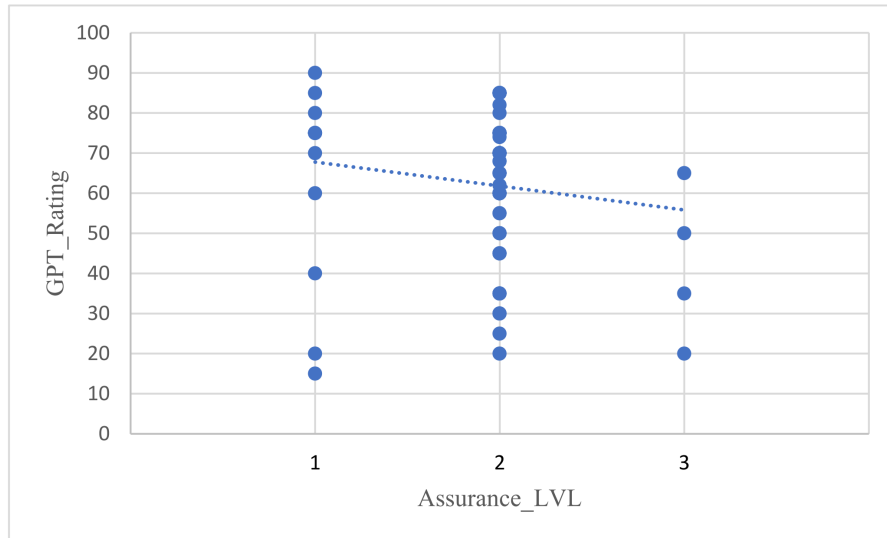
Figure 4: Relationship between Assurance_LVL and GPT_Rating

The length and related context of the text passages to be evaluated pushed the GPT 3.5 model to its limits. In addition, the evaluation criteria and the subject matter of the reports are more complex than those of many other texts. The combination of all these factors results in less reliable ratings. This has even led to the same text file receiving different ratings from GPT 3.5 when evaluated multiple times. The ratings assigned are based on probabilistic methods and are therefore influenced by statistical probabilities and judgments based on the text and information available to the model. In particular, longer texts increase the likelihood that the model will not provide an identical response or rating. In addition, GPT 3.5 is designed to produce outputs in text form. The model calculates each word within the answer based on the prompt itself, as well as on the previously given words of its own output. Thus, the model utilizes the previously produced part of its own output to generate the remaining part of the output, word by word. This generally improves the quality of the output (de Kok, 2023, p. 44). In the application case of this thesis, only the rating as a two-digit number is assigned as an output. Therefore, this effect is absent at the expense of output consistency.

The standard deviation of the ratings is 12.27 % (*Appendix E*). Thus, although the ratings are not randomly determined by the model, they are still subject to a certain degree of uncertainty. In order to increase the reliability of the *GPT_Rating* variable for possible future research, it is strongly recommended to verify it against valid ratings or the results of other textual analysis methods, like the control variables *Neutrality_Score* and *Fog_Index*.

7.2. Regression results for H2

H2 states that sustainable companies disclose more information. This hypothesis builds on the voluntary disclosure theory, which suggests that companies disclose information only when it is beneficial to them, and on the assumption that sustainable companies derive more of these benefits from disclosure and therefore provide more information in form of higher reporting quantity. The direct relationship between *ESG_Score* and reporting *File_Size* is presented in *Figure 5*.

In order to gain confidence in the statistical significance of this relationship, some regression analyzes were performed. In those regressions, *File_Size* represented the dependent variable. A first analysis included eleven independent variables besides *ESG_Score*. These control variables are identical to those for H1, except for the absence of *File_Size_ABS*, as the extracted text sections cannot have any effect on the dependent variable File_Size, since they are themselves taken from the originating report. Among these control variables, *Market_CAP* shows a significant positive correlation (t-statistic 2.66) and *Neutrality_Score* has a significant negative correlation (t-statistic -3.72). *Neutrality_Score* reflects the ratio of positive and negative words to the total amount of words, whereas a higher ratio of positive and negative words indicates a less neutral writing style (*Appendix A*).

A second analysis using only *ESG_Score* and the two significant control variables shows a slightly higher adjusted coefficient of determination and a generally higher significance for the overall regression analysis. The dependent variable *File_Size* and the control variable *Neutrality_Score* have a high negative correlation coefficient of 0.8590. *Neutrality_Score* differs greatly from the other significant control variables in that it is a measure derived directly from the reporting being analyzed. To prioritize relevant indicators that are not directly related to reporting, one further regression is performed, in which the dependent variable is only compared with *ESG_Score* and the control variable *Market_CAP*. *Equation 7* expresses the relationship between these two variables and the dependent variable as follows:

$$File\_Size_{it} = \alpha + \beta_1 ESG\_Score_{it} + \beta_2 Market\_CAP_{it} + \varepsilon_{it}$$
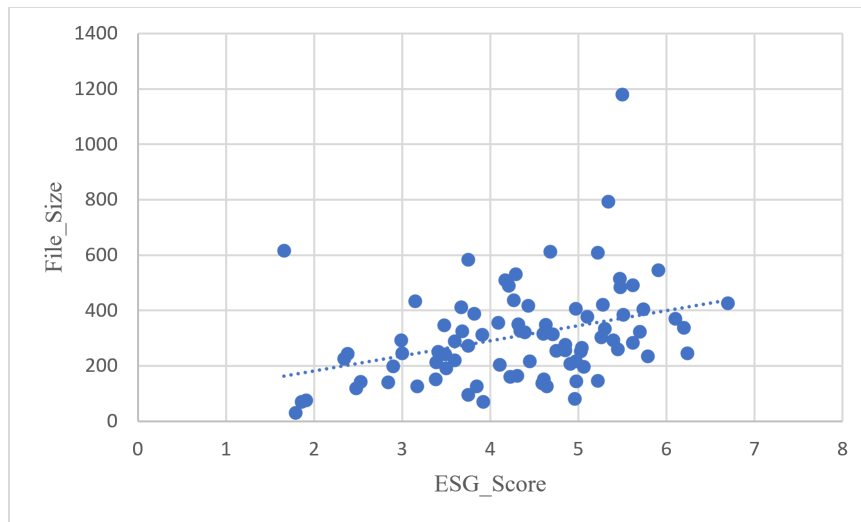$$(7)$$

Figure 5: Relationship between ESG_Score and File_Size

Within this regression model, *ESG_Score* has a significant t-statistic of 2.33, while *Market_CAP* is also significant with a t-statistic of 4.23 (at the 95% confidence level). When the regression is not adjusted for *Market_CAP*, the t-statistic of *ESG_Score* increases to 3.35, but the overall regression generally becomes less significant and its coefficient of determination decreases.

Next to *File_Size*, a number of additional regressions are performed with *File_Size_ABS* as the dependent variable. *File_Size_ABS* differs in that it does not measure the size of the entire report, but only the size of the file containing specific abstracts. These are the abstracts related to the EU taxonomy that were extracted to determine the scores from GPT 3.5. The extraction procedure is described in Chapter 6.3.1 and is further illustrated in *Appendix F*.

When running the regression with the new dependent variable *File_Size_ABS* and *ESG_Score* as well as the same eleven control variables as independent variables, the only control variable to be significant is *Neutrality_Score_ABS*. This variable, like *Neutrality_Score*, measures the neutrality of the writing style, but with respect to the abstracts instead of the full reports. It is reasonable that this control variable would be significant with respect to *File_Size_ABS*, since *Neutrality_Score* was also significant for overall report *File_Size*. The correlation coefficient of -0.7348 is also close to that of *File_Size* and *Neutrality_Score* (-0.8590). When the control variable *Neutrality_Score_ABS* is dropped from the regression model, no other independent variables remain that have a significant effect on the dependent variable *File_Size_ABS*.

In summary, the analysis reveals a significant positive relationship between *ESG_Score* and *File_Size*. Therefore, the analyzes are in support of H2. However, no significant relationship can be found between *ESG_Score* and *File_Size_ABS*. This suggests that sustainable companies generally disclose a higher quantity of information in their non-financial reports. Meanwhile, information based on compliance with the EU taxonomy is not affected. The rationale for this could be that

the additional information disclosed by sustainable companies does not concern this particular domain and that the reports are being enriched with redundant information instead or that the focus lies on other domains. At the same time, the reason may also be that the method used to extract the abstracts does not properly capture all relevant parts.

7.3. Regression results for H3

H3 states that sustainable companies are more likely to obtain an external audit of their non-financial reporting. This hypothesis arises from attribution theory, which suggests that the readers of reports are more likely to challenge published information if it presents the company in a favorable way. The relationship between the sustainability of a company and the level of assurance is presented in *Figure 6*.

Similar to *Figure 5*, *ESG_Score* represents the independent variable to determine the dependent variable, in this case *Assurance_LVL*. In addition to *ESG_Score*, eleven other control variables were tested for significance in a regression analysis. These are the same as for H2, with only *File_Size* and *File_Size_ABS* replacing *GPT_Rating* and *Assurance_Level*. In combination, all control variables as well as *ESG_Score* are found to be insignificant, with *Market_CAP* just falling below the threshold with a t-score of 1.93 (at the 95% confidence level). When attempting to determine the dependent variable using only *ESG_Score* or *Market_CAP* seperately, a significant positive correlation is found in each case (t-statistic *ESG_Score*: 2.64; t-statistic *Market_CAP*: 3.00 at the 95% confidence level). To increase the coefficient of determination and the overall power of the regression analysis, the dependent variable in *Equation 8* is determined by the two independent variables *ESG_Score* and *Market_CAP* combined.

$$Assurance\_LVL_{it} = \alpha + \beta_1 ESG\_Score_{it} \\ + \beta_2 Market\_CAP_{it} + \varepsilon_{it} \quad (8)$$
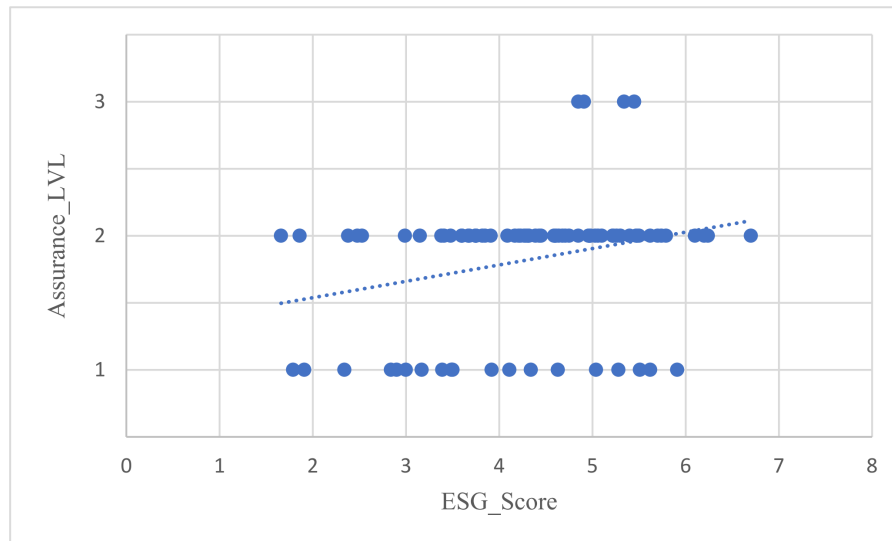
Figure 6: Relationship between ESG_Score and Assurance_LVL

In this analysis, *Market_CAP* shows a significant correlation (t-statistic: 2.38) with *Assurance_LVL*, while *ESG_Score* is just below the significance threshold (t-statistic: 1.93). Based on this result, H3 cannot be confirmed. The correlation between a company's sustainability and level of audit assurance cannot be statistically proven. However, it appears that larger companies with a higher capitalization are more likely to undergo an external audit. This relationship is also shown in *Figure 7*.

19 of the sample companies do not provide an external audit of their non-financial reporting.[21] Only three of those companies exceed \$10 billion in market capitalization, while the mean for the entire sample is \$21.2 billion and the median is \$8.7 billion (*Appendix B*). While many small-cap companies also undergo an audit of their non-financial reporting, at the same time a voluntary audit appears to be inevitable once a company reaches a certain market capitalization. Since the audit of non-financial reporting was not mandatory for the sample of German companies in the most recent fiscal year, implementation at the firm level is a trade-off between costs and benefits (Widmann et al. 2021: 457), similar to the publication of supplementary information according to the voluntary disclosure theory. Audit fees are primarily driven by the size and complexity of firms, but other factors such as a so-called *BIG-4 premium* also play a role, as firms hope to achieve higher audit quality by hiring the large, prestigious audit firms (Widmann et al., 2021, pp. 473–475, 479).

Based on the previous findings, larger firms in particular consider the benefits of an audit to outweigh the associated costs. The reasoning behind this opens up possibilities for further research. At the same time, smaller companies may not be able to afford the voluntary audit, as they do not have the same financial flexibility as larger companies. Neverthe-

less, even the smallest companies included in the sample are listed on the MDAX, meaning that they are still relatively large compared to other companies in terms of total assets or market capitalization, so that this effect is unlikely to be observed in this case.

The results of *Equation 8* and the results of the examination of the control variable *Market_CAP* should be considered in relation to the conditions of the data set. First, the sample size of 85 is relatively small. Second, the dependent variable *Assurance_LVL* is not a continuous variable but a categorical variable that distinguishes only between *no assurance, limited assurance* and *reasonable assurance*. It is particularly difficult to capture a categorical variable through a linear regression because the outcome of the regression equation provides values that need to be assigned to one of the three assurance levels since there are no intermediate levels.

8. Conclusion

Sustainability reporting has emerged as a major element of corporate reporting in recent years. The challenges arising from climate change as well as increasing stakeholder awareness are some of the key driving factors. While a number of companies have been reporting on these issues voluntarily for some time, today almost all of the major companies are getting on board, partly driven by regulatory requirements. The EU taxonomy represents one of the key regulatory foundations in this field. Not only does it tighten reporting requirements, it also encourages real effects by redirecting capital flows and company activities towards more sustainability and reducing practices such as greenwashing (European Union (EU), 2020, p. 14).

This thesis merges the content topic of sustainability reporting with the methodological topic of textual analysis. As sustainability reporting is mainly presented in qualitative text

---

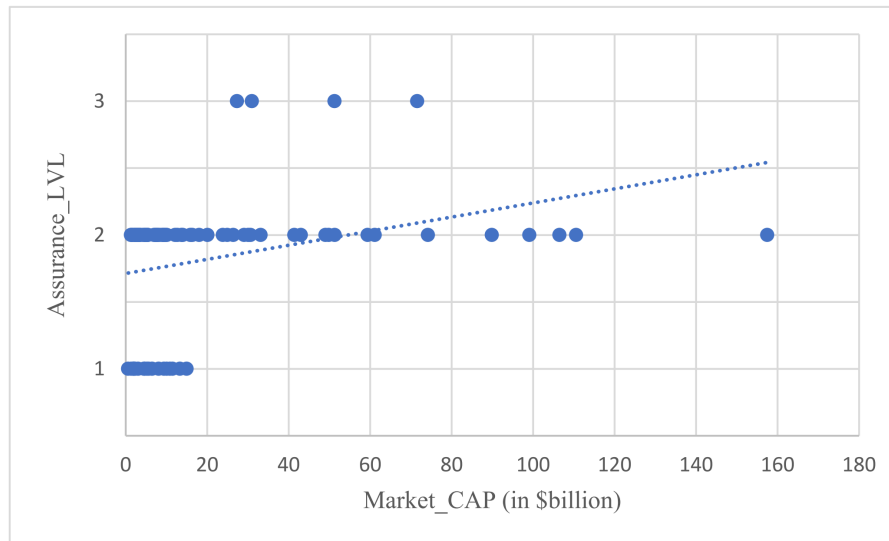[21] *One company (Sixt SE) excluded due to incomplete data.*

Figure 7: Relationship between Market_CAP and Assurance_LVL

form, this combination fits together quite well. The methodology of textual analysis has become very popular in academic research and among the general public through the introduction of text-generating models such as ChatGPT.

This thesis makes several contributions. It contributes to the literature in the area of auditing, especially the auditing of non-financial reporting, and to the literature in the area of European reporting requirements. The two main areas of focus of this thesis are divided, with the first being a literature review and analysis of various textual analysis methods. The literature review focuses primarily on the finance and accounting domain, detailing the textual analysis techniques utilized in prior research. The methodology overview provides a comprehensive examination of the advantages, disadvantages, and limitations of each method. This review contributes to the reader's understanding of textual analysis capabilities and potential applications, which will help readers identify appropriate methods for their own textual analysis research. A further contribution lies in the results of the investigation of the impact of audit assurance on the quality of sustainability reporting. The results were obtained through a combination of textual analysis methods and multiple linear regressions.

The unique aspect of the methodology in this thesis is that the essential data for the analysis is obtained with the help of GPT 3.5, a freely accessible LLM with text comprehension and generation capabilities. The model is used to analyze a defined problem. Ratings or scores have been used to identify genuine economic connections frequently in prior studies. In this case, the LLM is utilized to generate a rating based solely on the text of the non-financial reports of the sampled companies. By constructing a specific prompt, it is possible to determine exactly which factors should be included to create such a rating. For the purpose of this thesis, the compliance of the reporting with the requirements of the EU taxonomy in relation to two specific taxonomy objectives has been de-

fined as a quality feature that defines the rating. Typically, there are no established ratings for such specific objectives.

LLMs have been utilized in prior studies in a similar manner. For example, Kim et al. used another GPT 3.5 model to summarize components of corporate disclosure, and found that these summaries generated each had a stronger positive or negative sentiment than the original reporting. Accordingly, GPT appears to be able to filter noise from the texts, improve the information content and present more relevant insights than the original reporting (Kim et al., 2023, pp. 1, 2, 5, 15–16, 19–20, 30).

The information content of sustainability reports in this thesis was significantly reduced, with only the *GPT_Rating* remaining. While similar, the approach here is much more drastic, as Kim et al. eliminated about 70% of the original reporting, while here the entire text was eliminated and replaced by the *GPT_Rating* as a single number remaining. This significant reduction may account for why the analyses of this thesis did not yield many significant results.

The regression results from the analysis of H1 show a negative but insignificant correlation between the level of assurance and the reporting compliance, displayed via the *GPT_Rating* variable, contrary to the expectations. Additionally, it was found that companies with a higher ESG score also have a higher *GPT_Rating* and are therefore more likely to meet the requirements of the EU taxonomy. The analysis of H2 indicates a positive correlation between the *ESG_Score* and the *File_Size variable*. Thus, sustainable acting companies disclose more information, which supports H2. Finally, the last regression analyses could not confirm the hypothesis of H3, which states that sustainable companies are more likely to have their non-financial reporting externally audited, as the attribution theory would suggest.

The research results are subject to a number of limitations. First, the sample size which ranges from 73 to 90 companies, depending on the analysis, is relatively small. This is

due to the fact that the sustainability reports had to be manually retrieved from company websites and being further processed for the analysis. In addition, the variable *GPT_Rating* is prone to error. On one hand, the analysis of this variable is founded solely on sections extracted from sustainability reports, and not on the entire reports themselves. The extraction procedure was based on an intuitive yet untested approach. The second and more influential source of error is the rating of the sections by ChatGPT itself. Due to time constraints, the rating was done using a zero-shot approach. The model was not fine-tuned and has not been fed with training data in advance. Additionally, the results were not subjected to robustness tests. Such robustness testing could be considered in future research, either by comparing the results with existing, externally validated scores, or by comparing them with a portfolio of results from other textual analysis methods. In this thesis, the results present data that are conceivable but not fully comprehensible.

Changes in the prompt can affect the output, resulting in different rating results for the same report. This even happens if the prompt is not changed (*Appendix E*). The cause may be an overload of the GPT 3.5 model utilized, which is optimized for text output and has limits of approximately 8,000 tokens. OpenAI has announced new models capable of capturing an input context of up to 128,000 tokens. These models are designed to produce reproducible outputs, resulting in lower variances. Such models can enhance the quality of analyses and ensure comprehensive reports. However, at the time of performing the analysis (November 2023), the new models were not yet available.[22]

This thesis has introduced a number of textual analysis methods, ranging from the simplest models with almost no mathematical or technical depth, to models using the latest technical achievements in the field of machine learning. For the analysis of the hypotheses of this thesis, the application of an LLM has proven to be an exhaustive instrument. Despite the emergence and popularity of modern techniques, traditional methods are still commonly utilized in research due to their ease of understanding and intuitive results. However, the future of textual analysis lies in the possibilities presented by the advancing state-of-the-art. Generative LLMs open up numerous possibilities in all fields of research. Textual data is becoming increasingly relevant in the field of accounting. Models like ChatGPT can be particularly helpful in dealing with the growing importance of text in reporting and the associated information overload (Kim et al., 2023, p. 30). Researchers should not overlook these opportunities and utilize the possibilities offered by these and similar models in their research.

References

Aggarwal, C. (2018). *Machine Learning for Text*. Springer.

Agrawal, S., Azar, P., Lo, A., & Singh, T. (2018). Momentum, mean-reversion, and social media: Evidence from StockTwits and Twitter. *Journal of Portfolio Management*, *44*, 85–95.

Alloghani, M., Al-Jumeily, D., Mustafina, J., Hussain, A., & Aljaaf, A. (2020). A Systematic Review on Supervised and Unsupervised Machine Learning Algorithms for Data Science. In M. Berry, A. Mohamed, & B. Yap (Eds.), *Supervised and Unsupervised Learning for Data Science*. Springer Nature.

Amel-Zadeh, A., & Serafeim, G. (2018). Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal*, *74*(3), 87–103.

Antle, R. (1982). The Auditor as an Economic Agent. *Journal of Accounting Research*, *20*(2), 503–527.

Arrow, K. (1963). Uncertainty and the welfare economics of medical care. *The American Economic Review*, *53*(5), 941–973.

Azimi, M., & Agrawal, A. (2021). Is positive sentiment in corporate annual reports informative? Evidence from deep learning. *Review of Asset Pricing Studies*, *11*(4), 762–805.

Bae, J., Hung, C., & van Lent, L. (2023). Mobilizing Text As Data [forthcoming]. *European Accounting Review*.

Bai, J., Boyson, N., Cao, Y., Liu, M., & Wan, C. (2023). Executives vs. Chatbots: Unmasking Insights through Human-AI Differences in Earnings Conference Q&A. https://ssrn.com/abstract=4480056

Ball, R., & Brown, P. (1968). An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research*, *6*(2), 159–178.

Biddle, G., Hilary, G., & Verdi, R. (2009). How Does Financial Reporting Quality Relate to Investment Efficiency? *Journal of Accounting and Economics*, *48*, 112–131.

Black, F., & Schloes, M. (1973). The Pricing of Options and Corporate Liabilities. *Journal of Political Economy*, *81*(3), 637–654.

Blackwell, D., Noland, T., & Winters, D. (1998). The Value of Auditor Assurance: Evidence from Loan Pricing. *Journal of Accounting Research*, *36*(1), 57–70.

Bloomberg. (2021). Applying the EU taxonomy to your investments, how to start? https://www.bloomberg.com/professional/blog/applying-the-eu-taxonomy-to-your-investments-how-to-start/

Bloomberg. (2023). ESG Data. https://www.bloomberg.com/professional/product/esg-data/

Bochkay, K., Brown, S., Leone, A., & Tucker, J. (2023). Textual analysis in accounting: What's next? *Contemporary Accounting Research*, *40*, 765–805.

Bonsall, S., Leone, A., Miller, B., & Rennekamp, K. (2017). A Plain English Measure of Financial Reporting Readability. *Journal of Accounting and Economics*, *62*(2), 329–357.

BookCorpus. (2023). BookCorpus dataset. https://paperswithcode.com/dataset/bookcorpus

Bradbury, M. (1990). The Incentives for Voluntary Audit Committee Formation. *Journal of Accounting and Public Policy*, *9*, 19–36.

Breijer, R., & Orij, R. (2022). The Comparability of Non-Financial Information: An Exploration of the Impact of the Non-Financial Reporting Directive (NFRD, 2014/95/EU). *Accounting in Europe*, *19*(2), 332–361.

Brown, N., Crowley, R., & Elliott, W. (2020). What are you saying? Using topic to detect financial misreporting. *Journal of Accounting Research*, *58*(1), 237–291.

Brown, S., & Knechel, W. (2016). Auditor-client compatibility and audit firm selection. *Journal of Accounting Research*, *54*(5), 1331–1364.

Brown, S., Tian, X., & Tucker, J. (2018). The spillover effect of SEC comment letters on qualitative corporate disclosure: Evidence from the risk factor disclosure. *Contemporary Accounting Research*, *35*(2), 622–656.

Brown, S., & Tucker, J. (2011). Large-sample evidence on firms' year-over-year MD&A modifications. *Journal of Accounting Research*, *49*(2), 309–346.

Busco, C., D'Eri, A., & Novembre, V. (2022). *Corporate Disclosure* (N. Linciano, P. Soccorso, & C. Guagliano, Eds.). Springer Nature.

Chakrabarty, B., Seetharaman, A., Swanson, Z., & Wang, X. (2018). Management risk incentives and the readability of corporate disclosures. *Financial Management*, *47*, 583–616.

---

[22] For an recent overview see: platform.openai.com/docs/models/overview

Chelba, C., Mikolov, T., Schuster, M., Ge, Q., Brants, T., Koehn, P., & Robinson, T. (2013). One billion word benchmark for measuring progress in statistical language modeling.

Chen, H., De, P., Hu, Y., & Hwang, B. (2014). Wisdom of crowds: The value of stock opinions transmitted through social media. *The Review of Financial Studies*, *27*(5), 1983–2020.

Chen, W., & Srinivasan, S. (2023). Going digital: implications for firm value and performance [forthcoming]. *Review of Accounting Studies*. https://ssrn.com/abstract=4177947

Chevalier, J. A., & Mayzlin, D. (2006). The effect of Word of Mouth on sales: Online book reviews. *Journal of Marketing Research*, *43*(3), 345–354.

Christensen, B., Glover, S., Omer, T., & Shelley, M. (2016). Understanding Audit Quality: Insights from Audit Professionals and Investors. *Contemporary Accounting Research*, *33*(4), 1648–1684.

Christensen, H., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: economic analysis and literature review. *Review of Accounting Studies*, *26*, 1176–1248.

Christofi, A., Christofi, C., & Sisaye, S. (2012). Corporate sustainability: historical development and reporting practices. *Management Research Review*, *35*(2), 157–172.

Chychyla, R., Leone, A., & Minutti-Meza, M. (2019). Complexity of financial reporting standards and accounting expertise. *Journal of Accounting and Economics*, *67*, 226–253.

Colón-Ruiz, C., & Segura-Bedmar, I. (2020). Comparing deep learning architectures for sentiment analysis on drug reviews. *Journal of Biomedical Informatics*, *110*, 103539.

Coram, P., Monroe, G., & Woodliff, D. (2009). The Value of Assurance on Voluntary Nonfinancial Disclosure: An Experimental Evaluation. *Auditing: A Journal of Practice & Theory*, *28*(1), 137–151.

de Kok, T. (2023). Generative LLMs and Textual Analysis in Accounting: (Chat)GPT as Research Assistant? https://ssrn.com/abstract=4429658

Devlin, J., Chang, M., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of deep bidirectional transformers for language understanding. *Proceedings of NAACL-HLT 2019*, 4171–4186.

Dissanayake, D., Tilt, C., & Qian, W. (2019). Factors influencing sustainability reporting by Sri Lankan companies. *Pacific Accounting Review*, *31*(1), 84–109.

Dorfleitner, G., Hornuf, L., & Kreppmeier, J. (2023). Promise not fulfilled: FinTech, data privacy, and the GDPR. *Electronic Markets*, *33*(33), 1–29.

Drempetic, S., Klein, C., & Zwergel, B. (2020). The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of Business Ethics*, *167*, 333–360.

Dumrose, M., Rink, S., & Eckert, J. (2022). Why Do Firms in Emerging Markets Report? A Stakeholder Theory Approach to Study the Determinants of Non-Financial Disclosure in Latin America. *Sustainability*, *10*(9), 1–20.

Duran, I., & Rodrigo, P. (2018). Disaggregating confusion? The EU Taxonomy and its relation to ESG rating. *Finance Research Letters*, *48*, 1–8.

Dusík, J., & Bond, A. (2022). Environmental assessments and sustainable finance frameworks: will the EU Taxonomy change the mindset over the contribution of EIA to sustainable development. *Impact Assessment and Project Appraisal*, *40*(2), 90–98.

Efretuei, E., & Hussainey, K. (2023). The fog index in accounting research: contributions and challenges. *Journal of Applied Accounting Research*, *24*(2), 318–343.

European Commission. (2019). Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal. https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

European Commission. (2020). Taxonomy: Final report of the Technical Expert Group on Sustainable Finance. https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf

European Commission. (2021). FAQ: What is the EU Taxonomy Article 8 delegated act and how will it work in practice? https://finance.ec.europa.eu/system/files/2021-07/sustainable-finance-taxonomy-article-8-faq_en.pdf

European Commission. (2022). FAQs: How should financial and non-financial undertakings report Taxonomy-eligible economic activities and assets in accordance with the Taxonomy Regulation Article 8 Disclosures Delegated Act? https://finance.ec.europa.eu/system/files/2022-01/sustainable-finance-taxonomy-article-8-report-eligible-activities-assets-faq_en.pdf

European Union (EU). (2014). Directive 2014/95/EU. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0095

European Union (EU). (2016). Paris Agreement. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22016A1019(01)

European Union (EU). (2020). Regulation 2020/852. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852

European Union (EU). (2022). Directive 2022/2464/EU. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022L2464+

Filighera, A., Steuer, T., & Rensing, C. (2019). Automatic text difficulty estimation using embeddings and neural networks. In M. Scheffel, J. Broisin, V. Pammer-Schindler, A. Ioannou, & J. Schneider (Eds.), *Transforming Learning with Meaningful Technologies*. Springer International Publishing. https://link.springer.com/chapter/10.1007/978-3-030-34971-2_17

Frankel, R., Jennings, J., & Lee, J. (2022). Disclosure sentiment: Machine learning vs. dictionary methods. *Management Science*, *68*(7), 5514–5532.

Frankel, R., Mayew, W., & Sun, Y. (2010). Do pennies matter? Investor relations consequences of small negative earnings surprises. *Review of Accounting Studies*, *15*, 220–242.

Gaulin, M., & Peng, X. (2022). Semantic vs. literal disclosure similarity. https://ssrn.com/abstract=3971286

Gentzkow, M., Kelly, B., & Taddy, M. (2019). Text as data. *Journal of Economic Literature*, *57*(3), 535–574.

Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep Learning*. MIT Press.

Guay, W., Samuels, D., & Taylor, D. (2016). Guiding through the Fog: Financial statement complexity and voluntary disclosure. *Journal of Accounting and Economics*, *62*(2-3), 234–269.

Guidry, R., & Patten, D. (2012). Voluntary disclosure theory and financial control variables: An assessment of recent environmental disclosure research. *Accounting Forum*, *36*, 81–90.

Hartmann, J., Heitmann, M., Siebert, C., & Schamp, C. (2023). More than a Feeling: Accuracy and Application of Sentiment Analysis. *International Journal of Research in Marketing*, *40*(1), 75–87.

Hoberg, G., & Phillips, G. (2010). Product market synergies and competition in mergers and acquisitions: A text-based analysis. *Review of Financial Studies*, *23*(10), 3773–3811.

Hu, N., Liang, P., & Yang, X. (2023). Whetting All Your Appetites for Financial Tasks with One Meal from GPT? A Comparison of GPT, FinBERT, and Dictionaries in Evaluating Sentiment Analysis. https://ssrn.com/abstract=4426455

Huang, A., Lehavy, R., Zang, A., & Zheng, R. (2018). Analyst information discovery and interpretation roles: A topic modeling approach. *Management Science*, *64*(6), 2833–2855.

Huang, A., Wang, H., & Yang, Y. (2022). FinBERT—A large language model for extracting textual information from financial text [forthcoming]. *Contemporary Accounting Research*.

Huang, X., S., T., & Zhang, Y. (2014). Tone Management. *The Accounting Review*, *89*(3), 1083–1113.

IDW Verlag. (2022a). Entwurf eines IDW Prüfungsstandards: Inhaltliche Prüfung mit begrenzter Sicherheit der nichtfinanziellen (Konzern-)Berichterstattung außerhalb der Abschlussprüfung (IDW EPS 991 (11.2022)). https://www.idw.de/IDW/IDW-Verlautbarungen/IDW-PS/EPS-991-11-2022.pdf

IDW Verlag. (2022b). Entwurf eines IDW Prüfungsstandards: Inhaltliche Prüfung mit hinreichender Sicherheit der nichtfinanziellen (Konzern-)Berichterstattung außerhalb der Abschlussprüfung (IDW EPS 990 (11.2022)). https://www.idw.de/IDW/IDW-Verlautbarungen/IDW-PS/EPS-990-11-2022.pdf

International Auditing and Assurance Standards Board. (2013). ISAE 3000 (Revised), Assurance Engagements Other than Audits or Reviews of Historical Financial Information. International Framework for

Assurance Engagements and Related Conforming Amendments. https://www.ifac.org/_flysystem/azure-private/publications/files/ISAE%203000%20Revised%20-%20for%20IAASB.pdf

International Sustainability Standards Board. (2022a). [Draft] IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information. https://www.ifrs.org/content/dam/ifrs/project/general-sustainability-related-disclosures/exposure-draft-ifrs-s1-general-requirements-for-disclosure-of-sustainability-related-financial-information.pdf

International Sustainability Standards Board. (2022b). [Draft] IFRS S2 Climate-related Disclosures. https://www.ifrs.org/content/dam/ifrs/project/climate-related-disclosures/issb-exposure-draft-2022-2-climate-related-disclosures.pdf

Kim, A., Muhn, M., & Nikolaev, V. (2023). Bloated Disclosures: Can ChatGPT Help Investors Process Information? https://ssrn.com/abstract=4425527

King, R. (2007). *The Regulatory State in an Age of Governance*. Palgrave Macmillan.

Kothari, S., Li, X., & Short, J. (2009). The effect of disclosures by management, analysts, and business press on cost of capital, return volatility, and analyst forecasts: A study using content analysis. *The Accounting Review*, *84*(5), 1639–1670.

KPMG. (2022). Big shifts, small steps. Survey of Sustainability Reporting 2022. https://assets.kpmg.com/content/dam/kpmg/sg/pdf/2022/10/ssr-small-steps-big-shifts.pdf

Kutner, M., Nachtsheim, C., Neter, J., & Li, W. (2004). *Applied Linear Statistic Models* (Fifth). McGraw-Hill Irwin.

Lang, M., & Stice-Lawrence, L. (2015). Textual analysis and international financial reporting: Large sample evidence. *Journal of Accounting and Economics*, *60*, 110–135.

Lawrence, A. (2013). Individual Investors and Financial Disclosure. *Journal of Accounting and Economics*, *56*, 130–147.

LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *Nature*, *521*(7553), 436–444.

Lepore, L., & Pisano, S. (2023). *Environmental disclosure. Critical issues and new trends*. Routledge.

Li, F. (2008). Annual report readability, current earnings, and earnings persistence. *Journal of Accounting and Economics*, *45*, 221–247.

Long, C. S., Lucey, B., Xie, Y., & Yarovaya, L. (2023). "I just like the stock": The role of Reddit sentiment in the GameStop share rally. *Financial Review*, *58*, 19–37.

Loughran, T., & McDonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks. *Journal of Finance*, *66*, 35–65.

Loughran, T., & McDonald, B. (2014). Measuring Readability in Financial Disclosures. *The Journal of Finance*, *69*, 1643–1671.

Loughran, T., & McDonald, B. (2016). Textual Analysis in Accounting and Finance: A Survey. *Journal of Accounting Research*, *54*, 1187–1230.

Loughran, T., & McDonald, B. (2020). Textual Analysis in Finance. http://dx.doi.org/10.2139/ssrn.3470272

Lucarelli, C., Mazzoli, C., Rancan, M., & Severini, S. (2020). Classification of sustainable activities: EU taxonomy and scientific literature. *Sustainability*, *12*(16), 6460.

Madrazo, A., & Pera, M. (2020). Is cross-lingual readability assessment possible? *Journal of the Association for Information Science and Technology*, *71*(6), 644–656.

Martinc, M., Pollak, S., & Robnik-Sikonja, M. (2021). Supervised and unsupervised neural approaches to text readability. *Computational Linguistics*, *47*(1), 141–179.

McGurk, Z., Nowak, A., & Hall, J. (2020). Stock returns and investor sentiment: textual analysis and social media. *Journal of Economics and Finance*, *44*, 458–485.

Miller, B. (2010). The Effects of Reporting Complexity on Small and Large Investor Trading. *The Accounting Review*, *85*, 2107–2143.

Nagy, W., & Anderson, R. (1984). How Many Words Are There in Printed School English? *Reading Research Quarterly*, *19*(3), 304–330.

Porter, M. (1980). An Algorithm for Suffix Stripping. *Programm*, *14*(3), 130–137.

PricewaterhouseCoopers. (2023). EU Taxonomy Reporting 2023. Analysis of the financial and non-financial sector. https://www.pwc.de/de/content/20e6bff9-ea5a-4d03-b375-a6a58f7b8b46/pwc-eu-taxonomy-reporting-2023.pdf

Purda, L., & Skillicorn, D. (2015). Accounting Variables, Deception, and a Bag of Words: Assessing the Tools of Fraud Detection. *Contemporary Accounting Research*, *32*, 1193–1223.

Radford, A., Narasimhan, K., Salimans, T., & Sutskever, I. (2018). *Improving language understanding with unsupervised learning* (tech. rep.). OpenAI.

Reuters. (2021). Regulatory Intelligence. Country Update-France: ESG Reporting. https://www.gide.com/sites/default/files/2021_06_17_france_esg_guide.pdf

Reuters. (2023). ChatGPT's explosive growth shows first decline in traffic since launch. https://www.reuters.com/technology/booming-traffic-openais-chatgpt-posts-first-ever-monthly-dip-june-similarweb-2023-07-05/

Sautner, Z., van Lent, L., Vilkov, G., & Zhang, R. (2023). Firm-Level Climate Change Exposure. *Journal of Finance*, *78*, 1449–1498.

Siano, F., & Wysocki, P. (2021). Transfer learning and textual analysis of accounting disclosures: Applying big data methods to small(er) data sets. *Accounting Horizons*, *35*(3), 217–244.

Sorrosal-Forradellas, M., Barbera-Marine, M., Fabregat-Aibar, L., & Li, X. (2023). A new rating of sustainability based on the Morningstar Sustainability Rating. *European Research on Management and Business Economics*, *29*, 1–6.

Technical Readiness Working Group (IFRS Foundation). (2021). General Requirements for Disclosure of Sustainability-related Financial Information Prototype. https://www.ifrs.org/content/dam/ifrs/groups/trwg/trwg-general-requirements-prototype.pdf

Tetlock, P., Saar-Tsechansky, M., & Macskassy, S. (2008). More than words: Quantifying language to measure firms' fundamentals. *Journal of Finance*, *63*, 1437–1467.

Tworzydło, D., Gawroński, S., Opolska-Bielańska, A., & Lach, M. (2022). Changes in the demand for CSR activities and stakeholder engagement based on research conducted among public relations specialists in Poland, with consideration of the SARS-COV-2 pandemic. *Corporate Social Responsibility and Environmental Management*, *29*(1), 135–145.

United Nations. (2022). Global Issues. Climate Change. https://www.un.org/en/global-issues/climate-change

United States Securities and Exchange Commission (SEC). (1998). A Plain English Handbook. How to create clear SEC disclosure documents. https://www.sec.gov/pdf/handbook.pdf

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A., Kaiser, Ł., & Polosukhin, I. (2017). Attention is all you need. *Proceedings of the 31st International Conference on Neural Information Processing Systems (NIPS 2017)*.

Velte, P. (2023). Prüfung von Nachhaltigkeitsberichten nach der Corporate Sustainability Reporting Directive (CSRD) durch den Wirtschaftsprüfer – Fluch oder Segen? *Schmalenbach Impulse*, *3*(1), 1–13.

Verrecchia, R. (1983). Discretionary Disclosure. *Journal of Accounting and Economics*, *5*, 179–194.

Wagenhofer, A., & Ewert, R. (2015). *Externe Unternehmensrechnung* (Third). Springer Gabler.

Walker, C. (2014). Organizational Learning: The Role of Third Party Auditors in Building Compliance and Enforcement Capability. *International Journal of Auditing*, *18*, 213–222.

Widmann, M., Follert, F., & Wolz, M. (2021). What is it going to cost? Empirical evidence from a systematic literature review of audit fee determinants. *Management Review Quarterly*, *71*, 455–489.

Zaman, M., Hudaib, M., & Haniffa, R. (2011). Corporate Governance Quality, Audit Fees and Non-Audit Services Fees. *Journal of Business Finance & Accounting*, *38*, 165–197.

Zamil, I., Ramakrishnan, S., Jamal, N., Hatif, M., & Khatib, S. (2023). Drivers of corporate voluntary disclosure: a systematic review. *Journal of Financial Reporting and Accounting*, *21*(2), 232–267.

Zhou, Z. (2021). Introduction. In *Machine Learning*. Springer.

Junior Management Science

Understanding the Effect of Hedge Fund Activism on the Target Firm -
A Qualitative Study on Shareholder Value

Philipp Rittgen

EBS Business School

Abstract

This thesis represents a qualitative study analyzing a comprehensive interview dataset of long-standing target executives, investment bankers, and activist specialists to improve our understanding of the effects of hedge fund activism on target firms. Hedge funds possess a broad set of tools to alter the firm's trajectory for long-term value creation or short-term gains that may compromise long-term growth. As such, engagement is shaped by several factors, including the fund's incentives, fund size, credibility, and geography. Understanding these drivers is vital in comprehending the dynamics of hedge fund activism to increase shareholder value. However, understanding engagement does not directly translate into understanding the consequences for the target firm. Therefore, this thesis provides a theoretical model grounded in shareholder theory that conceptualizes the impact of measures based on their effectiveness to unlock value in the short - or long-term horizon. This research reveals that different measures have distinct temporal implications for value creation, showing that hedge fund activists often advocate for measures aimed at unlocking immediate shareholder value, while the long-term consequences depend upon the alignment with the target firm's overarching strategy.

Keywords: hedge fund activism; shareholder theory

1. Introduction

"Activist hedge funds drive long-term value creation or short-term gains at the expense of long-term corporate growth?" This is the key question that former Commissioner of the Security Exchange Commission ("SEC"), Daniel M. Gallagher, raised in 2015 regarding the effects of hedge fund activism (Security Exchange Commission, 2015). Despite robust efforts of scholars over the last 20 years to answer the imposed question of hedge fund activism, its implications remain contentious.

One of the first hedge fund interventions was in 1927 when Benjamin Graham wrote a letter to Rockefeller Jr., the chairmen of the Northern Pipeline, to distribute excess cash. Before this, hedge funds were primarily focused on generating high returns for their investors through speculative trading strategies. However, hedge funds began to realize their potential as agents of change in the corporate world (Gramm, 2016). Activism has consistently incorporated an element of

confrontation. However, in the 1980s and 1990s, the emergence of "corporate raiders" was particularly noteworthy due to their access to substantial financial resources, which set them apart from the "proxyteers" who represented dissatisfied shareholders in proxy situations but lacked the same financial firepower. One famous case of that era was Carl Icahn, one of most iconic hedge fund activists to date, who intervened in 1985 in one of the largest firms in the oil and gas sector Philips Petroleum. Icahn sent a letter to William Douce, chairmen and CEO of the target firm, offering to buy the firm or, if he is ignored, launch a hostile tender offer for control (Gramm, 2016). This active intervention, communication, and confrontation of target Boards set the stage for today's activist hedge funds. These days other highly reputable hedge funds emerged next to Carl Icahn, like Bill Ackmann ("Pershing Square Holding Ltd."), Paul Singer ("Elliott Advisors LLC"), or Daniel Loeb ("Third Point LLC"), managing up to USD 18 bn in Assets under Management ("AuM"). Because of their emergence, the shareholders' landscape faced

significant interventions, such as the Dow Du Point merger in 2017[1], the spin-off of the power grid business of ABB Ltd. in 2016, and the breakup of Thyssenkrupp AG in 2020. Of the mentioned interventions, some had substantial upsides, but others had significant adverse effects on shareholder value. Moreover, some CEOs and target executives have responded to activism in a significantly negative way – For example, Klaus Kleinfeld, a former Chief Executive Officer ("CEO") at Samsung Electronics Co., Ltd (Appendix B2). Former Commissioner, Daniel M. Gallagher, explains activism is often posed in a binary view – For example, is activism good or bad?

Scholars of hedge fund activism have mainly used quantitative methods, analyzing large data sets from publicly available SEC filings to measure the effects of activism on shareholder value and corporate performance. Finding evidence for a significant positive effect on shareholder value caused by abnormal returns in the 7 to 8 percent range in the period surrounding the announcement day. Furthermore, the positive returns persist and are not offset in the year following the announcement (Brav et al., 2008). Broadly in line with that, similar findings are reported by Bebchuk et al. (2020), Becht et al. (2010), and Clifford and Carey (2008). However, some scholars find deviating results – For example, Greenwood and Schor (2009) find that abnormal returns can largely be explained by the ability to force the target into a takeover and returns for independent firms are not detectably different from zero. The supporter of the myopic activist claim believes that activist engagement is focused on short-term increases in stock performance and returns, ultimately leading to value destruction in the long term (John et al., 2014). Yet there is much research done on hedge fund activism. Still, research is mainly connected to quantitative research using standardized numerical data sets to explain the causes and effects of hedge fund activism. Thus, limiting the impact of hedge fund activism on numbers and publicly available information and ignoring that most engagement occurs "behind the scenes" and, more importantly, neglecting in their sampling that many activists engage below the 5 percent threshold of SEC filings (Mccahery et al., 2016). Thus, it limits the understanding of the hedge fund-target firm effect, which may have different dynamics, challenges, and outcomes below this threshold.

To follow up on the contentious debate among practitioners and scholars, I study the factors that shape hedge fund engagement and their effects by using the inductive approach proposed by Gioia et al. (2013) and the categorization framework introduced by Grodal et al. (2021) analyzing a comprehensive, hand-collected dataset characterized by long-standing target executives, investment bankers, and activist specialists.

I develop a theoretical model that is grounded in shareholder theory and conceptualize the engagement of the hedge fund-target firm's effect. I show that hedge funds are a heterogeneous group of investors shaped by target choice, style, and resolving approach. As such, target firm performance needs to be measured at a divisional level rather than a top firm level to identify conglomerate discounts caused by inefficient portfolio structures – For example, by measuring the invested capital versus the weighted average cost of capital per division. Thus, highly diversified portfolios lead to complexity, inefficient capital allocation, adverse diversification effects, and a lack of synergies. As a result, the capital market perceives these firms as having less expertise and focus, resulting in a loss of shareholder value. My thesis makes a valuable contribution to the existing literature by highlighting the significance of various factors such as capital allocation, operational underperformance, Mergers & Acquisitions ("M&A"), and corporate governance in shaping the investment hypotheses of activists.

My research establishes a relationship between the investment thesis of the hedge fund and the low shareholder returns experienced by target firms. It demonstrates that low returns are fundamental to resonate with the shareholder base and strengthen the investment thesis. The receptiveness of shareholders is vital for implementing the desired changes advocated by hedge fund activists. Thus, the success of a hedge fund activist campaign relies on gaining shareholder support. By establishing these connections and emphasizing the importance of shareholder returns on shareholders' receptiveness, my research provides insights into the dynamics of hedge fund activism.

I reveal that hedge funds exhibit diverse incentives when intervening in target firms. These incentives can range from seeking to unlock hidden value within the company or attempting to decrease the firm's stock price – For example, through shorting the target's stock. Consequently, the opposing effects substantially influence value creation within the target firm. I provide evidence that the style of activism adopted by hedge funds is influenced by factors such as fund size, geographic location, and reputation. These factors provide insights into the metrics that attract activists, the types of firms that are more susceptible to being targeted, and the extent of support they garner from the capital market, ultimately shaping their success.

I advance hedge fund literature and shareholder theory by developing a systematic approach that advances the ongoing debate by conceptualizing the impact of hedge fund activism on shareholder value. It offers an alternative view of the long-term effects, considering the correlation between value creation and the adequacy of measures to unlock value. As such, I developed a 2-dimensional matrix that assesses the adequacy of measures proposed by a hedge fund activist to address the undervaluation of a target firm. It shows that some measures focus on realizing shareholder value primarily in the short-term or long-term – For example, measures such as capital structure and spin-offs can be implemented within a relatively short period. However, operational im-

---

[1] "The Combination of Dow Chemical and DuPont in 2017, followed by a split into three separate companies, was a huge and highly complex transaction that transformed the chemical industry landscape" (McKinsey & Company, 2021).

provements and Environmental Social Governance ("ESG") strategies need a longer time horizon to create value and are rarely introduced to implement shareholder value in the short term. Therefore, I suggest that activists frequently propose short-term measures to realize value on a near-term horizon. Acknowledging that short-term measures can also realize value in the long term I suggest that long-term consequences can be determined by the adequacy of measures to the long-term strategy of the target.

Section 2 of this thesis derives the relevant literature on hedge fund activism and shareholder theory. Within the section, there is a summary of shareholder activism, hedge fund engagement, and its effect on shareholder value. Section 3 considers the methodological approach chosen, including the research design, data collection, interview guidelines, and analytical approach. Specifically, it is utilized to explain the adequacy of the research methodology in the context of activism and prove rigorous in qualitative research. Next, in Section 4, data and findings are presented and structured to give a differentiated perspective on the effects of hedge funds. Section 5 presents the contributions of the prior analysis, related literature, and possible future research inquiries. Ultimately, Section 6 concludes and explains the limitations of my contribution.

2. Theoretical background and relevant literature

2.1. Hedge fund activism

Investors who purchase stocks in publicly traded firms to negotiate with management are known as activists (Gordon & Pound, 1993; Klein & Zur, 2009). These investors seek to alter corporate governance and directly or indirectly impact the company's strategic direction and performance because they believe that the company's management wastes resources and thus offers an opportunity to increase shareholder value (Briscoe et al., 2015; Verstegen Ryan & Schneider, 2002). However, activism takes different forms, and each has its engagement style. Pension and mutual funds are usually large institutional investors with a long-term investment horizon, while hedge funds have other organizational structures and incentives. These differences arise from the active managerial role activist take (DesJardine & Durand, 2020). Investment managers receive a significant share of the excess returns as performance fees, sometimes up to 20 percent, which provides them with a strong financial incentive to generate profits (Brav et al., 2008). Hedge funds are also subject to less government regulation because they are only available to a limited number of institutional clients and wealthy individuals. Hedge funds may hold riskier concentrated portfolios and may utilize additional financial instruments, such as derivatives or swaps, not used by risk-averse portfolio managers (Brav et al., 2015).

Some see activism as a means of overcoming monitoring and incentive issues. As Becht et al. 2010 indicate, shareholder activists lack the skills and expertise to second-guess the target firm's management, with fund managers replacing

corporate executives in pursuing private advantages such as short-term returns and their agenda (Lipton & Rosenblum, 1991). As a result, activism is frequently seen as disruptive, opportunistic, misinformed, and unproductive. Although activists often behave aggressively, they typically seek no control over the target firm and buy concentrated ownership in the target firm. Instead, they purchase concentrated ownership stakes, with the median maximum ownership around 9.1 percent, and even at the 95th percentile, the stake is 31.5 percent (Brav et al., 2008). Denes et al. (2017) have similar findings, with activists acquiring a median stake of 8.8 percent in the target firm. To gain more control, activists may use tactics such as stock lending, swap, and other derivative transactions to alter the relationship between their economic interest and voting power in the target firms (Becht et al., 2010). However, since activists do not have majority control, they rely on collaboration with the Board of Directors ("BoD") or support from the shareholder base to induce change (Becht et al., 2010; Hu & Black, 2006).

Since literature and researchers find that median ownership is over five percent, the activists must file with the SEC. As such, activists file a Schedule 13-D if they plan to be active or a Schedule 13-G if they plan to be passive (Bebchuk et al., 2020; Clifford & Carey, 2008). The activist focuses on the 13-D, which requires the activist to state the purpose of the transaction. In Germany, activists file with the Bundesanstalt für Finanzdienstleistungsaufsicht ("BaFin").

2.2. Engagement
2.2.1. Hedge fund types

There are three types of activists. Short sellers employ financial instruments to speculate on a decrease in the price of a company's shares. Using financial instruments, these activists borrow shares in the targeted firm and immediately sell them to repurchase the shares at a lower price once the campaign has achieved its desired effect. Subsequently, the activist will disseminate a report on the targeted firm, outlining an analysis of its potential weaknesses and raising awareness that the target is overvalued. When share prices fall, stop-loss mechanisms further support a decreasing share price (Aquila, 2021).

Value-driven activists are the counterpart of short-selling activists. Moreover, they seek locked values to increase the value of a firm. Potential target firms for value-oriented activists include undervalued companies, conglomerates perceived as sluggish, and companies that have failed to keep pace with rapidly evolving markets. Some activists focus on issues in different areas, such as executive compensation and regulatory compliance. At the same time, others take a broader view of value and may also pursue ESG-related topics. Pressuring management to run the company more efficiently to increase the company's valuation is the primary goal of most value-oriented activists. The company's business model and strategy are often challenged in such campaigns (Aquila, 2021).

Lastly, Aquila (2021) identified special situation activists who take advantage of situations where their votes are

needed to complete a takeover or corporate action, such as a squeeze-out situation. According to Aquila (2021), there are two major thresholds target management needs to achieve; on the one hand, 90 percent is required for merger-related and 75 percent for reorganizing. Major shareholders need a domination or profit and loss agreement with the target firm to instruct management on running the business. If a domination and profit transfer agreement does not exist following an acquisition, synergies may not be realized, and the firm's cash flows may not be available to refinance the acquisition. For this reason, many public tender offers are typically subject to a tender condition of 75 percent of the company's shares. A tender offer is an offer made by a firm to acquire all or a portion of a particular firm's outstanding stock shares (Müller & Panunzi, 2004). Such requests are generally made publicly and invite shareholders to tender their shares within a specified time and at a predetermined price (Bhagat et al., 2005). Typically, the offer price will be higher than the prevailing market price, and its validity may be subject to a minimum or maximum number of shares to be sold. The tender offer mechanism is a well-established practice in the corporate landscape. It serves as a tool for hedge funds seeking to gain company control by acquiring outstanding shares (Andrade et al., 2001). However, many shareholders may choose to ignore the tender offer or hold on to their shares even if they are under 25 percent, resulting in the tender offer to fail. In such cases, when takeover rumors become more reliable or after a takeover is announced, special situation activists acquire shares in the company. They significantly increase the likelihood of a successful takeover bid by agreeing with the bidder on the price they will tender their shares (Aquila, 2021).

2.2.2. Target choice

Activists often target firms that are underperforming relative to their peers or have underutilized assets. Hedge funds believe they can improve the company's performance by changing its strategy. In the literature, significant research on the target firms' strategy and performance was done by Brav et al. (2008) and Brav et al. (2015). In their empirical research, they identify five reasons, three of which characterize the strategy and performance of an activist target. In their first sample, they gathered 888 activist events. Their later study focused on 1,059 hedge fund events from 2001 to 2006 and elaborated on their prior research. The largest group in their sample, totaling 47,9 percent, was related to the target firm's undervaluation and poor stock price performance. About 23 percent were associated with business strategies such as M&A, restructuring, and operational efficiency (Brav et al., 2008, 2010). Their findings are consistent with the observations made by Greenwood and Schor (2009), who identify characteristics such as impeding strategic alternatives or obstructing proposed merger and acquisition activities as aligning factors. Based on this research, it can be deduced that undervaluation, on the one hand, and shareholder return, on the other hand, are key characteristics of target firms.

Clifford and Carey (2008) find that target firms experience poor market-adjusted returns. Market-adjusted returns are investment returns that are adjusted for overall market performance. This helps evaluate the performance of an investment relative to the overall market and determine if it is outperforming or underperforming the market average. Accordingly, firms that get targeted perform weakly compared to the overall market. Becht et al. (2010) further strengthen in examining the Hermes UK Focus fund finding that stock price underperformance is one of the three main investment criteria. They also found that hedge fund activists take other performance-related measures into account. Specifically, a target firm is characterized by a low share-price-to-book-value or Price-to-book ("P/B") ratio. In other words, a poor P/B indicates that the firm's intrinsic value is below the stock (Armour & Cheffins, 2009).

Denes et al. (2017) agree that performance is a crucial characteristic and further define that companies with poor stock returns, sales growth, and market-to-book ratios ("M/B") become targets of activist investors. Deviating from Brav et al. (2008), they find that the company also tends to have a high return on assets. Associated to the asset Key Performance Indicator ("KPI"), the EBITDA to assets ratio tends to be high (Jory et al., 2017). Clifford and Carey (2008) find that a high return on equity also characterizes performance. These findings suggest that hedge funds target firms that do not perform poorly on all levels (Denes et al., 2017). Instead, hedge funds seem to target firms with special operating characteristics that can potentially create shareholder value. However, we need to learn more about the exact metrics activists seek. However, Klein and Zur (2009) examined 151 activism events. They found that companies targeted by hedge fund activists have reasonably high stock price performance but seem to be an outlier (Denes et al., 2017).

Activist investors may examine a company's balance sheet to identify areas where it can improve its financial position, such as reducing debt, increasing cash reserves, or improving the quality of its assets. By changing its balance sheet, the company can become more financially stable and better positioned to pursue growth opportunities. Capital structure refers to the proportion of equity and debt used to finance its operations and growth. The ratio of equity to debt is called leverage. Debt components encompass various forms of borrowing, such as bonds, loans, and other types of obligations, while equity comprises common stock, preferred stock, and retained earnings. The capital structure affects a target's financial risk, the cost of capital, and their ability to raise additional funds. Therefore, balancing debt and equity is essential to achieve financial goals with minimum risk (Miller, 1988; Wainwright, 2005).

Scholars found that the characteristics of a target firm are often reflected in its capital structure. Specifically, they discovered that targets tend to have a slightly higher leverage ratio, so a lower cash-to-assets ratio, and a significantly lower dividend payout than their peers. This is reflected in both the dividend yield and the payout ratio (Brav et al., 2008). According to Jensen (1986), managers prefer spending free

cash flows on value-decreasing investments rather than redistributing to shareholders. Therefore, it is unsurprising that high levels of cash holdings draw the attention of activists (Desai et al., 2004; Klein & Zur, 2009). However, the level of debt and, consequently, the leverage ratio is controversially discussed. Jory et al. (2017), like Brav et al. (2008), find that debt levels are high, with a total debt ratio of 67 percent. Deviating from them, Bessler and Vendrasco (2022) find that firms that get targeted have a low level of debt, are more diversified, and have less capital expenditure. They argue that hedge funds are not sector experts, do not conduct indepth operational analysis, and therefore target fewer complex firms (Bessler & Vendrasco, 2022). Similarly, Klein and Zur (2009) find that debt negatively correlates with activism.

Corporate governance is a set of principles, rules, and procedures designed to ensure that managers act in the best interest of shareholders by promoting transparency, accountability, fairness, and sustainability in the organization (Daily et al., 2003). Hedge fund activists become involved when they believe that a target company's management is not maximizing shareholder value and focus on governance aspects such as executive compensation, regulatory compliance, or changes to the BoD. However, some activists have a broader definition of value and may also advocate for environmental, social, or governance ("ESG") measures (Aquila, 2021; Brav et al., 2015).

Governance-related activism revolves around the issue of control and ownership separation, where a few managers hold a significant amount of control through a small number of shares. At the same time, the owner faces a collaborative problem monitoring the manager. This creates a conflict of interest between the principal and the agent, as the manager may act in their best interests rather than the firms. Besides, being a shareholder grants the right to influence the agent regarding important business decisions through its voting rights. Thus, highlight the importance of ensuring that shareholders' interests are protected and that companies are managed responsibly and transparently. However, there are often conflicts of interest between shareholders and management, particularly regarding executive compensation, Board independence, and antitakeover provisions (Hu & Black, 2006). The latter is used by management to act more independently from shareholders. Thus, the more antitakeover provisions there are, the less accountable to the market for control management, making them more susceptible to acquisitions that increase the firm's influence but reduce shareholder influence (Masulis et al., 2007). Furthermore, each provision allows management to counter various forms of shareholder interference, including demands for special meetings, altering the firm's charter or bylaws, filing lawsuits against directors, or removing them all simultaneously (Jiraporn et al., 2006).

As a result, hedge funds often insist on eliminating poison pills, classified Boards, and supermajority antitakeover amendments from corporate charters (Gillan & Starks, 2007). Greenwood and Schor (2009) find that activists in the United States often successfully obtain a Board seat, make existing boards resign, and remove poison pills. A

target frequently overcompensates its Board members even though the firm's performance might not reflect that. Thus, activists often suggest introducing a mandatory advisory annual shareholder vote, also called a "say-on-pay" vote, on the executive compensation report included in the proxy statement (Ferri & Sandino, 2009). According to Gillan and Starks (2007), next to executive compensation, Board independence gets more prevalent. Activists frequently demand an increase in director ownership and limit directors' terms to ensure independence. Other voting-related measures are to go against the Board or management, also known as a "vote no campaign" during a proxy (Gillan & Starks, 2007).

2.2.3. Measures

The measures undertaken to induce change and unlock value are closely associated with the target choice. Not all proposed measures are publicly accessible and included in public campaigns, such as whitepapers or proxy fights. Instead, they are included in "behind the scenes" engagements (Mccahery et al., 2016). However, from available information, research derives a broad set of measures around corporate governance, M&A, operations, and capital allocation. Klein and Zur (2009) identify that the market reacts positively to activist purpose statements, especially when the activist asks for a board seat. Gillan and Starks (2007) deepen that activists pursue Board seats for either input, control, or information purposes. Moreover, there are also other measures on corporate governance, such as proposing for change of board composition, expressing concerns with corporate governance, replacing the Chief Executive Officer ("CEO"), and cutting executive compensations (Klein & Zur, 2009). According to Bebchuk et al. (2020), Klein and Zur (2009) state that activist investors are more inclined to enact measures concerning the appointment of new directors rather than measures aimed at replacing the CEO. Scholars suggest this may be because CEO replacement is a more drastic measure requiring more significant shareholder support and coordination. Moreover, it shows an incremental change rather than a radical transformation (Bebchuk et al., 2020).

In addition to the governance-related measures, M&A measures are also frequently proposed by shareholder activists. These measures include opposing a merger, selling the firm, merging with another firm, and buying stock to acquire a significant share in a firm. Greenwood and Schor (2009) suggest that in recent years, the term "strategic alternatives" has become synonymous with "spin-offs," indicating that strategic alternatives can also be a measure to change a firm's strategic direction. Klein and Zur (2009) elaborate that activists propose to buy back shares or pay dividends to the shareholder, which is also in line with Greenwood and Schor (2009), who adds that changes to the capital structure are utilized to improve the target's leverage.

Strategic and operational measures to propose changes to the strategic direction rarely occur and are associated with the least abnormal returns (Gillan & Starks, 2007; Klein & Zur, 2009). Other research scholars oppose that and show that exploring new strategic alternatives are more likely (Be-

bchuk et al., 2020). Additionally, changing Board decisions to increase influence on the strategic decision is a frequent measure by an activist (Gillan & Starks, 2007). Typical measures related to the strategic direction are breakups, whereas operational measures are related to performance improvements through personal cuts and spin-offs of non-core assets.

2.2.4. Communication

One of the critical assumptions of activist scholars is that activists act on a lack of performance and address management deficiencies (Brav et al., 2008; Gillan & Starks, 2007; Klein & Zur, 2009). Accordingly, a shareholder can vote with or against management in the Annual General Meetings ("AGM"), representing one of his fundamental rights. According to Hirschman (1980), shareholders have two main options when they are dissatisfied with a firm they have invested in: "voice" or "exit." The concept of exit, also called the "Wall Street walk" or "voting with their feet", involves shareholders selling their shares and withdrawing their investments from the firm. This option can be an effective way for shareholders to show their dissatisfaction and can decrease the firm's share price. However, it is essential to note that the threat of exit can also be used as a mechanism by shareholders to change the firm's management or policies, even if they do not actually sell their shares. This type of threat can be difficult to observe, as the shareholder may not follow through if the firms respond to their concerns satisfactorily (Hirschman, 1980).

Management compensation is linked to share prices and the activist is willing to drive the price down to privately incentivize management without exit. Therefore, the threat may be essential for behind-the-scenes negotiations (Admati & Pfleiderer, 2009; Mccahery et al., 2016). Accordingly, the threat can be seen as a "voice" since the activist engages rather than remains passive. Investors that use "voice" try to engage with Management and collaboratively take corrective actions to change a corporate strategy (Goranova & Ryan, 2014; Mccahery et al., 2016). Data and evidence on "voice" are way better obtainable since activists often suggest how the organization needs to change – For example, the possible activist tactics within "voice" range from private to public channels (Keeley & Graham, 1991). "Exit" is less considered as it is associated with the sale of stock. Public channels include options such as resolutions enabled by the SEC rule 14a-8 of the Securities and Exchange Act of 1934 (Goranova & Ryan, 2014). Hence, shareholders can submit a proposal at the annual general meeting, including a 500-word supporting argument in the firm's proxy materials. The topic of these proposals is subject to SEC review and shareholder votes during the proxy season (Denes et al., 2017). However, the proxy process has enabled the activist to raise concerns about performance and governance (Gillan & Starks, 2007).

In contrast, proxy contests are funded by the activist and occur less frequently than shareholder proposals (Denes et al., 2017). According to Mccahery et al. (2016), extreme engagement channels have a high usage rate, with 15 percent taking legal actions and 13 percent publicly criticizing their

portfolio firm. Such actions, including proxy fights, are described as confrontational activist campaigns (Klein & Zur, 2009). However, there are also non-confrontational campaigns.

Becht et al. (2010) and Mccahery et al. (2016) studied the possibilities that activism might take place behind the scenes and might therefore be predominantly executed privately. Those private engagements, sometimes called "quiet diplomacy," are expected to be a more powerful option as they are less disruptive and prevent public embarrassment and adverse effects on the firm's reputation (Goranova & Ryan, 2014). However, on the one hand, private activism is difficult to be observed for researchers as it includes letters, phone calls, meetings, and ongoing dialogues (Goranova & Ryan, 2014). On the other hand, public or private activism are not mutually exclusive events. Hence, private activism does not exclude the possibility of public activism, as activists may initiate a public campaign early or as a subsequent step if their attempts at quiet diplomacy fail to achieve the desired outcomes (Brav et al., 2008; Gantchev, 2013; Goranova & Ryan, 2014). Accordingly, Gantchev (2013) constructed a sequential decision model that shows the potential activist process.

According to Gantchev (2013), the campaign begins with announcing the activist's intentions, usually reported in Schedule 13D, as mentioned earlier. In the next stage, the activist contacts management and formally informs them, usually in a letter to the BoD, addressing demands and ideas that have emerged from the investigation – For example restructuring inefficient operations. During the demand stage, management can adopt a position regarding the demand that can rationalize possible inefficiencies. As a result, the activist investor chooses to sell their stock and exit the situation or proceed. Afterward, the Board phase commences, and the activist requests Board representation. When the activist is unsuccessful in obtaining Board representation, they can garner support from other shareholders by submitting an initial proxy statement (Brav et al., 2008; Gantchev, 2013). The last stage, known as the proxy stage, is the most expensive and confrontational and is pursued by the hedge funds only when they are confident in their ability to succeed – For example when the activist expects to have the shareholder support its assertions. Throughout this phase, the activist's approach transitions from private methods like negotiations with management to public ones, such as public letters, proposals, or proxies (Gantchev, 2013).

Besides the reasons to engage, there are also constraints to activism that are closely associated with agency theory. Free-rider problems arise since engagement benefits are shared among all shareholders even though they do not bear monitoring costs. According to Gantchev (2013), costs include the "time and effort of negotiating with a target company, disclosure, legal and other fees of hiring proxy advisors, corporate governance experts, investment banks, public relations, and advertising firms." Therefore, missing incentives led Admati et al. (1994) to assume that only large shareholders are incentivized to monitor a target to partic-
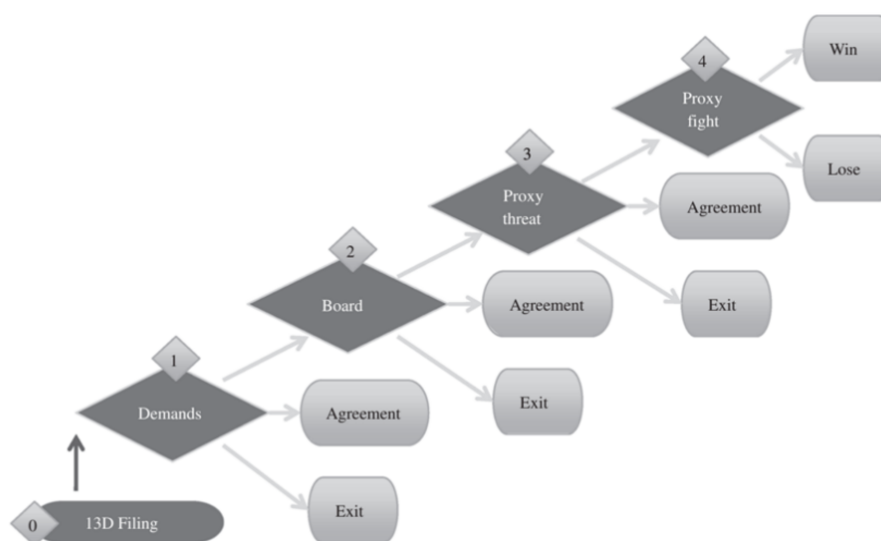
Figure 1: Activist decision model (taken from Gantchev (2013))

ipate proportionally to stake in capital gains to cover costs associated with monitoring. Accordingly, investors will only monitor when the share is large enough to cover the cost. However, holding a large ownership share is costly, especially when the investor is risk-averse (Admati et al., 1994; Danis, 2020). Jensen (1986) expands that view and argues that shareholders are only incentivized when ownership is significant, concentrated, and not diffusely held.

Consequently, a large shareholder with many portfolio firms also engages less in monitoring activities. Since hedge fund activists, with their concentrated ownerships, rely on collaboration with large shareholders, that effect would be determinantal to activism. Next, to freeride problems, scholars identified liquidity as an impediment to hedge fund activism. Generally, liquidity describes the ability to trade large amounts of stocks without profoundly impacting the stock price. Whether the liquidity is high or low can be observed with the bid and ask spread. "Bid" represents the maximum price at which an investor is willing to buy, and "ask" represents the minimum price at which an investor is willing to sell. Consequently, with a persistently large bid- and ask-spread, the trading volume is low, liquidity is low, and vice versa.

Scholars controversially discuss the effects of a portfolio firm's stock liquidity on engagement. On the one hand, literature agrees that low liquidity reduces engagement since stocks with concentrated institutional ownership, especially with hedge funds, tend to have low returns with lower liquidity and, therefore, no incentive to monitor (Kumar & Misra, 2015). On the other hand, the perception of the effects of high liquidity is ambiguous. Mccahery et al. (2016) found in their empirical research that high market liquidity discourages activism. Accordingly, high levels of liquidity lead shareholders to engage less since it is easier to "cut" and "run" rather than engage (Mccahery et al., 2016). This is broadly in line with Back et al. (2015), who also interpret high liquid-

ity as a limiting factor to activism. However, other research concludes that high stock liquidity makes the exit threat more credible and supports activism since engagement costs are better reflected in the stock price. Additionally, stock liquidity favors block formation and incentivizes shareholders to intervene (Maug, 1998). That's also in line with Bessler and Vendrasco (2022) that explain that higher liquidity helps activists to build their stake, on the one hand, more silently and quickly and on the other at a lower cost.

2.3. Effect on the target firm

In Friedman's (1962) shareholder theory, the shareholder owns a company and appoints an agent to operate the company in the principal's best interest. Therefore, the agent's primary objective is directing firm resources and concentrating action on wealth creation for the shareholder. On an institutional level, shareholder theory states that the only responsibility of a firm is to engage transparently in a competing environment without deception or fraud, maximizing shareholder value through growing performance and profits (Queen, 2015). Shareholder value is created through increased stock prices, higher market capitalization, and cash payouts such as dividends. Collecting dividends or having the opportunity to sell stocks at a higher price than the buy-in improve shareholder welfare. Accordingly, in shareholder theory, share price and dividends are the main metrics to evaluate a business' success. Therefore, all management decisions tailor to improve these metrics. In activism theory, there are three ideas on the effect of activists on shareholder value: (1) Help to monitor the agent and reduce agency costs and thereby improve shareholder value both in the short- and the long-term (2) Activists are focused on the short-term, and its actions are determinantal to shareholder value in the long-term. (3) The pure presence of activist leads to spill-over effects and create shareholder value even for yet-to-be-targeted firms.

Activists assume that target management engages in value-reducing activities such as shirking, perquisite consumption, or conglomerate building (Core et al., 2006). For example, they are growing a firm beyond optimal favors the agent since compensations are often connected to sales growth. This creates a conflict of interest between the principal and the agent since resources are not used to maximize shareholder value. Thus, the principal increases payouts to reduce management resources and requires the agent to monitor resources more efficiently (Jensen, 1986). Accordingly, activists are seen as a resolution to agency problems and help govern a company more effectively, positively correlating with short- and long-term returns. However, the effect of hedge fund activism on shareholder value is controversially discussed by scholars.

2.3.1. Direct effect

Using a case study approach, Becht et al. (2010) examined the efforts of Hermes U.K. Focus Fund and found economically significant and statistically positive abnormal returns around the announcement day. Brav et al. (2008) identify that activism leads to significant positive average abnormal returns in the 7 to 8 percent range in the period surrounding the announcement (-20, +20). There is a noticeable rise in both the target company's stock price and trading volume, starting 1 to 10 days before the Schedule 13D is filed; he further finds that these positive returns persist and are not offset over time, as there is no indication of a negative abnormal decline in the year following the announcement (Brav et al., 2008). In the cross-section analysis, they find that the most significant positive abnormal partial effect results from changes in business strategy, such as refocusing and spinning off the non-core asset (Brav et al., 2008; Clifford & Carey, 2008; John et al., 2014). However, balance sheet reallocations such as dividends and share repurchase show positive abnormal returns but are insignificant. A possible explanation is that this is due to market inefficiency since changes in strategy generally do not materialize in a 20-day time frame. However, Brav et al. (2008) argue that market reaction is not merely a stock-picking effect since performance increases ex-ante. Therefore, measures such as dividend payouts, book value leverage, and market value of equity increased compared to peers.

Similarly, they find that operating margins improved, such as EBITDA to assets or Return on Assets ("RoA"). Those findings align with Boyson and Mooradian (2011), Clifford and Carey (2008), and Klein and Zur (2009). Other research suggests limited evidence for improvements in operating performance (Del Guercio & Hawkins, 1999; Wahal, 1996). Deviating from that, Greenwood and Schor (2009) assume that abnormal returns can largely be explained by the ability to force the target into a takeover and returns for independent firms are not detectably different from zero. That would imply that an activist generates shareholder value by finding the best owner for an asset or target company.

The supporter of the myopic activist claim believes that activist engagement is focused on short-term increases in stock performance and returns, ultimately leading to value destruction in the long term (John et al., 2014). Accordingly, activism would oppose the idea of shareholder theory. John et al. (2014) did not find evidence to support that claim in their empirical study, which is also in line with the findings of Mccahery et al. (2016) and Gillan and Starks (2007). Nevertheless, John et al. (2014) and Denes et al. (2017) find that corporate advisors and jurisdiction have influenced and supported targets to defend against shareholder activism by adopting firm- and state-level antitakeover provisions. Resulting in defense mechanisms such as staggered Boards, poison pills, or changes to shareholder rights – For calling a shareholder meeting. Accordingly, the agent makes it more difficult for the principal to govern and obtain control or ownership in the target company (Becht et al., 2010; Cremers & Nair, 2005; Gordon & Pound, 1993).

2.3.2. Indirect effect

Some scholars like Wilhelm George, former CEO of Medtronic, assume that activists aim for a quick increase in the stock price by advocating for significant changes publicly, causing a temporary bump in the stock price which is detrimental to long-term value. However, John et al. (2014), who studied 2000 interventions between 1994-2007, found no evidence of long-term underperformance. In general, it is challenging to determine if activism was the direct cause of improvements in a company's performance or increased stock value, even if such activism leads to positive outcomes in the following years (Gillan & Starks, 2007). However, some also argue that activists do not need to buy ownership since the pure presence and threat to a peer could lead to positive spill-over effects. Accordingly, activism would cause positive externalities that enhance shareholder value. Firms that activists have not yet targeted perceive a sense of threat and take proactive measures by collaborating with advisors to assess their policies and reduce vulnerabilities to potential activist attacks. This proactive approach, often called an "activist fire drill," results in the implementation of actual policy changes. These changes can include actions like spinning off divisions or implementing programs to return capital, aiming to prevent dissent from arising in the first place (Becht et al., 2010). As a result of this proactive response, a spill-over effect positively impacts shareholder value. Prior studies by Gantchev (2013) and Maffett et al. (2022) have supported this notion, highlighting how implementing such changes leads to increased shareholder value.

3. Research methodology

3.1. Research design

Hedge fund activism has garnered significant attention in financial research, with scholars seeking to understand its causes and effects. While qualitative methods have been recommended to delve into the nuances of this phenomenon, scholars predominantly relied on quantitative research utilizing standardized numerical data sets. Thus, qualitative research limits the understanding of the effects of hedge fund

activism as it tends to focus on measurable outcomes and publicly available information, often overlooking that a significant portion of activist engagement occurs "behind the scenes" and relies more on strategic maneuvering than rigid scientific principles (Mccahery et al., 2016). As Gioia et al. (2013) already cited Einstein, "Not everything that can be counted counts, and not everything that counts can be counted" (Gioia et al., 2013, p. 2). Accordingly, that offers the opportunity to use a qualitative research methodology, particularly detailed observations by firsthand informants, for developing new theories (Eisenhardt et al., 2016; Nowell & Albrecht, 2019).

Thus, limit feasibility because it is essential to recognize that not every hedge fund follows the same approach or utilizes identical measures to unlock value. This diversity among activist strategies restricts the generalizability of findings across the entire activism landscape. Moreover, the choice of measures employed by activists can affect shareholder value differently. Each activist may employ their own unique set of metrics, which necessitates a nuanced understanding of the specific measures employed in each case. Furthermore, the effects on shareholder value resulting from activist interventions are often not triangulated with those of peer companies or the overall market environment. This lack of contextualization makes it difficult to separate the effect of activist measures from the prevailing market conditions, thereby only partially attributing the outcomes to hedge fund activists (Gantchev, 2013). Accordingly, existing theories do not offer feasible answers to reveal the actual effects of hedge fund activism, making an inductive design for this master thesis suitable to answer the research question (Nowell & Albrecht, 2019). Accordingly, this thesis follows the structured inductive approach proposed by Gioia et al. (2013), focusing on how organization members construct and understand their experiences. I used a semi-structured interview guide to have the desired flexibility for individual answers and give voice to the informants (Eisenhardt et al., 2016; Gioia et al., 2013). This approach is suitable since it facilitated a less restricted theory-building process in which findings emerged without the structured methodology limitations and through frequency, dominant, and significant themes inherent in raw data (Thomas, 2006). Hence, making sure that specific topics are covered.

To follow the urge in qualitative research to be rigorous, I used a mix of primary and secondary data and a methodological approach for my primary data to ensure that experiences and opinions were not formed uniformly and different perspectives on the phenomena were considered. Hence, inside perspectives from the target and advisors to activism from the business, legal, and activist close advisors were considered. Furthermore, secondary data was used to enrich the objectivity. The reasons for that are twofold. First, the chairmen's letters cause and call for change. Second, reports provided by interviewees offer broad insights into industry trends. Thereby allowing us to put experiences and numbers of prior research into context. Acknowledging the concerns of Pratt et al. (2022) and Eisenhardt et al. (2016) that the

availability and wide use of templates in qualitative research is a concern for quality, this master thesis uses, in addition to Gioia et al. (2013) the active category framework proposed by Grodal et al. (2021) to precisely demonstrate how I used, collected, coded, and analyzed the data when generating theory.

3.2. Data collection and sources

The data sources of this thesis include 20 interview data from leading industry experts and 7 secondary data from various sources to study the focal phenomenon of hedge fund activism. I utilized a broad set of industry experts to study the phenomena from different standpoints and took the target perspective and associated advisors to activism to also triangulate results. The tables 1 and 2 give an overview of primary and secondary data used to answer the research questions.

Interviews represent the main data source of primary data. The Interviews were conducted within a timeframe of two-month beginning in January 2023, to build the fundamental knowledge of this master thesis. Interviews were obtained through the network of interviewees who offered to connect me to other professionals. Interviewees were then further selected based on their area of profession and the employer's reputation. The sample includes the target companies and related advisors from the banking, strategy, and law side to view the phenomena from different perspectives. In total, ten banks were surveyed, focusing on bulge bracket banks such as J.P. Morgan, Morgan Stanley, and Bank of America, and other leading global banks such as Deutsche Bank, Citibank and Credit Suisse. Investment banks play an essential role in hedge fund activism by serving as advisors or intermediaries between the hedge fund and the company in which the hedge fund has invested. Investment banks can support the target in evaluating takeover offers, identifying defense strategies, and executing M&A.

Furthermore, investment banks support their clients to anticipate the threat of a possible activist campaign before such vocal investors show up (Gantchev, 2013). Therefore, Investment banks have the expertise and experience in capital markets and global reach to adequately provide me with insights. Moreover, they work with the largest corporations and financial institutions and typically have the resources and knowledge to handle the largest and most complex financial transactions. Besides, I have interviewed boutique banks such as Rothchild & Co., Greenhill and Moelis & Company. The interviewed bankers come from major financial centers in the United States, Great Britain, and Germany and hold Managing Director ("MD") positions within the M&A services department. Some also have a specific focus on shareholder engagement and therefore represent suitable interview set to answer the research questions.

Target firms play a crucial role in understanding the effect of an activist. For this purpose, I interviewed five senior strategic and merger and acquisition-related Executives. I have chosen senior executives since activism and related engagement are not transparent to the entire organization it

Table 1: Primary data

Company	Interview Responded	Background	Country
Credit Swiss	Managing Director	Investment Bank	US
Greenhill	Managing Director	Investment Bank	UK
Bank of America Merrill Lynch	Managing Director	Investment Bank	GER
Deutsche Bank	Managing Director	Investment Bank	GER
United Bank of Switzerland	Managing Director	Investment Bank	UK
Rothschild & Co	Managing Director	Investment Bank	GER
Citibank	Managing Director	Investment Bank	UK
JP Morgan Chase	Managing Director	Investment Bank	UK
Morgan Stanley	Managing Director	Investment Bank	GER
Moelis & Company	Managing Director	Investment Bank	GER
Target Firm	Global Head of M&A	Industry	n/a
Target Firm	Global Head of M&A	Industry	n/a
Target Firm	Global Head of Strategy	Industry	n/a
Sullivan Cromwell	Partner	Law firm	GER
Wachtel, Lipton, Rosen & Katz	Partner	Law firm	US
Alvarez & Marsal	Managing Director	Consulting	GER
Alvarez & Marsal	Managing Director	Consulting	GER
n/a	Activist advisor	n/a	GER
Deloitte	Partner	Consulting	GER
Investment Bank	Board Member	Investment Bank	n/a
Total	20		

Table 2: Secondary data

Characteristics	Title	Date
Activist Letter to Board	Trian vs. Disney	2023
Activist Letter to Board	Elliott vs. GSK	2021
Activist Letter to Board	Elliott vs. Alexion	2020
Proxy Statement	Pershing Square vs. ADP	2017
Activist Letter to Board	Third Point vs. Nestlè	2017
Management Letter to Activist	Kleinfeld to Singer	2017
Activist Letter to Board	Third Point vs. Sotheby's	2013
Total	7	

is located at the top of an organization's hierarchy - For example, Senior Strategy or M&A Executives and Board members. Generally, Board members receive the initial contact letter, which is also referred to as "Dear Chairmen." Furthermore, the mentioned executive, as their role of an agent, plays a crucial role in understanding the principal-agent relationship of an activist and its target firms, as well as the effect on the strategic direction. Lastly, other relevant advisors in activist situations were interviewed. Target firms often seek attorneys to defend against the hedge fund's efforts and protect their interests which includes advising on issues such as shareholder rights, proxy contests, and M&A. In addition, several businesses and hedge fund advisors were interviewed.

The Interview Guide is semi-structured to gain both a retrospective and a current perspective from individuals who are directly experiencing the phenomenon of interest and can be derived from Appendix A. Hence, I chose this approach to get an in-depth insight into the motivations, opinions, and experiences while covering certain topics (Bryman, n.d.; Gioia et al., 2013). The sample consisted of various respondents with diverse international backgrounds with a broad awareness of the phenomena (Eisenhardt et al., 2016). German interviews were translated into English and then checked for correctness. To adequately give voice to the interviewee's discretion was important. First, the respondents were asked for their consent to record the interview for analysis purposes.

Moreover, I involved interviewees in the evolving analysis, models, and even manuscripts to protect their interests; however, I did not grant a veto other than reporting of sensible data (Gioia et al., 2013). Besides, interviews were informed that data is anonymized and will not contain names or references to the company. Since the opinions of the interviewees on such a highly sensitive topic are detrimental

to honest opinions, I decided to further protect them by randomly assigning names to the transcript and interview numbers. Interviews took place mostly via a virtual conference such as Microsoft Teams or Zoom, some also at sight, and generally took 40 to 60 minutes. Furthermore, the interviews were transcript within one week after the interview. However, efforts to anonymize data interviews still have their limitations.

Secondary data comes from different sources. However, "Dear Chairman" letters, which represent letters from a shareholder to the Chairmen of the Board, represent the prime secondary data source. First, they show how they engage with the company and what the shareholders think of the company. Second, it shows how he plans to unlock and thereby increase shareholder value. In total, I gathered 10 "Chairmen" letters which can also be found in Appendix B1. To support that I collected presentations, newsletters, and studies from the interviewees that can be derived from Appendix B2 Those are mainly private, however, not confidential analysis presentations to corporate clients on the activism industry. Discovered documents during desk research, which included publicly available industry reports, newspaper articles, annual reports of target firms, and filings with the Security Exchange Commission. For detailed information on target firms, I used statistics and information from Bloomberg Terminal and Refinitive workspace. Such information includes stock price developments, ownership or "cap" tables, and valuation information.

3.3. Interview guidelines

Interview guidelines. The interview guide was only sent upon request to allow exploratory research. As a result, the interview questionnaire was only sent four out of twenty-one times. Additionally, no concepts or ideas were given as a priori explanations to verify an observation. However, the interview topics were defined in buckets ex-ante. This research aligns with an inductive research approach proposed by Gioia et al. (2013).

The first interview phase in January 2023 served to ask general questions about the phenomenon of hedge funds and shareholder impact. A screening of existing literature was made for the creation of the questions. This resulted in two blocks: (1) Activist formation and (2) Shareholder impact. The first block addressed the activist formation's definition, causes, and engagement characteristics. Then, the impact was asked on a short, medium, and long-term basis. Therefore, questions were asked to understand what the interviewee considers shareholder activism, what objectives and motivations are behind engagement, what problems an activist identifies, and what factors can potentially enable activism. Additionally, questions were asked to clarify the process of an activist and how it can impact shareholder value in different time horizons. Finally, it was to be clarified if the interviewee could illustrate an engagement using a specific case. This section was not covered in the second interview round in February 2023 due to confidentiality towards the clients.

The second interview phase went beyond the existing and general questions. The block structure was maintained as it covers the "effects" comprehensively, but it was clear from the first interview phase that activism is a concept that cannot be generalized and is very situational. Therefore, to consider this level of complexity, the questions were posed more specifically ex-ante. Questions related to activist formation were thus expanded and aimed at distinguishing from other shareholder groups, the different shapes and styles of activists and the significance of some characteristics of their essentiality. Regarding causes, more targeted questions were asked about the analysis an activist undertakes to identify a target and what measures result from it and if they can be classified in terms of implementation by the target company.

3.4. Data analysis

This empirical research is based on 20 interview transcripts, thereof 11 Investment Banks, five Target firms, and six advisors closely associated to hedge fund activism. Note that data was structured accordingly before being analyzed. According to the grounded theory approach by Gioia et al. (2013), the thesis analysis follows a two-step approach. First, these transcripts were analyzed inductively and openly coded using the qualitative research software MAXQDA. According to the 1st-order analysis, "I tried to adhere faithfully to informant terms" (Gioia et al., 2013, p. 20). Second, I began to abstract this functional collection of themes into higher-order themes. In research, this is achieved by attaining "theoretical saturation," according to Glaser and Strauss (2017). To further abstract categories, I explored the feasibility of further simplifying the emerging second-level themes into 2nd-order aggregate dimensions (Gioia et al., 2013; Glaser & Strauss, 2017). The emerging categories thereafter become the concepts and mechanisms to form my theory (Eisenhardt et al., 2016). This is also in line with Pratt et al. (2022) and Gioia et al. (2013), which further conclude that it shows how concepts relate to each other based on structured evidence. Categorization theory and its scholars argue how rigor can be achieved in qualitative research. Grodal et al. (2021) propose that researchers can prove rigor by detailing more precisely how they have purposely used a broad set of moves to engage with the data; Therefore, I followed the active categorization framework proposed by Grodal et al. (2021). I considered eight different moves that can be categorized into three stages: Generating initial categories, refining tentative categories, and stabilizing categories (Grodal et al., 2021).

To generate initial categories, I focused on finding puzzles, where I paid attention to surprising and salient information that deviates from existing literature. According to Locke et al. (2008) that helps abduct new insights that may be inherited in the raw data. Scholars refer to such puzzles as "negative cases" or "unusual incidents" (Grodal et al., 2021). This is particularly suitable since I expect to find activist engagements that deviate from the literature's positive findings. Second, this is important not only to find planned effects but also to describe the actual effects. In line with Thomas

(2006) "identifying any significant unplanned or unanticipated effects or side effects" is an important evaluation task.

To refine tentative categories I included different moves to make the categorization an iterative process characterized by reducing and increasing the number of categories. On the one hand, that is done by merging or dropping categories to either overarching categories, as emphasized by Gioia et al. (2013) and Elliott and Gillie (1998) or dropping them. Dropping categories is suitable when in the analysis process, categories turn out to be not relevant or do not emerge stable patterns. Conversely, I tried to find subordinate domains through "unbundling" or "splitting" categories. Thereby increasing the number of categories to limit overgeneralization. Furthermore, I compared and contrasted categories by specifying the relationships or lack of relationships among them. This differs from merging themes since I recognize connections between categories that may not necessarily belong to the same overarching category. Lastly, I considered the sequential relationships to find the dynamics and causal connection of categories in the data. Thereby decoding the relationship between an action and an object and determining concepts and mechanisms (Grodal et al., 2021). Furthermore, the end of the study was achieved at the point where no further themes evolved. In the last stage, stabilizing categories, I tried to re-analyze the categories and integrate identified mechanisms and concepts to check if the data supported the theoretical conclusions made (Grodal et al., 2021).

4. Findings

Comparing the primary interview data from 20 interviews and following Gioia et al. (2013) and Grodal et al. (2021), 12 first-order themes were aggregated and further abstracted into 2nd-order themes and dimensions. Finding that my independent variable hedge fund engagement cannot be viewed as a homogeneous group of investors since different factors determine the effects on shareholder value. I found evidence in my data that these factors include target choice, style, and resolving approach of the activist. Target choice refers to the specific internal factors such as waste of company resources, leverage ratio or operating KPIs, and external factors such as stock price, shareholder return, and shareholder concentration. I further found similarities that underline that the activist's shape and style effect the measures' choice. Hereby shape and tone are determined by the incentives of the activist to produce returns for their shareholder, geography, size, and reputation. Lastly, how the activist plans to resolve his investment hypotheses affects shareholder value. That's because the measures proposed can be short-term or long-term orientated in nature, and how aggressive the activist is while communicating publicly or privately influences the target firm.

The observed consequences for the dependent variable in this thesis can be categorized into two main aspects. Firstly, there is a direct impact on the target firm, affecting both short-term and long-term outcomes. Secondly, activism can also have an indirect effect through activist engagement with peers resulting through either taking corrective actions ("target response") or through a broader "market response," where the market reacts to anticipated changes. As such, the market response can be explained by the capital market anticipation of the changes to generate shareholder value. However, these overreactions seem to result from market inefficiencies rather than legitimate improvements in the target firm. The figure 2 illustrates the coding tree and structure of the emergent findings.

4.1. Hedge fund engagement

Hedge fund activist engagement is a case-by-case driven event and can change on almost all levels depending on the situation. However, activism is more a symptom than a cause (Interview 11). It shall rather be seen as a catalyst for unpleasant or even tough decisions (Interview 5). This chapter elaborates on the factors that shape engagement.

4.1.1. Target choice

Hedge funds are diligent when identifying a target firm before engaging. My findings reveal that hedge funds look for two relevant characteristics in a target firm. Internal-management-related factors build the backbone of the investment hypothesis. More specifically, they construct a storyline about why something needs to change. Whereas external-investor-related factors determine the receptiveness of the investment thesis with the shareholder base, which is necessary to implement change. The table in figure 3 illustrates the identified dynamics around target choice.

Internal, management-specific factors are linked to the financial and operational performance of the target firm. Common sense suggests that when a firm demonstrates strong performance across these dimensions, an activist has limited incentive to get involved and incur the associated monitoring costs, as the potential to generate alpha for their investors is insignificant. As highlighted by one of the interview respondents, well-performing companies are typically not targeted by activists.

> "(...) one must not forget when the activist looks at a company that is performing outstandingly, producing its earnings at an absolute level, and just as strong as the competitors. Then the activists are not attracted at all" (Interview 6).

Conversely, Interview 19 explains that a solid performance from a capital market perspective puts a firm in a strong position so that the activist has no point of contact – For example, have strong operative result and trading on a multiple "where there is not much room for improvement" (Interview 19). As such, my elaboration is vastly associated with target performance typically below the target firm and industry-specific ability to produce shareholder value. More specifically, activists analyze historical performance and management decisions within a time horizon of three to five years. Thus, evaluate if major milestones are achieved or
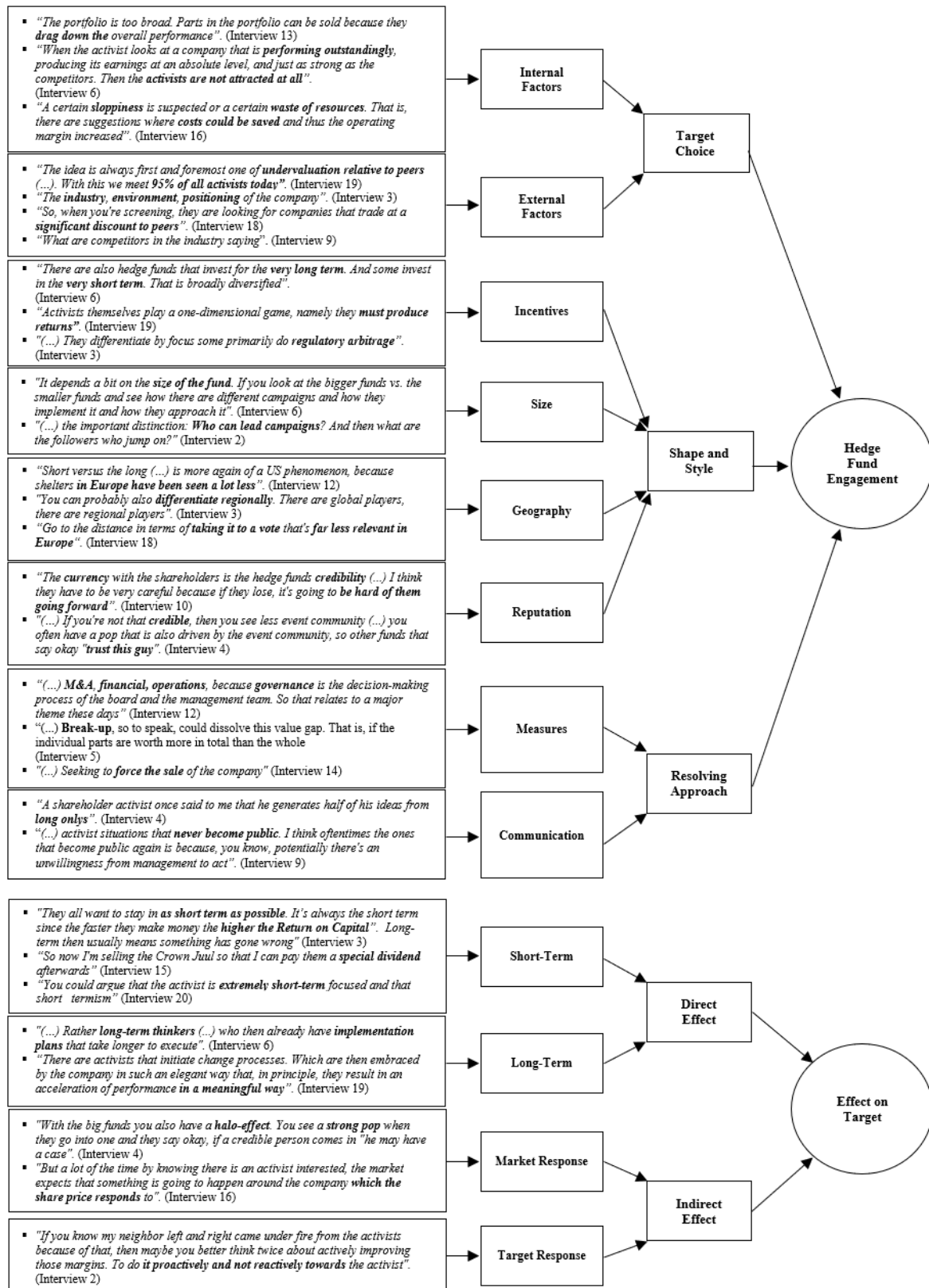
Figure 2: Coding tree.

missed and if management decisions have led to a company being in a compromised position from the capital markets

perspective, thereby impacting its outlook over the following years (Interview 9). Underperformance is a central theme
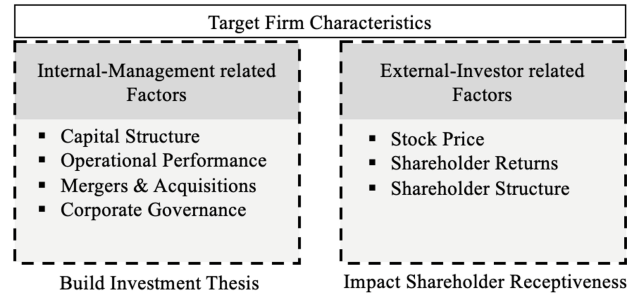
```
┌─────────────────────────────────────────────────────┐
│                Target Firm Characteristics            │
└─────────────────────────────────────────────────────┘
  ┌───────────────────────────┐  ┌───────────────────────────┐
  │ Internal-Management related│  │  External-Investor related │
  │         Factors            │  │         Factors            │
  │                            │  │                            │
  │  ▪ Capital Structure       │  │  ▪ Stock Price             │
  │  ▪ Operational Performance │  │  ▪ Shareholder Returns     │
  │  ▪ Mergers & Acquisitions  │  │  ▪ Shareholder Structure   │
  │  ▪ Corporate Governance    │  │                            │
  └───────────────────────────┘  └───────────────────────────┘
      Build Investment Thesis      Impact Shareholder Receptiveness
```

Figure 3: Target firm characteristics and relationships.

Note: Factors identified are not exhaustive or mutually exclusive

for an activist to engage in, and it needs to be considered that different factors lead to underperformance.

First, there needs to be a competitive cost structure. I observe that activists look at companies with too many operating costs and weak operating results. Interview 9 further explains that activists look at financial KPIs that show they are underperforming in terms of profitability (Interview 9). This is especially true for German companies, which, according to Interview 7, have performed well in the last twelve months regarding the "topline" and have withstood the competition with their peers. However, they are lagging internationally in terms of the profitability of the business. An activist then puts forward an investment hypothesis on how to make the cost structure competitive to make up this gap (Interview 7). In line with that, an activist may confront the target firm with a question such as, "While your competitors achieve an EBIT margin of 10 percent, yours stands at 6 percent. I want to understand the reasons behind this disparity" (Interview 19). The illustration 4 shows an analysis published in a letter from Elliott Advisors Limited ("Elliott") to the BoD of Alexion ("Target Firm") in FY20 (Appendix B1).

It can clearly be seen that the Enterprise value ("EV") to EBITDA decreased. In other words, the firm's value compared to the operative result decreased. This can have different causes. Either the market does not value the firm the same because of various factors, or operating activities are reduced in profitability. Acknowledging that reduced EBITDA results from revenue and costs, this is either related to a reduction in sales, the market demand shifted, or costs increased. However, decreasing profitability over five years gives the activist a reason to believe that the target management does not manage it well.

Second, M&A encompasses acquiring and divesting assets, which involves strategically managing a firm's portfolio and executing its corporate strategy. It revolves around evaluating the allocation of financial resources and determining whether they are appropriately invested in the core assets (Interview 8). As such, portfolio management is to ensure that a firm's portfolio of assets is in strong alignment with its overarching strategic goals. It involves making effective resource allocations to optimize long-term growth and profitability, maximizing shareholder value. One senior target firm executive mentioned that the investment hypothesis is that the target management does not appropriately focus on high-value, so-called "core assets" and miss allocates budgets (Interview 4). Activists argue that these assets should be divested to focus on the core assets and thereby improve competitiveness and shareholder value. As such, shareholder value is unlocked by selling these non-core assets and reinvesting proceeds to strengthen the core assets – For example, by investing in Research & Development ("R&D"). Besides, the sale proceeds of non-core assets can also be used to pay off debt, buy back shares, or distribute special dividends, further improving shareholder value.

In addition to diverting management's attention away from the firm's core assets, an interviewee highlights that an excessively broad portfolio can potentially have a detrimental effect on overall performance (Interview 13). Non-core assets may encompass subsidiaries, divisions, or product lines that are unprofitable or no longer align with the firm's strategic direction, resulting in a lack of synergies. Synergies can arise when certain functions like R&D can be utilized across multiple businesses or when administrative services can be shared as a backbone for a conglomerate. As such, another interviewee responds that - a firm can be diversified to the extent the portfolio setup is synergistic and logical (Interview 2). Logical in the perception of the capital market and plausible as to why an asset is useful to the portfolio. This approach is in corporate strategy often described as a "pure play"- strategy. A senior target firm executive explains that non-performing units or units with great value on a "standalone" basis do not necessarily have to be in the conglomerate from an investor's point of view (Interview 2).

Another respondent mentions that the disconnect begins when the asset is not sufficiently considered in a valuation, and the sum of part is significantly higher (Interview 4). That phenomenon is also referred to as a conglomerate discount, which describes a situation where the market value of a diversified conglomerate company is lower than the sum of the individual businesses or assets that make up the company. In other words, the total value of the conglomerate is less than the sum of the parts. Conglomerate discount is calculated as the difference between the market value of a conglomerate and the sum of the market values of its business units. This

Figure 4: Elliott analysis of EV/EBITDA of Alexion (taken from Elliott Advisors Limited).

discount occurs because investors often perceive diversified companies as having less focus and expertise in each business area than companies that specialize in a single industry or product. In other words, the asset is not fully utilized from a "best owner perspective", leading to high complexity, adverse diversification effects, inefficient capital allocation, and lack of synergies in a conglomerate structure (Interview 19). As a result, investors may be more hesitant to invest in conglomerates and may require a higher rate of return to compensate for the perceived risks.

Additionally, conglomerates may face challenges in managing multiple business units with different priorities and growth prospects, which can further contribute to the discount. One interview respondent stated that a conglomerate discount would - certainly be one of the most decisive factors (Interview 15). To illustrate, ThyssenKrupp AG, a German conglomerate, sold its elevator business ("TKE") to be more pure play due to the lack of synergies between elevators and its traditional steel business. According to Interview 12, there are various ways for an activist to identify a conglomerate discount:

> *"(...) a very important one is returns over invested capital versus your weighted average cost of capital, not only at a group level but at a divisional level so that you can see whether each company division controls several divisions, is creating value for shareholders. Because sometimes, top companies, which is group performance in terms of return over invested capital versus the weighted average cost of capital, can obfuscate. That might be very positive but could be covering or hiding the underperformance of a division that has never actually met its own cost of capital. And that is because there are two or three other divisions that are, you know, knocking it out of the park every evening. They are earning so much more than their cost of capital that the group is allowed to maintain divisions that are suboptimal and destroying value."* (Interview 12).

Following this viewpoint, activists prefer maintaining a "pure play" focus. As one of the interviewees articulates, "Activists desire organizations to maintain a clear focus; they become uncomfortable if there are too many diversions" (Interview 20). Likewise, stated that activists have an aversion to conglomerates and diversification.

Third, capital structure. Target firms tend to have a "lazy balance sheet" where there is a lot of access capital, which could be used to pay out to shareholders regarding dividends or share buybacks. Intuitively that makes sense because if a firm, cash is not used to that generate higher returns on capital than interest rates. Conversely, having a low level of capital on the balance sheet hinders investments, leads to high debt levels, and makes it more complex to secure financing of M&A. Target firms with high levels of cash, as elaborated previously, can pay special dividends, or buy back shares, thereby on the one hand increase shareholder returns and the other overall shareholder value (Interview 4). Interview 12 further details that leverage levels compared to their peers are relevant.

> *"The more the target company is unlevered relative to the median and average leverage level of their peers in the industry, the more that company will potentially be a target because the activist will go in requesting greater leverage".* (Interview 12).

That makes intuitive sense since peer leverage levels indicate which amount of debt to assets can be maintained to run the operative business of the firm. Consequently, when a target firm has a lower level of leverage relative to its industry peers, indicating a lower debt-to-assets ratio, it tends to operate with reduced risk compared to its competitors. However, this conservative approach to capital structure may result in slower growth and a potential loss of competitiveness. Another respondent explained that very liquid balance sheets, either a combination of low net debt EBITDA or a reasonable percentage of cash as a percentage of your market cap, get you on their radar (Interview 18).

Next to internal and management-related factors, I observed that external factors that relate to the investor's perspective and are essential to understand why a firm becomes a target. To investors, various metrics such as stock price, dividends, and total shareholder return determine investors' receptiveness toward an activist's investment thesis. The stock price is one of the most visible metrics that reflects the market's perception of a firm's value. A rising stock price indicates that investors have confidence in the company's future growth prospects, while a declining stock price can signal the potential shortcoming of management strategy or a special event – For example, major lawsuits like the Bayer & Monsanto case. My prior elaborations show that undervaluation is a decisive criterion for the choice of the target firm (Interview 11). Interview 18 further breaks undervaluation down

to the target firms' divisions compared to its peers.

> *"(. . .) relative valuation, the sum of the part, the sum of the parts story, you look at the company versus each of the individual peer sets for each business. And when you're lagging, you're demonstrating that the status quo isn't sufficient."* (Interview 18).

In line with that view, Interview 2 explains the importance of valuation in activist situations as part of the 3V, which is Value, Variety, and Vote. Valuation involves the estimation of the financial value of a firm. There are various ways in corporate finance to determine the value of a firm, such as Discounted-Cash-Flow method ("DCF"), Multiples, or Price-to-Earnings ("P/E") ratios. All of these try to estimate the firm's intrinsic value, considering factors such as its earnings, cash flows, and growth prospects. Performing poorly on these metrics increases the target firms' vulnerability toward activism. (Interview 2). Interview 19 further explains that valuation primarily expresses the perceived potential for the share price to grow (Interview 19). The potential is often also defined by the relative potential compared to peer firms (Interview 4). The illustration 5 shows an analysis published in a letter from Elliott Advisors Limited ("Elliott") to the BoD Alexion ("Target firm") in FY20 (Appendix B1).

In the letter, Elliott proves to the shareholder of Alexion that the ratio of EV to EBITDA compared to the peer group has been significantly below expected. In five consecutive years, Alexion traded at a discount of 50 percent compared to other industry peers (Appendix B1). Stock performance is also compared to the index (Interview 5). However, not only the firm but also individual divisions are analyzed since the entire firm can be undervalued, but also individual divisions that drag down overall valuation (Interview 6). It is essential to emphasize that when they look at undervalued companies, they are looking at not companies that are "basket cases, but generally strong companies with reasonable cash flows" that are undervalued in the market (Interview 18). So next to an undervaluation, there must be a reasonable explanation if locked values could be resolved to increase the stock price (Interview 20).

According to another response, total shareholder return ("TSR") "is one of the first references for target identification" (Interview 2). That makes intuitively sense since, from an investor's perspective, next to any gains in the stock price, the dividend yield is an important metric that provides a more comprehensive measure of the return on investment than just looking at the stock price. It also indicates how receptive other shareholders are when the activist wants to implement changes (Interview 3). TSR is a financial metric measuring the total return an investor receives from investing in a particular company's stock over a specific period. TSR monitors the overall value a shareholder receives from his investment, considering both capital appreciation (changes in the stock price) and dividends, thereby including valuation and payments to shareholders. So weak Total Shareholder returns

result in a low shareholder payment, making investors more receptive to special dividends or share buyback, which results in higher shareholder value, specifically when it is inferior to peers and index over a longer period. The illustration 6 shows Third Point LLC ("Third Point") approaching the BoD of Nestlè ("Target Firm"), highlighting that total shareholder returns have been inferior to peers for ten consecutive years (Appendix B1).

Shareholders that received less in their returns on their investment are more likely to support the activist's thesis. One interview respondent explains that an activist selects a target firm by weighing how likely he is to implement his investment hypothesis by looking at shareholder structure (Interview 3). Similarly, interview 14 calls on the importance of the shareholder base as an important context (Interview 14). A high level of shareholder concentration can be crucial when an activist hedge fund makes an investment decision, giving the fund more significant influence over the company and its decisions. A high level of shareholder concentration enables an activist hedge fund to gain more voting rights and greater control with less investor interaction. Accordingly, the power and influence of an activist hedge fund can be amplified through the concentration of shareholders who are aligned with its investment thesis. As one of the interview respondents mentioned, the higher the shareholder concentration, the worse it is for the target (Interview 3). Another explained that they look for a concentrated shareholder base and have some other funds they know to leverage their thesis (Interview 20); however, in traditional companies such as BMW, where major shareholders such as the family, Klatten own around 45 percent of the shares. This makes it difficult for activists to launch successful campaigns against these companies, as the family shareholders are unlikely to support them (Interview 14). To improve the target choice, the activists often approach proxy solicitors and do a "deep dive" into the shareholder base to understand the shareholder profile better. One of the respondents explained that he wants to figure out whom to talk to when they need to escalate pressure here in any way, thereby elaborating on where people might be supportive and where people are not supportive (Interview 18).

4.1.2. Shape and style

Next to the target choice, different shapes, and styles" can vary in the effectiveness of creating value depending on the situation. As such, Activists appear in different shapes and styles - For example, some activist investors may be more aggressive, publicly criticizing management and demanding significant changes. In contrast, others may be more collaborative, working behind the scenes with management to achieve mutually beneficial outcomes. How a hedge fund engages a target firm is strongly associated with its incentives, size, credibility, or geography. The underlying rationale is that the complexity and situation make different engagement styles better suitable.

For most, Hedge funds are diligent and highly analytical financial investors generating alpha for their investors. How-
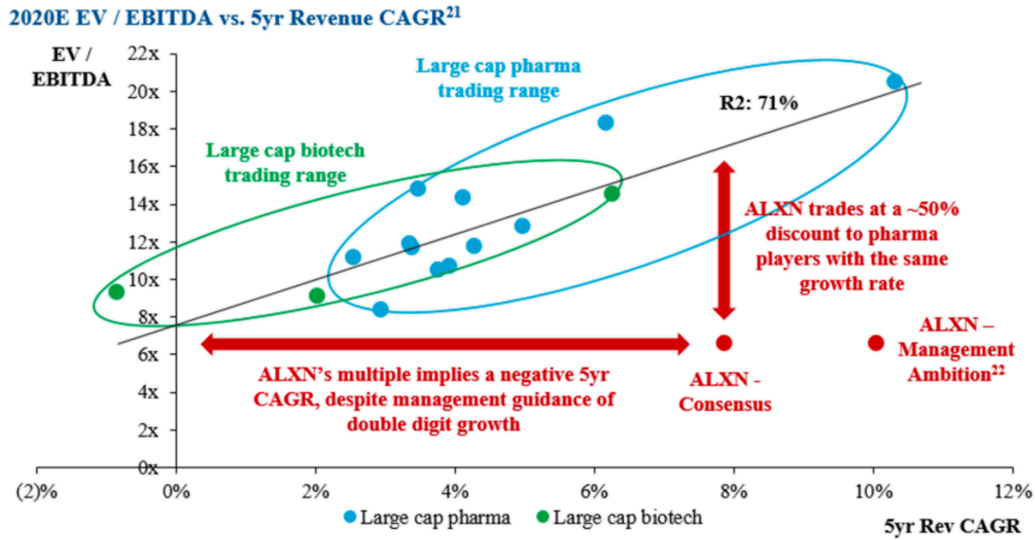
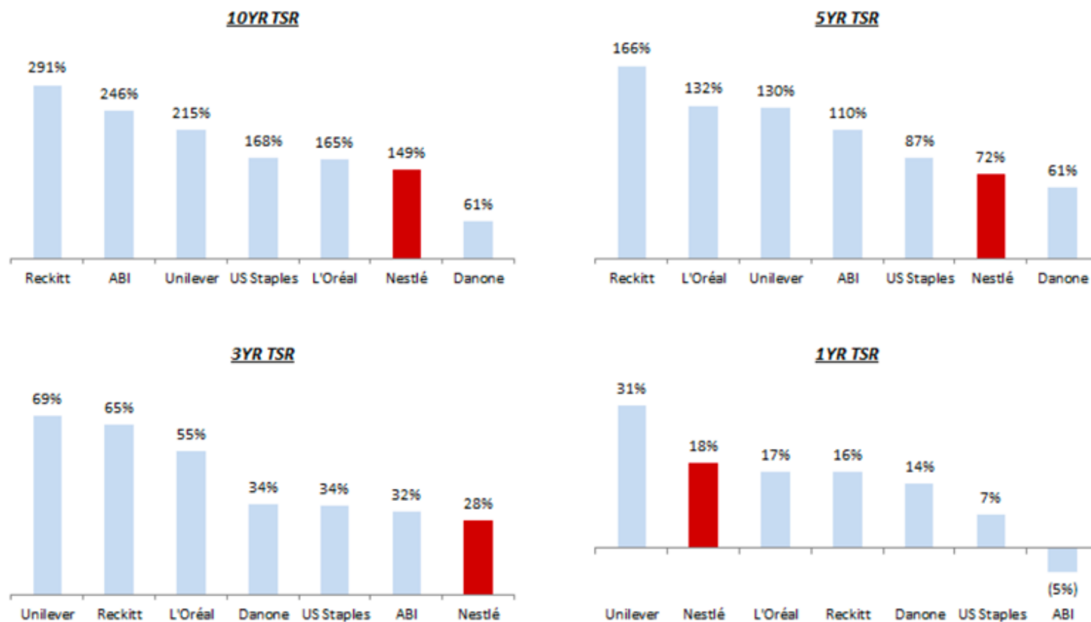**Figure 5:** EV/EBITDA vs. 5-year revenue CAGR (taken from Elliott Advisors Limited).

Figure 6: Comparing Nestlé's TSR to consumer industry peers (taken from Third Point).

ever, the way an activist engages can vary: (1) Value-driven activists build their investment criteria to find companies that are, undervalued and seek strategic or financial actions to unlock the value. (2) Activists who identified malpractice or financial opportunities to go short on a target firm bet on the demise of the share price (3) Special situation activists take advantage of situations in which decisions are directed to the shareholder base to benefit from arbitrage situations.

Interview 19 explains that it is not only about alpha but even about absolute returns. Thus, an activist wants to make more returns periodically, no matter what happens to the market. That makes intuitive sense since a hedge fund is responsible to its investors for producing dividends. Suppose a

hedge fund now drives an activist, so a particular investment or specific investment strategy in which the activist seeks to go into the dialogue with the companies, to change something, to force some activity (Interview 19). This change must resonate significantly with the capital market since a hedge fund and returns must be greater than the market average due to the greater risk for their investors. To follow up on that fund's hedge market and industry risk, thus generating an idiosyncratic risk profile. In other words, the alpha they create should not be the one that moves the general market but reflect greater returns (Interview 4).

Connecting these two statements: The incentive of a hedge fund is to increase the value of the underlying invest-

ment so that the hedge fund can pay its investors higher dividends than the market average. Since a hedge fund pays its investors yearly dividends, the investment needs to increase in value within a specific time frame. One could now assume that investments are structured so that each year on investments pays off; however, it seems reasonable to assume that every investor, particularly a hedge fund, intends to maximize returns as fast as possible.

Interview 6 emphasizes that there are different types of hedge funds and that there are those that invest for the very short term and those that invest for the long term. Accordingly, in a proxy statement filed by Pershing Square Holdings, Ltd ("Pershing Square") directed by Bill Ackman, the hedge fund explains ADP ("target firm") that it "intends to be long-term shareholders and will only propose changes that are in the company's long-term best interests" (Appendix B3).

One exciting statement of an interviewee associated with that is that the long-term benefit is more of a quote-on-quote "fortunate coincidence." Or, as another senior executive at Interview 3 indicated, a sign that something went wrong. The reason is that the activist does not have the staying power to concentrate on one investment to unlock the long-term value frequently. My findings suggest that the reasons for that are twofold. On the one hand, a hedge fund's objective is to have the liquidity to have sizable positions to increase or decrease a position in a firm – For example, to stay agile and use capital most efficiently if there is an investment opportunity. On the other, their incentive system, through the carried interest of the profit they generate for investors, does not enable them to stay long-term. A viable argument for that is if you suggest significant change so that the target firm will be better off in five years if they do specific changes, the investor will need to stay those five years invested. Agreeing with that, an interview respondent mentions that:

> *"(...) many times, corporate strategic decisions unlocked value in the long term and do not create value in the short term, rather the opposite, because sometimes you have to make large investments or take actions short term that are not enhancing earnings to be a stronger company and create value for the medium to long term"* (Interview 12).

Next, an interviewee explained that some activists *base their campaigns on overvalued companies instead of being undervalued and betting on their demise* (Interview 3). As a result, the campaigns are utilized to explain to the capital market why a company is overvalued or sometimes even why the company might be a fraud. This practice refers to so-called short strategies. Short selling, commonly referred to as "going short" on a stock, is a trading strategy wherein an investor borrows shares of a stock from a broker, sells them in the capital market, and anticipates repurchasing them later at a reduced price to return to the broker. The investor will make a profit if the stock goes down but stand to lose if it goes up. The risk of short selling is that there is no limit to

how high a stock price can go. This means that the potential for loss is unlimited. There are prominent cases in which a hedge fund exposed itself to a short strategy, such as Pershing Square Vaillant (Appendix B1).

Besides short-selling and value-driven activists, there are also so-called arbitrage activists. One banker explains that bump arbitrage has attracted many activists, *"especially in Germany, and has been the entry point for many funds in the German market"* (Interview 6). Bump arbitrage refers to situations where a buyer pushes for a squeeze-out. A squeeze-out situation occurs when a majority owner group of a firm decides to "squeeze out" or "push out" the remaining shareholders and take full control of the firm. Generally, 75 percent is the required threshold for a domination agreement to achieve a squeeze-out threshold of 90 percent is usually more expensive for the majority shareholder so that the remaining shares are acquired at a premium at a price higher than the current market value of the shares.

The activist can then buy in the tender and demand a higher price, which the acquiring firm needs to pay (Interview 14). Then there are two outcomes. When the deal drops, the acquirer must pay your shareholders a 5 percent guaranteed dividend (MD, Interview 6). Next, to bump arbitrage, there are M&A-related arbitrage situations where one buys stock in the acquiring and acquired firm, where you take a short in the acquiring firm and a long position in the acquired, since in a merger, prices for the acquired firm tend to decrease while the other increase. Interview 4 adds that some activists also engage a target firm to prevent large takeovers because they expect that the target firm is overpaying and there need to be more synergies to pay the price.

"If you compare the larger to the small funds, you see that campaigns and implementation differ; An interview respondent mentioned that he thinks that's a differentiator as to why there are certain activists who are more aggressive and more public than the others (Interview 6). In line with that, another interview respondent elaborated that *mostly "the smaller, newer, high momentum* funds are more incentivized to go public more quickly. According to Interview 9, that's due to their incentive to build or raise their profile. The larger the size, the more established and the longer the track record, the more a hedge fund becomes institutionalized. However, the interviewee argued that it does not impact their general willingness to go public. Still, they choose to go public if they feel they're not getting anywhere bilaterally with management (Interview 9).

Similarly, Interview 2 explains that *"the ability to lead a campaign is an important distinction."* The respondent points out two significant questions regarding the size and ability of an activist: First, who can lead campaigns? Second, who follows? Referring to the campaign leadership *"the higher you go in the escalation level, the fewer people there are that have the appetite, the resources, and ultimately the burning issues to do that"* (Interview 2). The second question refers to a typical problem the activist faces "ownership vs. control," which results from the activist's small ownership. To overcome this, activists must talk to other activists or share-

holder, and convince them that their analysis and arguments must be implemented to gain control. Larger groups of activists and shareholder are called "wolfpack" by practitioners (Interview 6). The term "wolfpack" is often used to describe activists who aggressively pursue their goals, using tactics such as public criticism, shareholder proposals, and proxy fights. Interview 15 further deepens that substantial funds have multiple strategies, so size is a factor that impacts the way a hedge fund engages a target firm.

Next to the size, credibility is essential to consider when talking about hedge fund engagement (Interview 19). high-lights that track record and reputation are critical success factors for everything concerning the capital market. Accordingly, mentioning that credibility is closely associated with the quality and potential of the activist proposal. In line with that, Interview 20 highlights that credibility can be seen as the "currency" for an activist because if they cannot get anyone to follow them, *"they basically don't have a business"*. Further highlighting *"the activist must be very mindful the whole time"* navigating through capital markets time (Interview 15). Consequently, the activist continuously reflects on *"Can I win?", "Is this going to create value for the other shareholders?".* Reflecting these question makes intuitively sense since the unsuccessful campaign and unachieved propositions do not cause other shareholders to believe in success the next time. Agreeing with that, the Interview 20 further mentions, *"If they do not create value, other shareholders will be less likely to follow me next time"* (Interview 20). Interview 12 further explains that:

> *"Public perception and brand name are crucial to their success. Indeed, it's kind of the most significant barrier to entry of that type of business is your track record because the more successful you have been in your campaigns or in unlocking value out of targets you have selected to invest in, the more your campaign thesis will resonate more quickly with long goal investors. They'd pay attention to what they say because they would be afraid to miss a good investment opportunity if they didn't follow you"* (Interview 12).

Associated to the impact of credibility on the capital markets Interview 4 response:

> *"(. . .) you often see a short-term pop because you have many investors who just say okay, especially with credibility, so if you're not so creditworthy, you see less event community. So now think again of your investors, the smart funds, the smart money. They carefully look at who invests in a case like this"* (Interview 4).

Event community represents similar as mentioned in chapter 4.2.2.2. Followers in terms of other activities ("Wolfpacks"), but also other large shareholders such as mutual, pension funds, and the broader public that act on the announcement of the activist and cause a pop in the stock. He further mentions that this event community evaluates if it is:

> *"(. . .) someone rattling the cage or someone who has done some work comes in with credibility and says," Okay, there must be something, I'll go along with that. You often see a pop that is also driven by the event community, other funds that say okay, "trust this guy," or that of, and then I'll go with it. But you also see with others that it's not necessarily the smart money that goes along, but other investors who jump out and sometimes long only. They say, "Hey, maybe there's change, and then we'll see what happens," according to the motto that it's not necessarily sustainable afterward because then you come in and make a bit of a racket, but that may or may not lead to anything at that point* (Interview 4).

However, credibility can also affect smaller activists' engagement with a shorter track record (Interview 19). In line with that, Interview 18 explains that activists and shareholders are not given credibility, they must fight hard, and that's partly why they were much more public and had to be more public more quickly" (Interview 18). The theme was also taken up by another respondent who explained that it is essential to convince the event community that they have the "power" to make the next fund they launch, more prominent in investment size. Building on that, the interviewee notes that it is not about making returns on every engagement but, sometimes, as a marketing for the next fund and their portfolio to grow (Interview 6).

The geographic location and jurisdiction have a notable impact on hedge fund engagement. Based on my research, it is evident that the approach taken by activists in engaging the target firm can vary significantly depending on the country, particularly when comparing Germany and the United States. Interview 2 highlights this difference: "The first important distinction to consider is whether the activist is American or not." This emphasizes the significance of considering the nationality or origin of the activist when analyzing their engagement strategies. Agreeing with that, another interview respondent highlights a particularly significant difference in engagement (Interview 17). The statement makes intuitive sense to me as the United States economy operates on a shareholder-centric model. This model emphasizes the firm's primary responsibility to maximize profits and enhance shareholder value through dividend payments and share price appreciation. Correspondingly, pronounced stakeholder approach in Europe is the fundamental reason for the notable disparities observed between the two regions. The strong consideration given to various European stakeholders contributes to the contrasting approaches to shareholder engagement. In economies that prioritize stakeholder thinking, the BoD is bound by obligations to the shareholders and the various stakeholders involved. The stakeholder approach considers all stakeholders' interests and is responsible for balancing their interests. As dividends and share prices are important, employment and wages are essential for employees and long-term contracts for a supplier. Interview 2

declares that activism in jurisdictions with more stakeholder thinking, such as Germany and France, differs significantly from countries like the UK, Nordics, Switzerland, and Italy (Interview 2).

Similarly, an Interview 9 mentioned that shareholders in the US are more open to having the shareholder dialogue: In continental Europe, there seems to be a prevailing perspective that shareholders are granted an opportunity to express their views during the Annual General Meeting (AGM) once a year. It is perceived as the designated time for shareholders to take the podium and voice their opinions. However, for the remaining 364 days of the year, the expectation is that shareholders should remain silent and refrain from actively engaging with the company (Interview 9).

Another interviewee mentions Japan as another jurisdiction where shareholder activism seems less present than in the US. This observation may be attributed to the prevalence of cross-shareholdings in Japan, which can deter shareholder activism. As such, Japanese firms hold shares in each other, and they have an understanding that if any outsider comes in, for example, to try to do a hostile takeover or if an activist were to come, or if any other external party tries to tell them what to do all the other corporates vote with the management. The companies within a particular network tend to support each other's management teams, as they know that mutual support will be reciprocated in return.

4.1.3. Resolving approach

The most intuitive finding affecting hedge fund engagement is the choice of measures and associated communication with the capital market. Measurements refer to any actions taken to resolve the undervaluation and unlock value. Measures are generally related to the area where the weakness is identified. Accordingly, measures introduced and proposed by a hedge fund generally relate to the target firm characteristics identified in Chapter 4.1.1.1. So, for example, keeping all conditions equal, an interview respondent explains that when a firm is trading like its peers, on the exact multiples, not undervalued in terms of share price, trading in the middle of the pack compared to its peers, the balance sheet is levered correctly, but one out four divisions is a "stellar performer."

Consequently, the proposed measure by an activist is to sell the underperforming unit and reinvest returns in strong performing, most of the time core assets (Interview 12). However, it must be noted that measures are not mutually exclusive. Communication is associated with how hedge funds communicate those changes privately or publicly with the capital market. M&A is one-way activists solve undervaluation. One senior target firm executive explains that a break-up can make sense if there is a significant gap between the sum-of-parts valuation of the target and the market capitalization of a listed firm on the capital market (Interview 12). Elliott Advisors Limited ("Elliott") proposed such a measure in a letter to the BoD of GSK ("Target Firm") in FY21 (Appendix B1).

"GSK has a substantial value creation opportunity: We believe there is significantly more value to be realized at GSK with superior execution. Our analysis suggests that GSK has an opportunity to generate up to a 45% upside in its share price in the lead-up to its full separation and much more in the years beyond" (Elliott, Activist letter).

That makes intuitive sense to me, as it is logical that companies that do not complement each other cannot generate synergies, which hinders the realization of their full potential. The unlocking of value occurs because, within the capital market, there may be a potential acquiring entity better suited to own the asset in terms of its ability to create synergies. As a result, this acquirer is willing to pay a premium for the takeover, recognizing the potential for enhanced value through synergistic effects. This also links to core versus non-core businesses associated with conglomerate discounts that can be unlocked through M&A. For example, ThirdPoint LLC. ("ThirdPoint") suggested Nestlè ("Target firm") in FY17 monetize the L'Oréal stake ("asset of target firm") because the portfolio is "not strategic and shareholders should be free to choose whether they want to invest in Nestlè or some combination of Nestlè and L'Oréal"; Furthermore, they suggest reevaluating the portfolio comprising over 2000 brands in the Food & Beverage and Health care market to unlock value (ThirdPoint, Activist letter).

On the other hand, I was surprised to learn that activists prevent M&A deals. An activist who wants to avoid a takeover does so in the belief that the buyer will overpay and miss synergies (Interview 6). In addition, selling off specific segments, i.e., focusing on certain business segments and giving up non-profitable divisions, can also be a measure, i.e., through a spin-off (Interview 14).

A frequent measure taken by activists is related to corporate governance. That includes personnel change in the BoD (Interview 2). Interview 4 concurs with this perspective and further note that in Europe, in a two-tier governance structure, the focus is not typically on directly replacing the CEO but rather on attempting to change the Chairman of the Board. Furthermore, replacing and proposing a candidate for the BoD serves as the "entry angle" for the hedge fund to have greater transparency and scrutiny of the firm's operations. Interview 11 highlights that in Germany, for instance, removing the CEO requires obtaining a 75 percent majority of the members of the Supervisory Board. In addition to CEO replacements, compensation issues are important in activist engagements. (Interview 11). That makes it intuitive because most target firms are undervalued, suggesting management compensation should be lower and utilized to improve the business. For example, Trian Fund Management, L.P. ("Trian") approached Disney ("Target firm") in FY23 and called for a set of governance changes. Trian explains that the targe firm failed to plan succession, over-the-top compensation, and minimal shareholder engagement, including an apparent unwillingness to engage constructively with Trian (Appendix B1).

Corporate governance includes Environmental, Social, and Governance ("ESG") measures. Within corporate governance, activists identify weaknesses in ESG strategy and propose measures there (Interview 12). Interview 6 explains that ESG is a relatively new field for activists to propose measures. However, it becomes essential through societal reshuffling and public pressure. Interview 12 explains that this includes typical questions such as: Have you done enough for your firm regarding environmental stewardship? Are you effectively minimizing your carbon emissions? or are you sufficiently diverse in your BoD (Interview 12).

Additionally, frequent measures are to reduce gender pay gaps and introduce quotas for gender diversity in BoD (Interview 19). According to another interviewee, activists sometimes utilize "perceived valuation triggers" when a change in the BoD occurs. They anticipate positive returns from this change. Interestingly, activists may suggest a course of action that would have happened regardless of their involvement. Subsequently, the activist can claim success when the share price rises by 10 percent to 15 percent. This measure and strategy are commonly known as the "Free rider" approach, where the activist takes advantage to enhance their perceived impact. Another measure activists frequently take relates to capital allocation. That includes, on the one hand, the steering of capital structure. For example, when there is too much cash on the balance sheet to relevel and adjust through a change in dividend policy, initiation of share buyback, or special dividend unlocking the value (Interview 2). Interview 18 explains that extracting capital from the firm through a share buyback makes liquidity and a few other items essential.

For example, in ThirdPoint LLC. ("ThirdPoint") versus Nestlè ("Target firm") case, the activist explains, "Buybacks offer an attractive alternative to M&A given the high multiples in Nestlé's sector, offering similar EPS uplift with none of the integration risks." (ThirdPoint, Activist). Another case was between Trian LLC ("Trian") and Disney ("Target Firm"); Trian explains that Earnings per share ("EPS") decreased, target firms management showed poor judgment on M&A efforts overpaying 21st Century Fox assets and bidding aggressively for Sky plc (Appendix B1).

It should be noted that high cash levels are not pleasant situations for Boards. There are situations in which cash and capitalization are held for M&A, not only because it is a safety buffer but because they may have plans, they do not want to share (Interview 4). However, the issue of share buybacks is ultimately also a declaration of failed management since they don't know what to do with the money (Interview 11). Building on that, management became more professional since capital allocation and lazy balance sheets were more present 15 to 20 years ago. An interviewee mentioned seeing much less today (Interview 3). However, to a target firm executive, "Governance is always just a crutch. The activist is a financial investor who is only interested in financial gain and has no altruistic motives."

Operative changes encompass actions that pertain to the operational aspects of a business. Proposed measures typically involve enhancing operational efficiency, making cost structures more competitive, reducing headcount or full-time equivalents (FTEs), and implementing reorganization efforts. These measures aim to optimize the company's day-to-day functioning and drive improvements in its operational performance (Interview 7). This means operating margins must be improved, increase growth, and optimize cash flow (Interview 2). Margins generally refer to revenue and key financial performance indicators relative to revenue. Accordingly, consider Gross Profit ("GP"), EBITDA, EBIT, and Net Income - margins when it comes to the Profit and loss ("P&L") statement.

Making operational changes requires hard work, which means headcount reduction and some adjustments to the footprint on time (Interview 2). Accordingly, operational changes require a deep understanding of the business, take a long time to implement, and positive returns will be effectively produced even after that. Furthermore, it must be considered that activists have an outsider's perspective and no inside data on different businesses (Interview 20). In line with that, another interviewee mentions that an activist understands the capital markets, but their expertise needs to be running a firm. There are also situations in which significant cost-cutting is also the reason for an activist to go against management – For example, ThirdPoint LLC ("ThirdPoint") and Sotheby's ("Target firm") (Appendix B1). In this case, the cost-cutting was, according to ThirdPoint, not the right strategic decision. ThirdPoint explains in a letter to the chairmen:

> "(...) it is our understanding that it has been Sotheby's who has most aggressively competed on margin, often by rebating all the seller's commission and, in certain instances, much of the buyer's premium to consignors of contested works. We believe that Sotheby's should be competing based on the quality of its service, expertise, and ability to generate the highest possible price for its customer." (ThirdPoint, Activist letter).

According to a senior executive, activists often aim to facilitate a firm breakup. This involves initiating the firm's division into distinct parts or spinning off specific segments as separate entities. Such strategic actions entail selling or separating various business units or assets to create smaller, independent entities, eliminating the parent firm. This approach can help organizations focus on their core strengths and enhance overall financial performance, but it also has significant implications for the long-term trajectory of the firm. Additionally, Interview 11 suggests that there are instances were separating a firm and installing new management can prove advantageous. This implies that having a new leadership team in a separate entity can bring positive outcomes for the firm. Interviewees often associate Trian LLC ("Trian") and Dow DuPont ("Target firm") cases.

In my last discovery, I investigate the impact of hedge fund engagement on the communication of strategies and measures among the target firm, activist investor, and the

capital market. This communication occurs through both public and private channels. As my prior elaboration highlighted, when an activist believes there is an opportunity for value creation, they invest and initiate contact with the target firm's management to persuade them regarding their thesis (Interview 5). This is often initiated privately through a letter to the BoD followed by a personal dialog (Interview 19). Certain activists also meet with individuals with previous or current affiliations with the targeted firm. This interaction allows them to validate and assess the viability of their thesis. These individuals may have insights and knowledge about the company that can provide valuable input to the activist's analysis (Interview 2). This part of the communication is *"behind the scenes"* and is often characterized as *"friendly"*.

The extent of further communication typically depends on the response of the target firm's management to the initial contact made by the activist. As a Managing Director clarifies, the activist is awaiting indications of receptiveness and seriousness from the management to proceed with potential changes or further dialogue (Interview 7). On the other hand, the target firm's management receives the demands and communication from the activist and must contemplate how to respond to the contact. The mere receipt of the activist's letter places pressure on the management, as it can potentially escalate into a public engagement. As stated by one interviewee, "no target wants topics to be discussed in public." Consequently, the target firm's management frequently assesses its vulnerability, considering factors such as investor relations efforts and the management team's reputation (Interview 19).

If the management then engages not sufficiently with the activist, or if the activists feel that they are not being listened to and that this is being ignored for the wrong reasons, pressure is increased via public writing or writing circulated via media, such a measure is more confrontational (Interview 7). Accordingly, if there's a potential unwillingness from management and they ignore the criticism that the hedge fund is delivering, there's a certain level of frustration that reaches some point where the activist feels that he is not getting anywhere (Interview 18). Consequently, it highlights that public communication increases with an unwillingness to engage with the activist (Interview 19).

Interview 18 objects and explains that certain activists claim they only engage behind the scenes, but that is only partly true. Of course, they speak to the press and use it to their advantage. Next to these highly aggressive activists, there are also less publicly aggressive. Interview 12 explains that these seek private engagement with the Boards and executive management teams. They don't publish white papers; they don't publish their views. They don't aggressively or publicly try to discredit and undermine corporations (Interview 12). Sometimes they call themselves *"constructivists"*. They are interested in a private and constructive engagement with management to unlock value collaboratively. The higher form is the "suggestive," which only advises or suggests the target firm on the measures. However, Interview 18 explains that all processes start constructively except in unique situa-

ations. It's incorrect when people and advisors constantly come in and say: "The white paper comes out of the blue; it never comes out of the blue; There's always some sort of dialogue." (Interview 18). An interviewee mentions that this is sometimes very professional but can then also become very personal on both sides. For example, Klaus Kleinfeld ("Target executive") wrote a letter to the activist urging him to observe him and his private life (Appendix B2).

Generally, it can be observed that this step can be on a continuum from most publicly aggressive to least publicly aggressive. Interview 12 explains that the most publicly aggressive hedge funds run campaigns whereby they will publish their thesis directly through white papers. Consequently, everything will be fought in the public domain, which is usually quite detrimental and concerning for the target firms. Interview 6 also explains that contact is initiated with others long only. Sometimes also with other hedge funds' the formation is called "wolfpack." In line with that, an MD at Interview 4 elaborates on the nature of the communication between institutional investors and activists. Accordingly, there are discussions between both camps. Sometimes, institutional investors approach the activist when they feel insufficient movement, even suggesting the activist rattle the cage (Interview 4). It's more challenging when the target firm is in the public domain because, with all the inside knowledge, they can see the complexity, which is not necessarily driving the market. The interviewee refers to the fact that markets also tend to have inefficiencies and act on information quickly, sometimes neglecting the complexity of some data. Accordingly, the target firm, on the one hand, must work closely with the investor's relation department and, on the other, distill some of those messages to "win the hearts and minds of your shareholders?" (Interview 18). Another interviewee at Interview 4 refers to this point as information asymmetry a target firm must deal with and calls the interaction with the capital market "educational work"; Accordingly, the target firms need to explain the situation, and then you or do not have the market tolerance (Interview 4). One interviewee goes into more detail. Accordingly, it is crucial to demonstrate the "piece of math". So, the target firm knows about its business's valuation and current performance and can justify or present a detailed plan.

4.2. Effect on target firm
4.2.1. Direct effect

The direct effect represents the immediate consequences of the engagement on the target firm. My findings suggest that the effect of a hedge fund on a target firm is diverse and affects it in different ways, both in the short and long term. Moreover, measures identified in Chapter 4.1.3.2 affect the target firm during the engagement and after that. The following chapter provides an overview of how the engagement affected the target firm on these two-time horizons. The first effect on shareholder value often occurs when an activist investment is announced. Interview 19. explains that management's and all other market participants' expectation that something will change drives up performance and

share price, creating positive excess returns. But this is surprising because the activist has not changed the firm's performance. It is simply the market's expectation that there will be a discussion that drives the share price up. Thus, communication and reputation are crucial when communicating with the capital market. It is explained that the activist creates the impression of change, and reputation creates returns (Interview 19). Interview 12 explains that financial measures such as buying back shares or paying dividends are short-term strategic measures. Similarly, selling an undervalued firm and collecting a premium is a predominantly short-term measure (Interview 12). Another respondent adds that governance is short-term (Interview 2).

Raising forecasts because they are not ambitious enough is another short-term measure - For example, one of the interviewees recalls a situation in which the CEO went out to the market after four to six months of discussions and raised all the targets. As a result, the share price went up, and the activist left. On the earnings call, management could not meet those targets, and the target firm's stock price dropped. According to a senior target firm executive, activists are often interested in factors that can immediately affect a firm's value, such as management changes, divestitures, or improvements in ESG credentials. These actions can positively affect investor sentiment and help increase a firm's value in the short term (Interview 4). These actions can be implemented quickly and have a measurable short-term effect, which makes intuitive sense. Another interview respondent takes it further and explains that hedge funds want to change to be implemented as short as possible because the shorter, the higher the return on capital. That makes intuitive sense since financial investors want to generate returns for their shareholders as quickly as possible.

Moreover, changing the capital structure, doing spin-offs, putting firms up for sale, blocking management compensation, criticizing ESG strategy, or changing Board composition is implementable within twelve months. Accordingly, hedge funds rarely pursue operational measures and settle over the years because too much capital is locked in an investment. Moreover, activists rarely fire 20,000 people and wait for a better EBITDA margin in four years (Interview 3). Another interview respondent explains that:

> *"The problem is, and this is what the activists are looking for, is a substantial return of capital at the cost of Capex and bolt-on M&A. So, it can eviscerate your growth strategy going forward. It could be turned into an effective yield vehicle. So, in terms of long-term growth and valuation targets, that is intuitively not ideal"* (Interview 18).

Interview 4 explains that abnormal return often comes from when you bring about an M&A event because that's when the takeover premium crystallizes (Interview 4). To better understand that activists are good at assimilating information instantaneously and immediately given a view on the value of something. However, they do not go in-depth on

qualitative factors as they are hard to factor in. These factors are often not considered in the markets but can affect long-term valuation (Interview 20). One interviewee mentioned that he thinks it's an effective discipline mechanism, but it's there's a limit to it, and it can lead to some answers that are, you know, sometimes a little too short-term. It is difficult to change the firm's trajectory within a short period. Activists may not see the benefit of it in the longer term, but they can claim the public win because it caused the firm to take a specific action. A target firm executive explains that you can press certain levers in the short term and get a result in the short term. Financially, it is quite hard. Next to short-term measures, the more exciting part is to see how the interviewees view the long-term effect on the target firm. One exciting response to evaluate the shareholder effect on the long-term value also considering short-termism is that:

> *"There are not only the good in the long term versus the good in the short term, which is then bad in the long term, but there is also the good in the short term, which are also good in the long term. And there is also the good in the long term. Which are still not good in the long term because they are simply an alibi, an excuse for doing nothing in the short term* (Interview 19).

Accordingly, short-term actions do not always lead to long-term value loss. For example, a spin-off of a business in which two firms have no synergies creates value in the short and long term. Moreover, if the capital budgeting process deprives one division of much-needed investments in favor of another division that does not earn its cost of capital, splitting up the firms also creates long-term value (Interview 12). Often activists propose to lever or unlever a balance sheet changing capital structure. To better understand the effect on shareholder value. If the target firm was overcapitalized before, the hedge fund had a legitimate point. Is capitalization too weak afterward because the hedge fund paid out too much or because the management got carried away with paying out too much? It has negative consequences for the target firms and disrupts the operational activity in the future, reducing the firm's value for the future (Interview 14). This aligns with the view of an Interview 12 who further explains that operational measures such as cost cutting, restructuring, investing, reinvesting, and divesting take a long time to implement and produce returns (Interview 12). That makes intuitive sense since changes take time before they positively affect EBITDA. However, a cost-cutting program to improve quarterly financial performance is a short-term measure and will lead to underinvesting in the short term (Interview 12). Agreeing with that, an economic theory suggests that even short-term actions could be considered long-term if they make a firm more profitable in the short term. That is due to short-term cash leading to better competition and reinvestment opportunities in the future. However, implementing a cost-cutting program that leads to underinvestment will only create short-term value (Interview 4). A positive exam-

ple of a positive change in capital structure was the Bill Ackman ("Pershing Square") versus Nestlè ("Target firm") case. According to an interviewee, they initiate change processes that the firm absorbed in such an elegant way that, in principle, they accelerate performance in a very meaningful way.

However, looking at the campaigns and the motivation, the interviewee explains that operational campaigns are more noise and a way of getting shareholder support, suggesting that it is more about convincing the shareholder base. However, operational campaigns are mostly not the genuine motive activists seek. Although there are campaigns where operational change is why the hedge fund engages. However, activists that spend more time on operational changes are often less performant in generating alpha for their investors. Besides, it is much harder to accomplish because activists are not an operator (Interview 18). That makes sense, Interview 2 further explains that the execution of operational measures and a spin-off needs some preparation. However, he highlights that if it is a separate business, it can also be executed in the short term (Interview 2).

Interestingly, one of the interview respondents gives a perspective on determining the effect. Combining the previous statements gives a perspective on the effects of measures on shareholder value. First, does the proposed measure make sense in the longer term? In other words, does the short-term measure also make sense regarding the longer-term implications for the firm? Intuitively that makes sense because it allows for an objective. For example, a share buyback does not make sense in the long run when the company builds cash reserves for a suitable M&A transaction aligned with the core business. Second, is the measure implementable? Meaning that the measures must align with the shareholder base. For example, if you have core shareholders and more than 50 percent of the shares, it will be up to management alone to decide. An activist proposal can then be defeated with 50 plus-one ownership. So, it's always a question of feasibility or ability to implement and how strong your action is regarding longer-term value creation for the firm (Interview 3).

ESG seems to affect long-term engagement. One interview respondent argues that ESG activists are long-term activists that seek value optimization, long-term value optimization. Specifically, giant funds can really make a difference with their capital and have invested and take longer implementation and are often start in private conversations, trying to proceed analytically and efforts to come to terms with the management (Interview 6). Building on that, if the activist strives for Board representation, the probability tends to be high to the fund seeking long-term commitment with a longer-term value-creation effort. After all, these are usually designed to last at least a year, often even longer.

4.2.2. Indirect effect

The indirect influence of hedge fund activism refers to effects not arising from the direct interaction between the activist and the target firm. Instead, the market behavior influences shareholder value or the presence of activists which causes the target firm to act without hedge fund engagement.

Market response refers to so-called Halo effects, which are biases that occur when an initial impression or perception of an organization affects our subsequent behavior. One interviewee explains that with credible funds, "you see a sharp pop in stock price" (Interview 4). The reasons why that surprised me are twofold.

On the one hand, I expected any activist to cause that pop in the stock price since every activist has similar measures that he potentially utilizes. However, that highlights that reputation is essential to understanding the abnormal returns caused by activism. The interviewee further elaborates and explains that the shareholder considers credible activists as signs of change and quote-on-quote *"watch out! He may have a case and I'll go along with it" (*Interview 4). Similarly, interview 2 agrees on the effect and elaborates that the capital market acts because it expects something to happen (Interview 2). On the other hand, I was surprised that the market acts before change happens, and one of the bankers highlights that sometimes it is clear that some of the proposed measures "(...) have no chance to go through, but because there is an activist, the stock pops (Interview 3). On top of that, the interviewee explains that sometimes it is not observable since the activist buys a stake below the threshold and sells it off; nobody notices (Interview 3).

Interview 12 explains it is a self-fulfilling prophecy when a certain activist's track record and branded reputation align. Especially when the investment thesis is to unlock shareholder value and the activist makes its position public. According to the interviewee, that is due to everyone knows that it's likely that they will succeed, and they will likely be right. That is interesting since the price bump is not based on any fundamental performance or analytical tool (Interview 12).

The response of a target firm when an activist investor becomes involved is a critical factor in determining the outcome of the engagement. One interviewee notes that when activists target peers, the firm can take proactive measures to improve their margins and decrease the likelihood of becoming a target. This proactive response makes sense, as activists target underperforming firms relative to their peers. By improving their performance, firms can reduce their vulnerability to activist attacks and strengthen their position in the market (Interview 2). It is important to note that the response of the target firm must be proactive rather than reactive. A reactive response may indicate a lack of initiative or strategic planning on the firm's part, which could make them an even more attractive target for activists. Therefore, target firms must be aware of the potential for activist engagement and take proactive steps to improve their performance and decrease their vulnerability to attack. Future research could explore the effectiveness of different types of proactive responses and their impact on the outcome of activist engagements (Interview 2).

5. Discussion

My theoretical model, grounded in shareholder theory, makes several contributions to activist literature, and sug-

gests several corresponding directions for future research. The model in figure 7 conceptualizes the engagement of the hedge fund and target firms comprising the impacting factors on shareholder value. My model's overarching perspective presents an alternative view of the dimensions that shape hedge fund engagement. It proposes that to comprehend the effects of hedge fund engagement on the target firm, it is crucial to consider that hedge funds are not homogeneous financial investors; instead, engagements differ in target choice, style, and resolution approach. Each of these dimensions operates within a cause-and-effect framework, which is critical in determining the extent to which shareholder value is unlocked.

Moreover, the style of an activist is determined by the incentive, fund size, geography, and reputation, and illuminates which metrics are appealing to an activist, which firms an activist can target, and how successful the capital market will support the hedge fund. Target choice narrows down on the technicalities and target firm characteristics activists seek to engage and determines which measures are used to unlock shareholder value. Further contributions are conceptualized within this model and broader literature and logical structure to answer the research question of this thesis.

The first key contribution of my model is the explication of target choice. Research has consistently shown that activist hedge funds target firms that are undervalued in terms of stock price and have weak operating results, poor corporate governance, and inefficient capital allocation (Brav et al., 2015; Denes et al., 2017; Mccahery et al., 2016). My findings align and further suggest that target choice builds the fundament for the activist investment thesis. Moreover, this allows for a subjective reason based on analysis and represents the necessary "piece of math" to engage and justify why the target firm needs to change.

Scholars such as Denes et al. (2017) have observed that target firms tend to exhibit poor stock returns, sales growth, and market-to-book ratios. However, other scholars, such as Brav et al. (2008), Clifford and Carey (2008), and Jory et al. (2017), have found that certain metrics, such as return on assets or return on equity, respectively, tend to be high. These conflicting findings suggest that hedge funds may target firms not performing poorly on all levels (Denes et al., 2017). Instead, hedge funds target firms with special operating characteristics that can create shareholder value. However, we need to learn more about the exact metrics activists seek.

In my research, activist investors tend to target firms with diversified portfolios that exhibit conglomerate discounts, which occur when a parent firm's valuation is lower than the sum of its subsidiary parts. These firms often have a broad portfolio, leading to complexity, inefficient capital allocation, adverse diversification effects, and a lack of synergies. As a result, the capital market perceives these firms as having less expertise and focus, resulting in a loss of shareholder value. Activists target these firms because investors can diversify and optimize their returns. This leads to double diversification and inefficiency, causing the firm to be run in a way that

is not in the shareholders' best interests.

Furthermore, management may allocate capital to non-core assets that do not produce synergies, leading to operating inefficiencies. Activists identify these target firms by measuring invested capital versus the weighted average cost of capital at the divisional level to ensure each division produces shareholder value. They check that one division is not earning significantly more than its cost of capital, causing the group to maintain divisions that are destroying value. Activists propose a spin-off or divestiture of non-core assets to unlock shareholder value. A potential acquirer may be willing to pay a premium for these assets and use them synergistically in their portfolio, leading to higher returns for the shareholders. The target firm can use this premium to strengthen its core business or return it to shareholders through share buybacks or dividends, ultimately increasing its value.

Research is needed on the optimal level of diversification necessary to create value. One possible area of inquiry is the nature of the relationship between diversification, hedge fund engagement, and shareholder value. There may exist a non-linear, parabolic relationship between these variables, wherein an optimal level of diversification may be reached that maximizes the benefits of hedge fund engagement while simultaneously increasing shareholder value. While diversification can help firms spread risk across multiple areas and reduce exposure to individual market fluctuations, it may also dilute focus and resources. This may, in turn, impede the ability of firms to engage with hedge funds or deliver value to shareholders effectively. Future research can help firms better understand the trade-offs involved and make more informed decisions regarding their strategic direction by exploring the relationship between diversification, hedge fund engagement, and shareholder value.

My conceptualization of the impact of hedge fund engagement also suggests that shareholder returns and structure are essential in the targeting process of a hedge fund activist. In the prior elaboration, I build and extend the ongoing debate on stock returns. Moreover, my theory offers an alternative answer to why stock price and shareholder returns are key characteristics of a target firm.

To date, literature has extensively debated the relationship between stock returns and the likelihood of a firm becoming a target of shareholder activism. While some scholars suggest that low returns are associated with a higher likelihood of becoming a target (Clifford & Carey, 2008; Denes et al., 2017). Others argue that high stock returns are more likely to attract activist attention (Klein & Zur, 2009). However, there needs to be more research on why stock returns are a significant factor in the targeting process.

I suggest significantly impacting the likely hood of an investment thesis resonating with the shareholder base, which is necessary to implement the change. Specifically, low total shareholder returns, which are the overall value a shareholder receives from his investment, tend to characterize a target firm. Moreover, TSR is the first reference an activist looks at and suggests a connection between an investor's willingness to support the investment thesis and low total share-
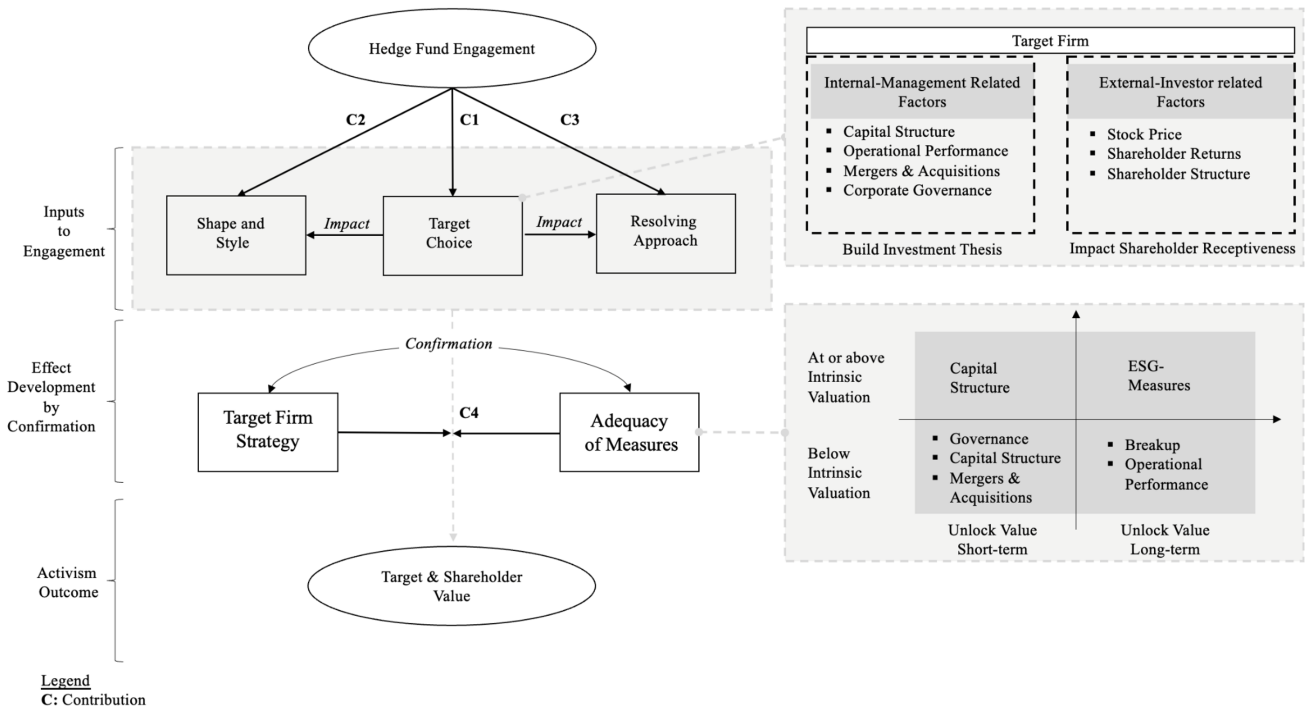
Figure 7: A Shareholder theory-based model of the hedge fund-target firm effect.

holder returns. The reason is that the combination of both low capital appreciation and dividends negatively impacts shareholder returns making the investor more receptive to short-term measures to unlock value - For example, spin-offs of non-core assets or special dividends. My research further expands that next to shareholder returns, the shareholder structure is vital in determining a target firm; however, it is scarcely covered in prior literature. I identified the three areas within shareholder structure that are important for target selection profile, structure, and concentration. These factors are crucial in the targeting process of an activist to make the investment thesis resonate effectively with a significant proportion of the shareholder base.

Accordingly, activists interact with other shareholders, former executives, and senior employees of the target firm to challenge its investment thesis. Moreover, activists often approach proxy solicitors and "deep dive" into the shareholder base to understand the shareholder profile to figure out whom to talk to when they need to escalate pressure. Accordingly, activists elaborate on which thesis shareholders might support or not. Doing so is essential because the minority share of an activist need to be scaled to implement change, and shareholder structures make engagement detrimental to an activist. I propose that the Activists seek targets firms with a highly concentrated shareholder base or have some other funds they know to leverage their thesis. Moreover, a high level of shareholder concentration enables an activist hedge fund to gain more voting rights which are essential to increase pressure on management and the likelihood of succeeding in a proxy contest. However, targets firms with large shareholders that support management are

unattractive to activists. I further propose that shareholder structure, especially the profile, impacts value creation. Because, like hedge funds, other funds and shareholders have incentives and are supportive of different proposals impacting the measures and, thereby, the shareholder value.

While the literature has shed some light on the effectiveness of hedge fund activism in improving the performance of targeted firms, more research is needed regarding the influence of the identity and characteristics of the target firm's shareholders on the outcomes of such activism. Perhaps, future research could investigate how shareholders' size, concentration, and investment horizon affect their level of support for hedge fund activism and, consequently, the success or failure of such efforts. Institutional investors represent a critical stakeholder group that warrants closer examination in the context of hedge fund activism. As large-scale investors, institutional investors have the potential to shape the outcomes of activism campaigns through their voting power and influence on corporate governance decisions. Therefore, a better understanding of their attitudes towards hedge fund activism, including their motivations for supporting or opposing such campaigns, through more qualitative research could provide valuable insights into the potential for activism to drive positive change in corporate performance.

The second key contribution of my model is the explication of the dimension shapes and styles of activists that shapes engagement. In my prior elaboration, I suggest that hedge funds may approach engagement with target firms differently. For example, some hedge funds prefer to negotiate privately with management behind closed doors. In contrast, others prefer to take a more public approach, making de-

mands through the media or filing public proxy statements. In addition, some hedge funds focus on short-term gains and push for changes that can quickly drive up the stock price. Others are more focused on long-term value creation and push for changes that can lead to sustainable improvements in the firm's performance. Consequently, I build a new theory on the impacting factors to hedge fund engagement.

Scholars have identified three distinct types of activists. The first type of activist targets overvalued firms and seeks to profit by betting on their decline. This can occur due to market inefficiencies, malpractice, or other factors that lead to inflated stock prices (Aquila, 2021). The activist will use financial instruments to go "short" on the target firm and actively communicate their thesis with the capital market. If the market perceives its thesis as credible, stock prices will fall, decreasing shareholder value for most shareholders. The second type of activist is value-driven and seeks to increase shareholder value by pressuring management to operate more efficiently (Aquila, 2021). These activists look for "locked-in" values within the firm that can potentially increase the stock price. By advocating for changes in corporate governance, executive compensation, or other areas, they aim to improve the firm's valuation and create long-term value for shareholders. In addition to these two types of activists, special situation activists focus on decisions that directly affect the shareholder base. These activists may seek to influence M&A, shareholder buybacks, or other strategic decisions that could impact shareholder value (Aquila, 2021).

As per my previous analysis, it is evident that hedge funds have dissimilar motives for participating in activism, which is consistent with the research by Aquila (2021). Nevertheless, I argue that irrespective of their approach, their primary goal is to generate alpha for their investors, which is their core responsibility as financial investors. Therefore, if they determine that shorting a stock is the most effective approach to achieving their objective, they will do so. Alternatively, if they identify a firm's division that is not generating returns that cover the cost of capital, they will strive to create value by spinning. Moreover, special situation activists are attracted to technical arbitrage situations that do not aim to improve value.

Additionally, my findings expand on prior literature, and consequently, I suggest that the size of the hedge fund, its credibility, and its geography impact engagement and its ability to produce shareholder value. Looking at the size of a hedge fund, I find that the smaller, newer, high-momentum funds are more incentivized to go public more quickly. That's due to their incentive to either build or raise their profile. I suggest that to build their profile, these activists focus on short-term measures. This is because engagement, especially long-term measures such as operational improvements, is cost intensive. In line with that, credibility is connected to the proposal and track record. In my findings, I suggest that credibility is the currency for an activist because they need to sell their thesis to the capital market. Accordingly, if an activist engagement fails, other shareholder investors are less likely to follow the next time. Geography is about the juris-

diction; in a stakeholder economy like Germany, a two-tier Board impacts how and how a hedge fund engages with a target. On top of that, in a shareholder-orientated economy, there is more engagement.

More research needs to be done to explore how hedge funds' geographic location, size, trustworthiness, and incentives influence their engagement with target firms and their ability to create shareholder value. While hedge funds operate in different geographic regions, their objectives, and strategies for engaging may differ based on the market in which they operate. Therefore, the impact of geography on engaging and creating value remains unclear. In addition, the size of the hedge fund is another critical factor that may influence its ability to engage effectively with target firm. Larger hedge funds may have more substantial resources and more extensive networks, enabling them to exert greater influence on the strategic direction of the target firm. However, smaller hedge funds may be nimbler and more flexible in their investment decisions, allowing them to take advantage of emerging opportunities.

The third key contribution of my models is detailing the hedge fund resolution approach. Previous studies have identified various measures used by hedge funds based on SEC filings but have not thoroughly explained them. Therefore, by providing a more comprehensive understanding of the measures used by hedge funds to resolve firm undervaluation, my research extends existing theory.

Scholars identified that activists use various measures to resolve target firms' undervaluation (Bebchuk et al., 2020; Brav et al., 2008; Gillan & Starks, 2007; Klein & Zur, 2009). These measures include proposals related to corporate governance, such as changes to Board composition, seat acquisition, and compensation reductions (Bebchuk et al., 2020; Gillan & Starks, 2007; Klein & Zur, 2009). Another common approach is through M&A, which may involve selling a firm or opposing a merger (Greenwood & Schor, 2009). Other measures include balance sheet changes, such as share buybacks and dividends, and operational improvements, such as breakups, personnel cuts, and KPI enhancements (Bebchuk et al., 2020; Brav et al., 2008).

I propose that measures differ for the activist's styles shown before. Accordingly, short seller and special situation activists focus on financial measures or technical situations which do not enhance shareholder value and, therefore, differ from value-driven activists. Furthermore, my prior elaboration extends that measures are not mutually exclusive and often relate to each other, which is not yet covered in the literature. For example, governance measures, such as ESG issues, are used as a pretext to place the actual reasons that would more obviously generate more value.

While some studies have focused on identifying the measures proposed by activists through SEC filings, there is a need to go beyond this and understand the specific reasons behind these proposals. This could involve analyzing the letters and proposals submitted by activists to identify the underlying motivations and goals behind their proposed measures. Moreover, it is important to track which measures

were ultimately implemented and how they influenced the target firms' performance. This can provide valuable insights into the effectiveness of different activist styles and measures in creating shareholder value. To achieve a more comprehensive understanding of the relationship between activist styles and measures and their impact on shareholder value, future research could employ a mixed-methods approach.

The fourth key contribution of my model is its explication of measures and their impact on shareholder value. It builds and extends on the recent discussion on the long-term consequences of activism on shareholder value that has to date, consistently shown that hedge fund activism can positively affect the target firm in the short and long term.

Scholars find that hedge fund engagement causes economically significant and statistically positive abnormal returns. Specifically, around announcement day, hedge fund activism leads to positive average abnormal returns in the 7 to 8 percent range (Brav et al., 2008). Narrowing the effect down to a particular measure, the largest positive returns result from changes in business strategy, such as refocusing and spinning off the non-core asset (Brav et al., 2008; Clifford & Carey, 2008; John et al., 2014). However, some scholars believe that activist engagement is focused on short-term increases in stock performance and returns which ultimately lead to value destruction in the long term (John et al., 2014). Accordingly, the key question addressed by Commissioner of the Security Exchange Commission ("SEC"), Daniel M. Gallagher, persists that activist hedge funds drive long-term value creation or whether short-term gains to activism are at the expense of long-term corporate growth (Security Exchange Commission, 2015).

My systematic approach advances the ongoing debate by conceptualizing the impact of hedge fund activism on shareholder value. It offers an alternative view of the long-term effects, considering the correlation between value creation and the adequacy of measures to unlock value. I suggest that a hedge fund creates long-term value when proposed measures aim to solve the target firm's undervaluation and confirm the long-term strategy of the target firm. The figure 8 illustrates the adequacy of measures to unlock shareholder value.

My 2-dimensional matrix assesses the adequacy of measures proposed by a hedge fund activist to address the undervaluation of a target firm. The y-axis of the matrix represents the firm's current stock market valuation, while the x-axis represents the benefit horizon of a given action. The cells in the matrix represent different combinations to evaluate the adequacy of hedge fund measures based on their expected impact on the firm's value in the stock market over different time horizons. For example, measures that have a short-term impact on the firm's value, such as a spin-off or leveraging the capital structure, will boost valuation in the near term.

Moreover, hedge fund activism tends to focus on undervalued firms, where a range of short-term and long-term measures can be implemented to unlock value. Measures such as governance, capital structure, and spin-offs can be implemented within a relatively short period of time. These measures aim to raise forecasts, put firms up for sale, block management compensation, or change Board composition. On the other hand, strong-performing firms face less activism, but even they can face activist attacks that focus on financial engineering to improve the short-term valuation, such as changes to capital allocation rather than changing management or operational improvements.

As shown in my prior elaboration, hedge fund activism typically focuses on short-term measures and despite the short-term focus of these measures, scholars have found that hedge fund activism can lead to positive returns (Brav et al., 2008). I suggest that the effectiveness of hedge fund activism largely depends on the circumstances in which it is applied. While activists frequently use short-term measures related to governance, capital structure, and M&A, it is important to consider their long-term impact.

Further research is needed to identify the parameters that separate beneficial short-term measures from those that may have negative long-term consequences. It is also important to recognize that what may seem beneficial in the short term may not necessarily have positive long-term consequences. Activists and practitioners need to consider both short-term and long-term consequences when evaluating the effectiveness of proposed measures. There may be situations where short-term measures are necessary to address immediate issues, but there should also be a long-term strategy in place to ensure sustainable growth and success. Conversely, sometimes long-term measures may be necessary, but it is important to ensure that they are not being used as an excuse for inaction or avoiding taking immediate steps to address problems. Careful consideration of both short-term and long-term consequences is crucial for effective hedge fund activism and sustainable corporate success.

6. Conclusion and limitations

6.1. Concluding statement

Hedge fund activists' engagement with target firms and their Boards has become increasingly important in the shareholder landscape. This thesis provides a systematic overview of the effects, analyzing a comprehensive, hand-collected dataset characterized by long-standing target executives, leading investment bankers, and specialists, to identify the drivers and consequences to shareholder value. It is the first study to provide a holistic analysis of this multifaced phenomenon, and the findings have important implications for hedge funds, shareholder activism, and strategic decision-making literature.

I use the inductive approach proposed by Gioia et al. (2013) and the active categorization framework by Grodal et al. (2021) to provide rigorous qualitative research and identify the factors determining hedge fund engagement. I show that hedge funds are heterogeneous investors and engagement is shaped by target choice, style, and resolving approach of the hedge fund activist. Moreover, induced measures depend on the style of the activist and the target choice.
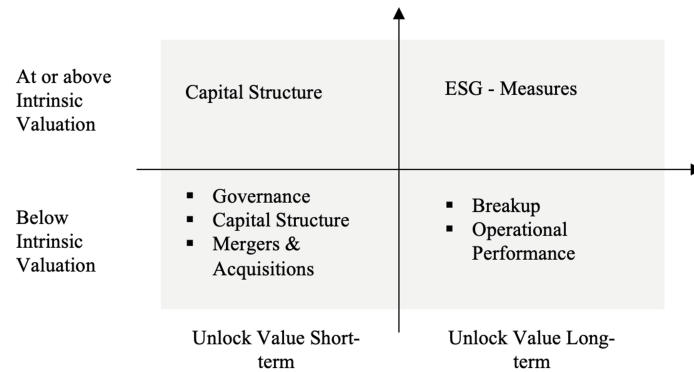
At or above Intrinsic Valuation	Capital Structure	ESG - Measures
Below Intrinsic Valuation	• Governance • Capital Structure • Mergers & Acquisitions	• Breakup • Operational Performance
	Unlock Value Short-term	Unlock Value Long-term

Figure 8: Adequacy of hedge fund measures to unlock shareholder value.

My results prove that hedge fund engagement occurs at target firms characterized by inefficient operations, capital- and portfolio structure, and weak shareholder returns relative to their peers. These inefficiencies build the investment thesis, and poor returns determine the receptiveness with management. My prior analysis highlights that activists have different shapes in terms of size, track record, and credibility, which can be seen as the currency when dealing with other shareholders and the capital market – as it determines how likely an investment thesis will resonate. I further identify that activists use a broad set of measures intended to induce change, including suggesting or blocking M&A, such as buying or selling a firm, spin-off, or entire breakup of the target firm.

Moreover, measures relating to capital structure or corporate governance include blocking management compensations, replacing the Board, and diversity. I provide evidence that the measures are communicated through private letters to the BoD and show that communication depends on the interaction with the target firm, especially when the activist is being ignored for the wrong reasons, pressure is increased via public letters, and engagement turns confrontational. Thereby contributing empirically to hedge fund literature and answering my first research question, which factors shape hedge fund engagement.

I further provide a systematic model, grounded in shareholder theory, that tailors the effect of hedge fund activism to the induced measures and respective adequacy to unlock shareholder value. I show that the adequacy of measures to create shareholder value depends on two dimensions: The target firm's valuation and adequacy to unlock value short or long-term. I provide evidence that measures induced to change the target firm realize value in the short term. However, firms that perform at or above their intrinsic valuation face activism, which is not addressing strategic or operational changes but is limited to financial engineering and ESG-related measures. Moreover, I acknowledge that measures, either in the short or long term, create value when they confirm the long-term strategy of the target firm. In addressing the second research question of how hedge fund engagement affects the target firm, my analysis underscores the

factors that shape the hedge fund-target firm engagement.

The results of my thesis contribute significantly to understanding hedge fund activism and its role in inducing change. The empirical findings and systematic model presented in this thesis provide a fundament for future research on hedge fund activism and its impact on the value creation of target firms. As such, my research offers valuable insights into the relationship between hedge fund activism and the shareholder landscape, contributing significantly to the Management field.

6.2. Limitations

This research has limitations that must be considered when interpreting the findings. While the research design and methods were carefully chosen to address the research question, several factors could have affected the reliability and validity of the results. The section is structured according to methodological and researchers' limitations and prioritized in the context of hedge fund activism.

I choose a primary data set that contains large investment banks such as Interview 18, and Interview 4, and stock-listed target firms, which may limit the empirical contribution to large engagements, activist funds, and campaigns. Moreover, prior mentioned investment banks have a natural bias towards the target firms due to more sizable and timewise more prolonged industry mandates. Furthermore, the interview set consists of senior executives and bankers, which may also contribute to this bias, as they may have faced more extensive campaigns that may result in different findings. Consequently, the results of this thesis are limited to the elaborated context of the participants in this thesis. They may not be generalizable to small or medium-sized hedge fund engagements. I focus on publicly traded firms and associated activism and do not consider private firms.

Consequently, the findings of this study may not apply to activist situations for private firms, which may have different dynamics, challenges, and outcomes - for example, they may be less proficient in dealing with activism and do not have the capital to hire external advisors. I did not capture the activist's perspective – for example, through additional interviews. Thus, it may limit my understanding of the activist

incentives to engage and unlock shareholder value. Accordingly, my primary data have an outside-in perspective, limiting information so that the activist view would help us better understand intentions, behind-the-scenes engagement, and induced strategies. Moreover, I did not study other forms of activism or vocal investors that use their shareholding, which might limit the scope of empirical contribution.

Besides, I chose a qualitative inductive approach proposed by Gioia et al. (2013) which allows for a rich exploration of interviewees' experiences and stays close to informant terms; However, the abdication of overarching categories is subject to the interpretation and analysis of the data. Although efforts were made to minimize these biases by using the active categorization framework by Grodal et al. (2021), inheriting eight moves to prove more rigor in the analysis, it is subjected to subjectivity bias in the analysis and interpretation of the raw data.

References

Admati, A. R., & Pfleiderer, P. (2009). The "Wall Street Walk" and shareholder activism: Exit as a form of voice. *Review of Financial Studies*, 22(7), 2645–2685. https://doi.org/10.1093/rfs/hhp037

Admati, A. R., Pfleiderer, P., & Zechner, J. (1994). Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium. In *Journal of Political Economy* (Vol. 102). https://about.jstor.org/terms

Andrade, G., Mitchell, M., & Stafford, E. (2001). New Evidence and Perspectives on Mergers. *Journal of Economic Perspectives*, 15(2), 103–120. https://doi.org/10.1257/jep.15.2.103

Aquila, J. F. (2021). The Shareholder rights and Activism review.

Armour, J., & Cheffins, B. (2009). The Rise and Fall (?) of Shareholder Activism by Hedge Funds. http://ssrn.com/abstract=1489336

Back, K., Li, T., & Ljungqvist, A. (2015). Liquidity and Governance. *ECGI - Finance Working Paper SSRN*. https://doi.org/10.2139/ssrn.2350362

Bebchuk, L. A., Brav, A., Jiang, W., & Keusch, T. (2020). Dancing with activists. *Journal of Financial Economics*, 137(1), 1–41. https://doi.org/10.1016/j.jfineco.2020.01.001

Becht, M., Franks, J., Mayer, C., & Rossi, S. (2010). Source: The Review of Financial Studies. *The Review of Financial Studies*, 23. https://www.jstor.org/stable/40604779

Bessler, W., & Vendrasco, M. (2022). Why do companies become hedge fund targets? Evidence from shareholder activism in Germany. *Finance Research Letters*, 47. https://doi.org/10.1016/j.frl.2022.102748

Bhagat, S., Dong, M., Hirshleifer, D., & Noah, R. (2005). Do tender offers create value? New methods and evidence. *Journal of Financial Economics*, 76(1), 3–60. https://doi.org/10.1016/j.jfineco.2004.05.002

Boyson, N. M., & Mooradian, R. M. (2011). Corporate governance and hedge fund activism. *Rev Deriv Res*, 14, 169–204. https://doi.org/10.1007/s11147-011-9065-6

Brav, A., Jiang, W., & Kim, H. (2010). Hedge Fund Activism: A Review *. http://ssrn.com/abstract=1947049

Brav, A., Jiang, W., & Kim, H. (2015). The Real Effects of Hedge Fund Activism: Productivity, Asset Allocation, and Labor Outcomes. *Review of Financial Studies*, 28(10), 2723–2769. https://doi.org/10.1093/rfs/hhv037

Brav, A., Jiang, W., Partnoy, F., Thomas, R., Bolton, P., Bratton, B., Cremers, M., Dyra, G., Edmans, A., Ferrell, A., Huberman, G., Mason, J., Rock, E., Roe, M., Romano, R., Santos, T., Spitz, W., & Thompson, R. (2008). Hedge Fund Activism, Corporate Governance, and Firm Performance.

Briscoe, F., Gupta, A., & Anner, M. S. (2015). Social Activism and Practice Diffusion: How Activist Tactics Affect Non-targeted Organizations. *Administrative Science Quarterly*, 60(2), 300–332. https://doi.org/10.1177/0001839215579235

Bryman, A. (n.d.). *Social research methods*.

Clifford, C., & Carey, W. P. (2008). Value Creation or Destruction? Hedge Funds as Shareholder Activists. http://ssrn.com/abstract=971018

Core, J. E., Guay, W. R., & Rusticus, T. O. (2006). Does Weak Governance Cause Weak Stock Returns? An Examination of Firm Operating Performance and Investors' Expectations. In *The Journal of Finance* (Vol. 61).

Cremers, K. J. M., & Nair, V. B. (2005). Governance Mechanisms and Equity Prices. In *The Journal of Finance* (Vol. 60).

Daily, C. M., Dalton, D. R., & Cannella, A. A. (2003). Corporate Governance: Decades of Dialogue and Data. *The Academy of Management Review*, 28(3), 371–382. https://doi.org/10.2307/30040727

Danis, A. (2020). Shareholder activism with strategic investors. *Finance Research Letters*, 33. https://doi.org/10.1016/j.frl.2019.06.007

Del Guercio, D., & Hawkins, J. (1999). The Motivation and Impact of Pension Fund Activism. *Journal of Financial Economics (JFE)*, 52(3). https://ssrn.com/abstract=110513

Denes, M. R., Karpoff, J. M., & McWilliams, V. B. (2017). Thirty years of shareholder activism: A survey of empirical research. In *Journal of Corporate Finance* (pp. 405–424, Vol. 44). Elsevier B.V. https://doi.org/10.1016/j.jcorpfin.2016.03.005

Desai, M. A., Foley, C. F., & Hines, J. R. (2004). A Multinational Perspective on Capital Structure Choice and Internal Capital Markets. *The Journal of Finance*, 59(6), 2451–2487. https://doi.org/10.1111/j.1540-6261.2004.00706.x

DesJardine, M. R., & Durand, R. (2020). Disentangling the effects of hedge fund activism on firm financial and social performance. *Strategic Management Journal*, 41(6), 1054–1082. https://doi.org/10.1002/smj.3126

Eisenhardt, K. M., Graebner, M. E., & Sonenshein, S. (2016). Grand challenges and inductive methods: Rigor without rigor mortis. *Academy of Management Journal*, 59(4), 1113–1123. https://doi.org/10.5465/amj.2016.4004

Elliott, S. J., & Gillie, J. (1998). Moving experiences: a qualitative analysis of health and migration. *Health & Place*, 4(4), 327–339. https://doi.org/10.1016/s1353-8292(98)00029-x

Ferri, F., & Sandino, T. (2009). The impact of shareholder activism on financial reporting and compensation: The case of employee stock options expensing. *Accounting Review*, 84(2), 433–466. https://doi.org/10.2308/accr.2009.84.2.433

Friedman, M. (1962). *Capitalism and Freedom*. http://ci.nii.ac.jp/ncid/BA06363190

Gantchev, N. (2013). The costs of shareholder activism: Evidence from a sequential decision model. *Journal of Financial Economics*, 107(3), 610–631. https://doi.org/10.1016/j.jfineco.2012.09.007

Gillan, S. L., & Starks, L. T. (2007). The Evolution of Shareholder Activism in the United States *. http://ssrn.com/abstract=959670

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, 16(1), 15–31. https://doi.org/10.1177/1094428112452151

Glaser, B. G., & Strauss, A. L. (2017). *The Discovery of Grounded Theory*. Routledge. https://doi.org/10.4324/9780203793206

Goranova, M., & Ryan, L. V. (2014). Shareholder Activism: A Multidisciplinary Review. In *Journal of Management* (pp. 1230–1268, Vol. 40). SAGE Publications Inc. https://doi.org/10.1177/0149206313515519

Gordon, L. A., & Pound, J. (1993). Information, Ownership Structure, and Shareholder Voting: Evidence from Shareholder-Sponsored Corporate Governance Proposals. *The Journal of Finance*, 48.

Gramm, J. (2016). Dear Chairmen.

Greenwood, R., & Schor, M. (2009). Investor activism and takeovers. *Journal of Financial Economics*, 92(3), 362–375. https://doi.org/10.1016/j.jfineco.2008.05.005

Grodal, S., Holm Student, A. L., Bechky, B., Beckman, C., DiBenigno, J., Golden-Biddle, K., Goodsel, A., Okhuysen, G., Mazmanian, M., van Maanen, J., & Zbaracki, M. (2021). Achieving Rigor in Qualitative Analysis: The Role of Active Categorization in Theory Building [Forthcoming at Academy of Management Review].

Hirschman, A. O. (1980). "Exit, Voice, and Loyalty": Further Reflections and a Survey of Recent Contributions. *The Milbank Memorial Fund Quarterly. Health and Society*, *58*(3), 430–453. https://doi.org/10.2307/3349733

Hu, H. T. C., & Black, B. (2006). Empty Voting and Hidden (Morphable) Ownership: Taxonomy, Implications, and Reforms. *The Business Lawyer*, *61*.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, *76*.

Jiraporn, P., Kim, Y. S., Davidson, W. N., & Singh, M. (2006). Corporate governance, shareholder rights and firm diversification: An empirical analysis. *Journal of Banking and Finance*, *30*(3), 947–963. https://doi.org/10.1016/j.jbankfin.2005.08.005

John, H., Bebchuk, L. A., Brav, A., Jiang, W., School, H. L., Harvard, T., & Olin, J. M. (2014). THE LONG-TERM EFFECTS OF HEDGE FUND ACTIVISM. https://ssrn.com/abstract=2291577

Jory, S., Ngo, T., & Susnjara, J. (2017). The effect of shareholder activism on bondholders and stockholders. *Quarterly Review of Economics and Finance*, *66*, 328–344. https://doi.org/10.1016/j.qref.2017.04.004

Keeley, M., & Graham, J. W. (1991). Exit, Voice, and Ethics. *Journal of Business Ethics*, *10*. https://www.jstor.org/stable/25072157

Klein, A., & Zur, E. (2009). Entrepreneurial Shareholder Activism: Hedge Funds and Other Private Investors. *The Journal of Finance*, *64*.

Kumar, G., & Misra, A. K. (2015). Closer View at the Stock Market Liquidity: A Literature Review. *Asian Journal of Finance & Accounting*, *7*, 35. https://doi.org/10.5296/ajfa.v7i2.8136

Lipton, M., & Rosenblum, S. A. (1991). A New System of Corporate Governance: The Quinquennial Election of Directors. *University of Chicago Law Review*, *58*. https://chicagounbound.uchicago.edu/uclrev/vol58/iss1/3

Locke, K., Golden-Biddle, K., & Feldman, M. S. (2008). Perspective—Making Doubt Generative: Rethinking the Role of Doubt in the Research Process. *Organization Science*, *19*, 907–918. https://doi.org/10.1287/orsc.1080.0398

Maffett, M. G., Nakhmurina, A., & Skinner, D. J. (2022). Importing activists: Determinants and consequences of increased cross-border shareholder activism. *Journal of Accounting and Economics*, *74*(2–3), 101538. https://doi.org/10.1016/j.jacceco.2022.101538

Masulis, R. W., Wang, C., & Xie, F. (2007). Corporate Governance and Acquirer Returns. *The Journal of Finance*, *62*.

Maug, E. (1998). Large Shareholders as Monitors: Is There a Trade-Off between Liquidity and Control. *The Journal of Finance*, *53*.

Mccahery, J. A., Sautner, Z., & Starks, L. T. (2016). Behind the Scenes: The Corporate Governance Preferences of Institutional Investors. *The Journal of Finance*, *71*.

McKinsey & Company. (2021). *The making of a megadeal: Howard Ungerleider on the merger of Dow and DuPont*. https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/the-making-of-a-megadeal-howard-ungerleider-on-the-merger-of-dow-and-dupont

Miller, M. H. (1988). The Modigliani-Miller Propositions After Thirty Years. *Journal of Economic Perspectives*, *2*.

Müller, H. M., & Panunzi, F. (2004). Tender Offers and Leverage. *The Quarterly Journal of Economics*, *119*. https://about.jstor.org/terms

Nowell, B., & Albrecht, K. (2019). A Reviewer's Guide to Qualitative Rigor. *Journal of Public Administration Research and Theory*, *29*, 348–363. https://doi.org/10.1093/jopart/muy052

Pratt, M. G., Sonenshein, S., & Feldman, M. S. (2022). Moving Beyond Templates: A Bricolage Approach to Conducting Trustworthy Qualitative Research. *Organizational Research Methods*, *25*, 211–238. https://doi.org/10.1177/1094428120927466

Queen, P. E. (2015). Enlightened Shareholder Maximization: Is this Strategy Achievable? *Journal of Business Ethics*, *127*, 683–694. https://doi.org/10.1007/s

Security Exchange Commission. (2015, June). *Activism, Short-Termism, and the SEC: Remarks at the 21st Annual Stanford Directors' College* (tech. rep.). https://www.sec.gov/news/speech/activism-short-termism-and-sec

Thomas, D. R. (2006). A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation*, *27*, 237–246. https://doi.org/10.1177/1098214005283748

Verstegen Ryan, L., & Schneider, M. (2002). The Antecedents of Institutional Investor Activism. *The Academy of Management Review*, *27*. https://about.jstor.org/terms

Wahal, S. (1996). Pension Fund Activism and Firm Performance. *The Journal of Financial and Quantitative Analysis*, *31*(1), 1–23. https://doi.org/10.2307/2331384

Wainwright, J. T. (2005). *The Theory of Corporate Finance*.

Junior Management Science

Energy-Aware Production Planning with Renewable Energy Generation Considering Combined Battery- and Hydrogen-Based Energy Storage Systems

Gabriel Benedikt Thomas Adams

Technical University of Berlin

Abstract

This study investigates the capacity of a developed production planning model to coordinate energy management within a hybrid energy system. The specific focus is on energy-intensive manufacturing firms utilizing renewable energy generation and energy storage. Unlike prior research in the field of energy-aware production planning, which revealed considerable cost saving potentials for the consideration of energy storage, this study considers a combined battery- and hydrogen-based energy storage with more realistic technology modeling. A formal mathematical model is developed as a mixed-integer linear program. Moreover, the cost saving potential of the combined energy storage system in energy-aware production planning is investigated based on numerical experiments. The experiments reveal that the implementation of the proposed planning approach saves significant costs compared to a baseline scenario. Up to 29.3 % cost saving potentials can be reached. In particular, the battery storage achieves significant energy cost savings while the hydrogen storage improves independence from fluctuating energy tariffs and availability of renewable energy. Possible model extensions are suggested to enhance the utilization of the proposed planning approach.

Keywords: energy-aware production planning; energy storage systems; hydrogen; mixed-integer linear programming; renewable energy generation

1. Introduction

Climate change and energy security currently pose some of the world's biggest challenges. Hence, governments react with policies that aim to reduce greenhouse gas (GHG) emissions and move towards a more sustainable future. The European Union (EU) has established the objective of becoming climate neutral by 2050 with the European Green Deal. This objective is linked with an interim goal of reducing greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The industry sector plays an especially significant role in the decarbonization process, accounting for 25% of the EU's energy consumption (European Commission, 2021). In Germany, the renewable share of net installed electricity generation capacity already amounts to 62%. However, the actual public net electricity generation from renewable sources constitutes only 46% (European Environment Agency, 2021). This is due to the intermittency

of renewable energy sources and their surplus energy generation potential when demand is low. The present expansion of renewable energies and the development of energy storage technologies are central measures of the German federal government's Climate Action Plan 2050 for decarbonizing the energy and industry sector in Germany (BMU, 2016). As a result, more decentralized energy structures are emerging in electrical energy systems on grid base and in production companies. In the industry context, these are considered as hybrid energy systems, which combine two or more energy conversion technologies to meet a common final energy demand (Palatel, 2017, p. 205). In the scope of this thesis, these are characterized by energy supply, energy consumption and energy storage. These components are described briefly in the following.

First of all, energy can be supplied via the energy market or by an on-site energy generation plant. Energy supply from energy markets is characterized by highly volatile en-

ergy tariffs. This is due to trading mechanisms on various submarkets that trade energy at different time intervals from the actual delivery. At any given time, prices result from the momentary supply and demand of energy. As energy tariffs are based on predicted energy consumption, prices are high in times of high energy demand and correspondingly low in times of oversupply to create an incentive to consume energy over periods of high supply. The exchange markets for Germany are the European Energy Exchange EEX in Leipzig and the European Energy Exchange EPEX SPOT in Paris.

On the other hand, energy supply from on-site energy generation allows independence from fluctuating energy tariffs on the energy market. There are conventional on-site energy generation methods such as gas turbine usage or combustion engines combined with generators. However, the objective of this thesis is to consider renewable energy generation. Renewable energy sources have the potential to support decarbonization. Photovoltaic systems (PV) and onshore wind power plants are on average the least expensive technologies when considering all power plants in Germany (Kost et al., 2021). Although renewable energies promise to be cheaper and generate cleaner electricity than conventional energy plants, the biggest challenge is their highly uncertain and intermittent nature.

Secondly, in energy-intensive production industry, energy consumption mainly rises from energy-demanding processes. Flexibility instruments can be incorporated by production planning regarding job scheduling and shift planning. This is economically significant as the share of electrical energy costs accounts for 54% of energy costs in the energy-intensive production industry (Matthes et al., 2017). Operative planning and production management influence the exact amount and time of energy consumption, thereby significantly impacting energy costs.

Thirdly, the optimal utilization of increased shares of renewable energies requires the integration of energy storage systems (Sterner & Stadler, 2019, p. 134). Energy storage systems allow for temporally decoupling of energy generation and consumption within a considered system. By storing and extracting energy, the storage system enables energy generation or purchase in periods before consumption and thus independence from volatile prices at the spot market. Additionally, excess generated energy or stored energy might be sold to the external energy market, thereby providing additional revenue. In this investigation, electrochemical lithium-battery storage is considered representative for short-term energy storage, based on the corresponding cost-reduction potential in broad use and high efficiency (Sterner & Stadler, 2019, p. 658). According to the Fraunhofer Institute (2019), a Power-to-Gas hydrogen storage is considered as one of the only effective options for long-term storage and a potential energy carrier of broad use in the energy transition according.

The management of energy supply, energy consumption and energy storage presents a framework of interdependencies and decision relations. Energy-oriented or energy-aware production planning approaches (EAPP) coordinate

decisions related to such frameworks. In literature, these model based planning approaches further include energy-awareness through objective criteria regarding monetary and non-monetary indicators for energy usage.

The objective of this bachelor thesis is to investigate the potential of combined battery- and hydrogen-based energy storage systems for energy-aware production planning with renewable energy generation. Further, analyzing the utilization of short-term and long-term energy storage systems and their potential to bridge daily - short-term - intermittency and inter-seasonal - mid-term - intermittency of renewables. This investigation aims to identify the optimal ratio of battery to hydrogen storage capacities in the context of energy-aware production planning.

The remainder of this thesis is structured as follows. First, the problem's characteristics and requirements are derived from the energy economic environment in Chapter 2. Secondly, existent literature streams in production planning regarding energy-aware production planning, renewable energy generation and energy storage systems are evaluated in Chapter 3. The model implementation including assumptions, notation and framework of the model is described in Chapter 4. A numerical study, including an investigation of the utilization of various storage capacity scenarios, is conducted and analyzed in Chapter 5. In conclusion, implications for practical application are derived and discussed and an outlook on potential future investigations is given in Chapter 6. The thesis is summarized in Chapter 7.

2. Characteristics of energy-aware production planning

In this chapter, special features of energy-aware production planning with renewable energy generation considering energy storage systems are analyzed. In Section 2.1, the problem is derived from the present context of the energy market (Subsection 2.1.1), renewable energy generation technologies (Subsection 2.1.2) and storage technologies (Subsection 2.1.3). The derivation of the conceptual model and analysis of requirements for the solution approach are conducted in Section 2.2.

2.1. Problem description

Energy-aware production planning aims to coordinate energy-oriented decisions within production systems. In the Scope of this thesis, the integration of a decentralized energy system is also considered. These usually consist of energy supply, demand and storage. Decentralized energy systems are emerging in industry due to their long-term advantages from ecological and economical points of view. Political pathways for a sustainable future linked to expected future measures are beginning to show verifiable impacts. Increasing numbers of companies are stating their compliance with politic pathways efforts such as the climate action plan. Many companies have publicly communicated their sustainability objectives, thereby ramping up the pressure for them to effectively fulfill the stated climate goals. This

is reflected not only in investments in new energy-efficient production machines as well as the design of new production processes, but also in pilot projects increasingly incorporating solutions for greener production and sector coupling. Therefore, projections and concepts for a sustainable energy consumption include more decentralized energy structures. These decentralized energy structures depend on energy supply drawn from the energy market or on-site power plants, energy demand from energy-intense production processes and energy storage technologies. The context of these fields is characterized in the following sections.

2.1.1. Energy market

Since the liberalization of European markets in the 1990s electrical energy became a commodity. The unbundling of the energy sector led to the rise of numerous actors on the energy market. Here, wholesalers trade energy to customers that are either retailers or large energy consumers from industry. Large energy consumers in the German energy grid can benefit from wholesale prices on the energy market. But still, they depend on energy supply from the market. Energy supply from energy markets is characterized by highly volatile energy tariffs. This is due to the relatively high volume of traded energy in relation to available storage capacities combined with an mostly inelastic demand. Therefore, physical generation must follow energy demand (Schäfer, 2022, pp. 291 sq.). Trading mechanisms on various submarkets determine the actual market clearing energy price at any specific time based on the merit-order principle.

Figure 1 shows that the aggregated actual energy generation follows trends of the actual consumption. Differences between actual generation and consumption must be balanced by energy from the balance energy market. Usually, this is covered by additional storage or extraction of generated energy from pumped hydro or from fast-scaling gas-fired power plants. Trading energy on the internal energy market is another mean of assuring a stable energy grid.

Electrical energy is traded on the exchange and "over-the-counter". On the one hand standardized energy products are bought and sold on the exchange spot market. However, most of energy demanding companies close direct supply contracts with electricity producers considered as "over the counter" (OTC). In order to match energy demand with energy supply and employ generation plants cost-effectively, the exchange market offers electricity contracts for different time horizons. The futures market offers such contracts with up to six years, the day-ahead market until 12:00 pm of the previous day and intra-day market, which closes 45 minutes before delivery (Gate closure). OTC can be traded until 15 minutes before delivery. The different time horizons help balance supply and demand. Energy contracts from the futures market allow the prediction of energy consumption for a future point of time (Lenz et al., 2019). Energy tariffs are based on these predictions. That is, for periods of predicted high energy consumption, prices will be high, as there is a scarce supply of energy. In periods of low predicted energy demand, there is an oversupply of energy. As an incentive

to consume energy and create demand, prices are low during those periods. By means of time-varying electricity tariffs, energy suppliers encourage companies to adapt their production schedules to match the power generation. They introduce so called time-of-use (TOU) tariffs as well as contracts on an hourly basis, such as real-time-pricing (RTP), that act in the range of the intra-day market and fulfill supply contracts in the very short-term (Bänsch et al., 2021). The different time horizons also allow energy producers and traders to plan their obligations over a longer period. The actual generation can also be adjusted to the real consumption as the delivery date of the electricity supply approaches. Additionally, the electricity price not only depends on national exchange markets, but is also influenced by international exchange of energy. The exchange markets for Germany are the European Energy Exchange EEX in Leipzig and the European Energy Exchange EPEX SPOT in Paris. Energy tariff data of past years is published by the Bundesnetzagentur (2020) on the basis of the day-ahead energy price. The day-ahead energy price depicted in Figure 2 indicates the aforementioned price fluctuations. On a daily basis (Figure 2a), the energy price is generally characterized by two peaks. The energy price tends to drop after a peak in the morning, until the price spikes again in the afternoon. This relation is given since a high share of the total energy demand is supplied by utility photovoltaic systems during the day as shown by Figure 1. Therefore, the cost-intensive energy production by conventional power plants can be reduced, which lowers the energy price. On a weekly (Figure 2b) and also mid-term basis, energy prices can differentiate drastically, which is due to developments on international energy exchange.

2.1.2. Renewable energy generation

On-site energy generation allows independence from fluctuating energy tariffs on the energy spot market. Schedulable and non-schedulable on-site energy generation may be differentiated. Moreover, on-site generation can be divided into conventional technologies and renewable energy generation (RGEN) technologies. Renewable energy sources have the potential to support decarbonization. Furthermore, renewable energy technologies are becoming increasingly economically applicable. Levelized cost of energy (LCOE) for renewable energy systems has been dropping in recent years. LCOE ranges of different power plants are depicted in Figure 3. The LCOE of PV systems range from 3.12 to 11.01 €cent/kWh, excluding value-added tax (VAT), depending on the type of system and solar radiation. The LCOE of onshore wind power plants in 2021 are between 3.94 and 8.29 €cent/kWh. The cheapest conventional power plants are combined cycle gas turbines (CCGT) with LCOE between 7.79 and 13.05 €cent/kWh. As a result, PV systems and onshore wind power plants are on average the technologies with the lowest LCOE in Germany, both among renewable energy technologies as well as all other power plants. Forecasts predict that even existing conventional fossil power plants will reach very high operating costs by 2030 at the latest, while the LCOE of new renewable energy plants will
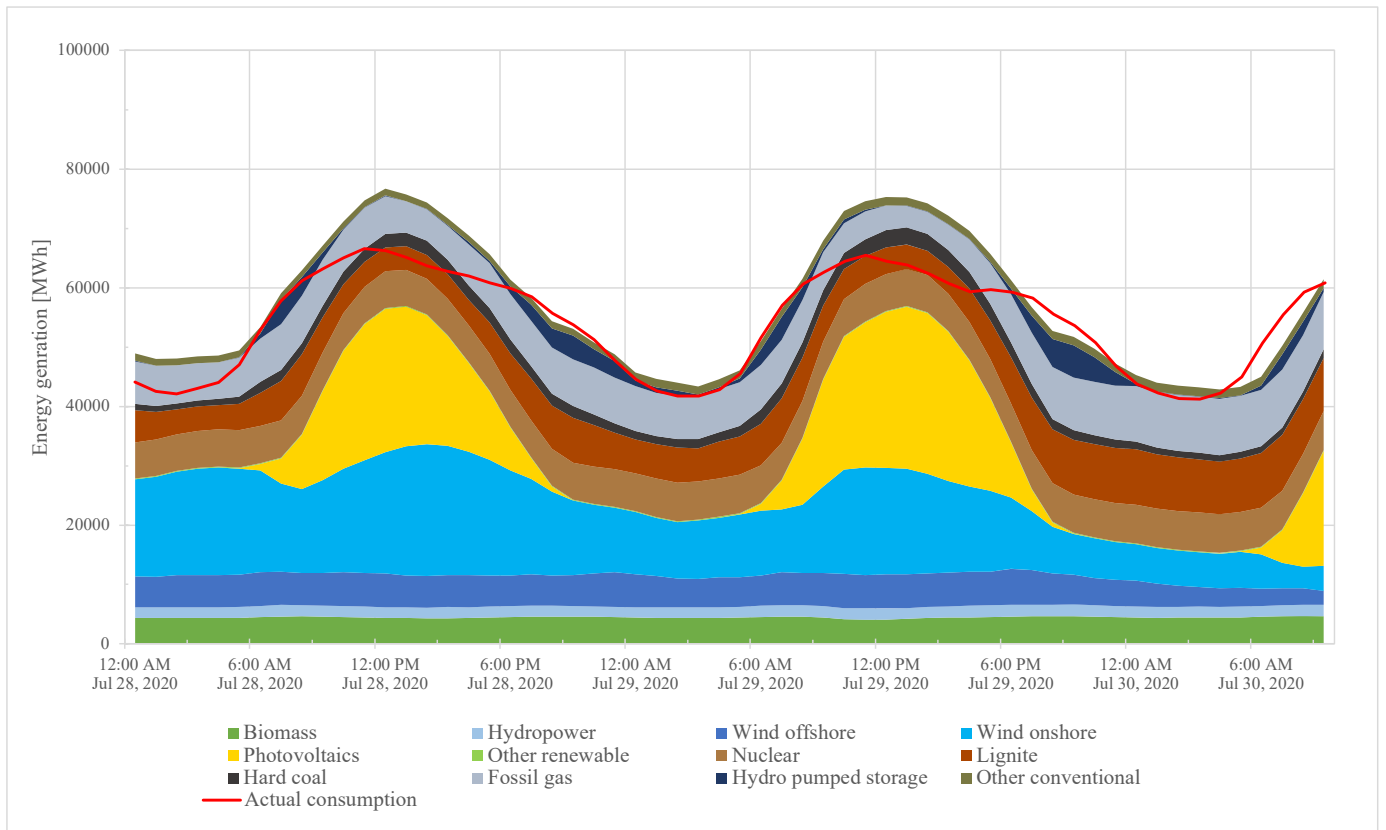
Figure 1: Fluctuating actual energy generation of renewable and conventional energy generation plants for demand fulfillment (own depiction based on data from Bundesnetzagentur (2020)).
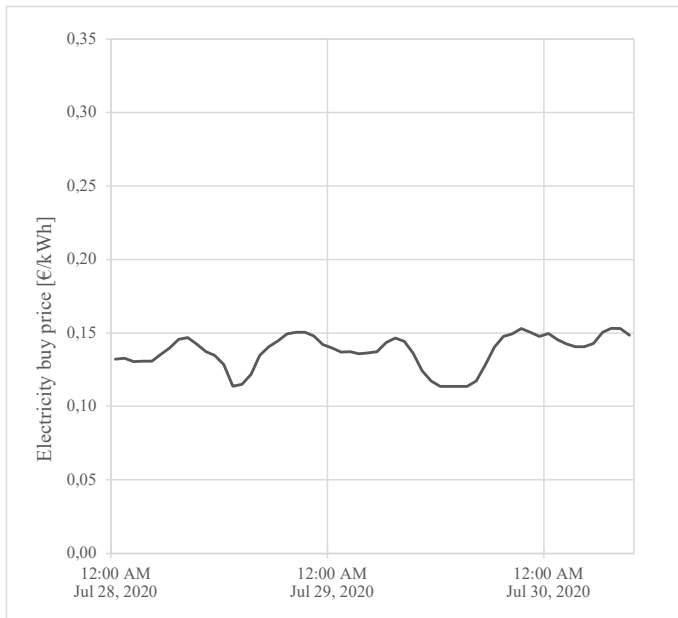
(a) Daily energy price fluctuations
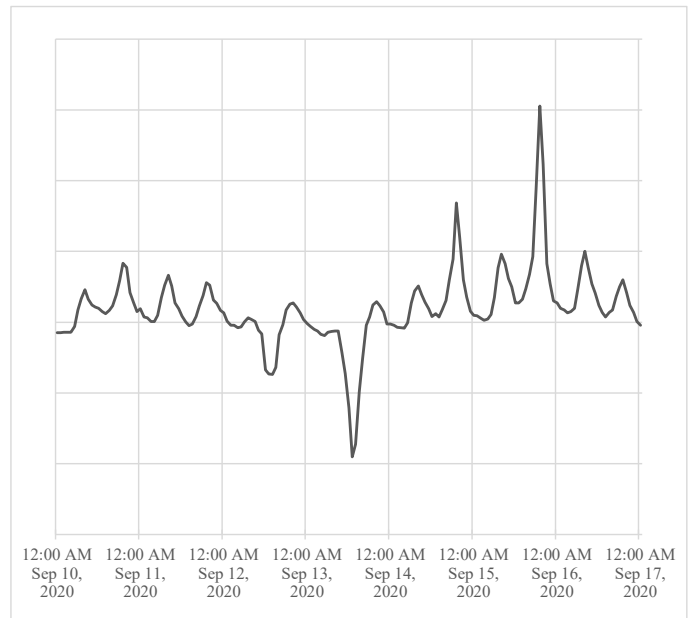
(b) Weekly energy price fluctuations

Figure 2: Day-ahead energy price fluctuations at European spot market for Germany with a surcharge of 0.1136 €/kWh (own depiction based on data from Bundesnetzagentur (2020)).

be significantly lower (Kost et al., 2021). Despite those advantageous economic and ecologic indicators and projections, renewable energies are characterized by their highly uncertain and intermittent nature. Therefore, RGEN are usually considered to be non-schedulable and lacking in terms of energy security and reliability. In the past, fluctuations in energy supply could be mitigated by demand-side flexibility, but renewables add to the inhomogeneous availability of energy. The renewable energy sources PV and onshore wind power are characterized by a highly intermittent nature. PV fluctuations occur on a daily basis as sun light is only available during daytime. Both wind and PV are also affected by inter-seasonal fluctuations of availability. The intensity of solar radiation decreases particularly during German winters. Therefore, solar energy generation undergoes corresponding decreases. In contrast, wind energy is more readily available during winters.

In energy-intensive production industry energy consumption mainly rises from energy demanding processes. These processes can be, for example, blast burn processes for steel production or the electrolytic process for aluminium production for example. There are pilot projects such as the sector coupling project "Windwasserstoff Salzgitter" (engl.: wind hydrogen) by the Salzgitter AG. The goal of such a project is to produce hydrogen through electrolysis from a network of wind turbines to reduce CO_2-Emissions during steel production. Similarly, in the transition to greener production processes and technologies, an increase of electrical energy demand is expected. Renewably generated electricity represents the basic energy source for decarbonizing various industry sectors. Be it for producing green hydrogen or delivering process heat, renewable electricity is considered as the substitute of fossil energy carriers. Thus, energy-aware decision making becomes increasingly important to distribute the available energy efficiently to satisfy the energy demand of the energy-intensive processes. For such production systems various energy-related decisions must be made while also considering new means of on-site energy sources.

2.1.3. Energy storage technologies

The optimal utilization of increased shares of renewable energies requires the integration of energy storage systems (Sterner & Stadler, 2019, p. 134). Energy storage systems allow for temporal decoupling of energy generation and consumption within a considered system. By storing and extracting energy, the storage system enables energy generation or purchase in periods before consumption and thus independence from volatile prices at the spot market. Additionally, excess generated energy or stored energy might be sold to the external energy market, thereby providing additional revenue. Typically, there are two types of storage systems: short-term and long-term energy storage. Short-term storage refers to storage over a duration ranging from several minutes to a few days. Long-term storage involves storing energy over a duration ranging from weeks to a year. Existent short-term storage systems are primarily characterized by high efficiencies and dis-/charging capacities but small storage capacities

due to high investment costs. Long-term storage systems feature lower energy conversion efficiencies but larger storage capacities (Sterner & Stadler, 2019, p. 566). In this investigation, lithium-ion batteries are considered to be representative for short-term energy storage, based on their cost-reduction potential in broad use and high efficiency. A hydrogen storage is considered as one of the only options for long-term storage. Moreover, hydrogen plays a significant role as a potential energy carrier of broad use in the energy transition as it can be used in all three sectors - electricity, heating and transport (Sterner and Stadler, 2019, pp. 658 sq.; Fraunhofer Institute, 2019). For the Power-to-Gas conversion an electrolyzer utilizing Polymer Electrolyte Membrane (PEM) electrolysis (EL) is considered. The Gas-to-Power conversion is realized with a PEM fuel cell (FC) system. Both technologies have proven themselves for broad use in industrial, mobility and energy sectors (Yue et al., 2021).

The described components energy supply, energy consumption and energy storage provide the framework for EAPP. Due to the high share of electrical energy costs, energy-intensive production companies have an intrinsic motivation to become independent from fluctuating energy prices and availability. On-site renewable energy generation technologies and energy storage system (ESS) are key to achieving this goal. The framework and requirements for EAPP in the scope of this thesis are deepened in the following section.

2.2. Framework and requirements for energy-aware production planning

The framework of the production system considered in this thesis is illustrated in Figure 4. A production environment, energy storage system and renewables are all contained within the system boundary. The core element is the production environment, including machinery needed to run or support production processes. Workers operate the machines. The required amount of energy to run these energy-intensive processes is provided in three ways. Energy can be obtained from the energy market, supplied by on-site renewable energy generation or extracted from the ESS. The renewable energy generation features PV and a wind turbine. The ESS combines a battery storage and a hydrogen tank with an electrolyzer and fuel cell. The special features of the optimization problem are presented below.

The energy-aware production planning with renewable energy generation considering combined battery- and hydrogen-based energy storage systems (EAPP-BHS) requires three different planning approaches: job scheduling for the available machines, shift planning to employ operators at machines and decentralized energy management. Additionally, realistic characteristics of energy systems are considered.

Firstly, job scheduling in energy-aware production planning generates energy demand. The purpose of job scheduling is to assign jobs to a given set of machines, considering possible dependencies, with regard to a defined objective criterion. The production schedule determines the assignment of individual jobs to the machines informing about the order and the timing by which the jobs are completed on the
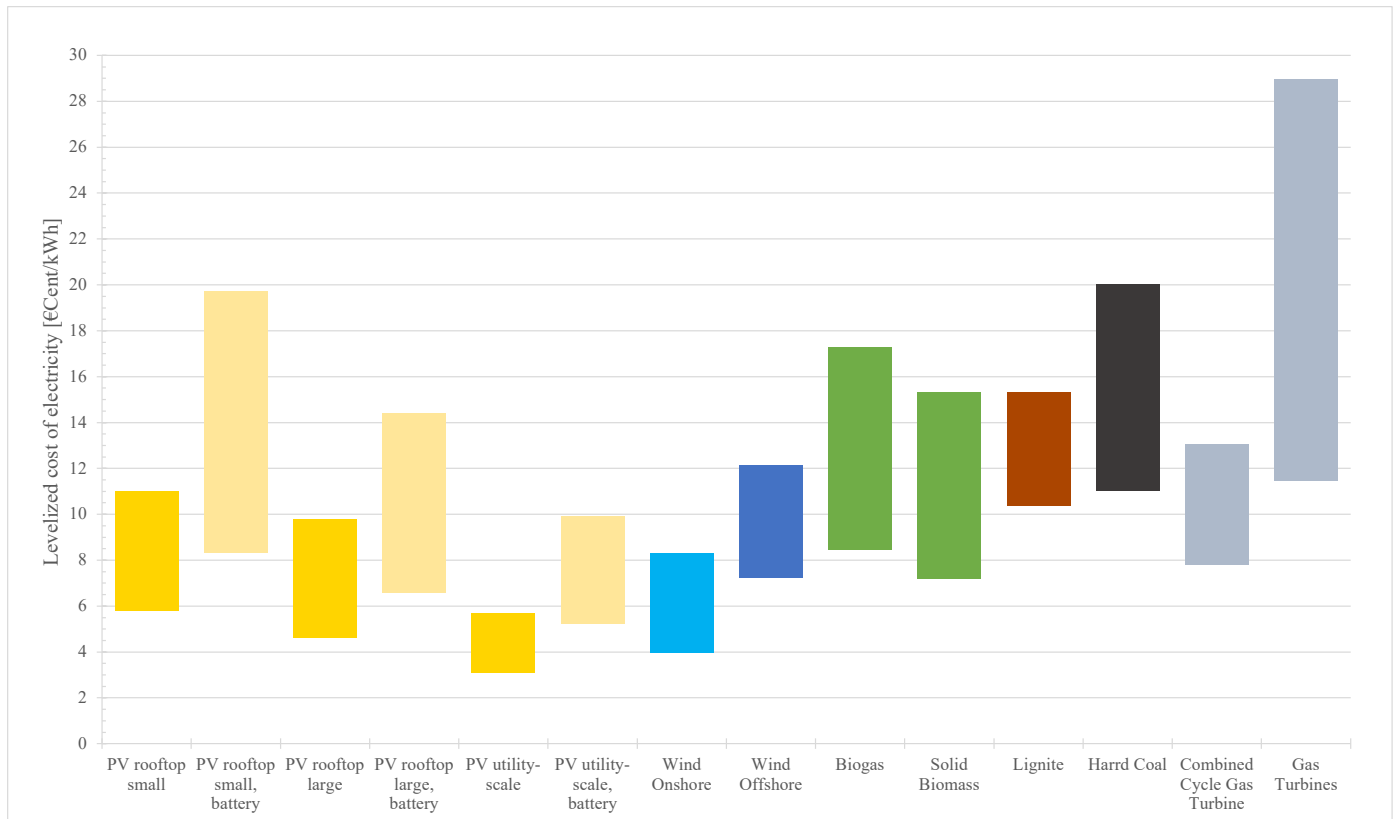
Figure 3: Levelized costs of energy of renewable energy technologies and conventional power generation plants at different locations in Germany in 2021 (own depiction based on Kost et al. (2021)).

machines. Decisions regarding starting times and lengths of different production states are included. The machine states determine capabilities, energy demand and if a worker is needed to operate the machine. In this consideration, five machine states are sufficient to describe manufacturing machines. The states include "off", "setup", "idle", "process" and "turnoff". In the off state, the machine cannot be used for production and has no energy demand. In the setup state, the machine is set up for the processing of a job in the subsequent period. The setup time is typically known and deterministic. In the idle state, the machine is on, but cannot produce. In the process state, the machine produces for which the machine must be set up. The processing of one job requires a certain amount of time. In the turnoff state, the machine is shut down and cannot produce. The energy consumption is based on these production-related machine states, thus influencing energy costs. (Liu et al., 2014; Copil et al., 2017).

Secondly, shift planning determines the assignment of shifts according to the number of machines to be operated. Machines in setup, process or turnoff mode require workers to operate. The focus is the optimal allocation of jobs within assigned shifts to optimally utilize the employed worker. An assigned shift itself is linked with day and daytime dependent salaries, thus influencing the labor costs. In combination, job scheduling and shift planning focus on the fulfillment of product demand within shifts during the planning horizon. However, in terms of energy-oriented decisions both planning approaches have conflicting objectives. On the one hand, job scheduling focuses on energy-efficient decision making on the quantity and timing of energy distribution. To minimize energy costs and fully utilize on-site renewable generation potential, energy focused job scheduling would follow the availability of renewable energy generation, which is characterized by high uncertainty and intermittency. In contrast, the objective of shift planning in the manufacturing industry is to establish recurring shift plans that homogeneously distribute workload. Hence, energy demand results from the operation of machines and the corresponding energy consumption within shifts regardless of energy prices and renewable energy availability.

Thirdly, decentralized energy management implies several decisions related to the distribution of renewable energy generation, energy storage system, external energy market and energy consumption. As described in Section 2.1 the energy market is characterized by energy traded at the same price only for short periods of time. For these short periods, energy-related decisions must be made regarding the purchase and retail of energy on the market, the distribution of on-site generated renewable energy, charging and discharging storage capacities of the energy storage system and energy consumption. Considering exact energy flows between the components of the energy system depicted in Figure 4,

eleven decisions must be made regarding the quantity of energy exchanged between its components:

- Energy quantities that are bought from the grid, either being used for energy demand, stored in the battery or used to fill the hydrogen storage.

- Energy quantities that are sold to the grid, either absorbed from the renewable power generation, or extracted from the battery storage or hydrogen storage.

- Generated renewable energy quantities that charge the battery, fill the hydrogen storage or are used for energy demand.

- Stored energy quantities for production either from the battery or the hydrogen storage.

Additionally, considered energy flows are linked with conversion and dissipation losses when stored or extracted from the ESS. Storing electro-chemical energy in the battery is coupled with charging and discharging efficiencies as well as aging effects of the battery over time. The Power-to-Gas-to-Power conversion utilizing hydrogen as an energy carrier is tied to electrolysis and fuel cell efficiencies as well as dissipation losses. The production system is connected to the power grid for additional purchases of electricity and retail of surplus electricity.

To conclude, an EAPP should consider the conflicting objectives of job scheduling and shift planning. There are energy-aware decisions that must be made regarding the quantity and timing of energy flows both distributed within the system boundary and crossing the system boundary to trade with the energy market. Considering exact energy flows between components allows for better understanding of the energy management and renewable energy utilization in combination with the ESS.

3. Approaches to energy-aware production planning in literature

This section examines the relevant research streams in energy-aware production planning. Numerous papers incorporating energy-awareness and means of renewable energy into production management were recently published in this field. This is primarily due to the substantial amount of energy demand in industrial production and the increased awareness of environmental aspects found during literature review by Bänsch et al. (2021). Energy-aware production planning has notably been a main research subject of recent literature reviews conducted by Bänsch et al. (2021) and Terbrack et al. (2021).

On the one hand, Bänsch et al. (2021) propose a ten-dimensional classification scheme. From one perspective, they classify relevant articles in terms of their energy related scope, considering energy supply, energy demand and energy storage. From another perspective, classification dimensions refer to the modeling approach regarding objective criterion,

the system of objectives, the manufacturing model, the mode characteristics, the planning horizon, the model type and the proposed solution method. Proposed literature includes on-site power generation environments that address the challenges of designing and operating production systems with open issues regarding mid-term energy procurement decisions and more realistic production costs. Moreover, the integration of multiple energy forms, e.g. electricity, on-site generation, chemically stored or pressurized energy forms, is proposed as another field for future research, especially considering the modeling of conversion technologies.

On the other hand, Terbrack et al. (2021) derive a more compact classification scheme revealing papers classified by their key topic: energy consumption, load management and supply orientation. The key topics emphasize the planning approach as either an optimization goal or as constraints within the considered approach. Further, they group together similar conditions into frequently found characteristics within EAPP to identify well investigated areas and gaps for future research. They propose the following five characteristics: various energy utilization factors, alternative production resources, heat integration, multiple energy sources and energy storage systems. As a result, they identify three main areas for future research. Firstly, they propose an increased integration of energy into mid-term production planning to potentially increase flexibility for energy-orientation in short-term planning. This puts heightened focus on ecological issues and reflecting that in planning approaches. Secondly, approaches addressing energy at multiple planning levels or across the entire planning hierarchy are identified as future fields of research potential. Thirdly, the combination of different dimensions related to energy use and different conditions for better energy efficiency should be investigated. Additionally, they describe notable research potential in the consideration of on-site energy generation and energy storage systems in EAPP.

Section 3.1 outlines general approaches to modeling energy-aware decision support. Section 3.2 goes on to present approaches to on-site energy generation in before Section 3.3 puts specific emphasis on managing energy storage systems in the scope of this thesis. Approaches considering characteristics of all streams are only presented in Section 3.3. Finally, the scope of this thesis is detailed in Section 3.4.

3.1. Modeling energy-aware decision support in production planning

This section presents a selection of papers modeling energy-aware decisions in production planning based on costs for total energy consumption and varying energy prices.

Ding et al. (2016) implement a parallel machine scheduling problem under a TOU electricity pricing scheme minimizing the total electricity cost. A time-interval-based mixed-integer linear program (MILP) formulation and a novel column generation heuristic were applied to solve the problem. Analyses of instances with different TOU settings discover tradeoffs between makespan and total energy costs that
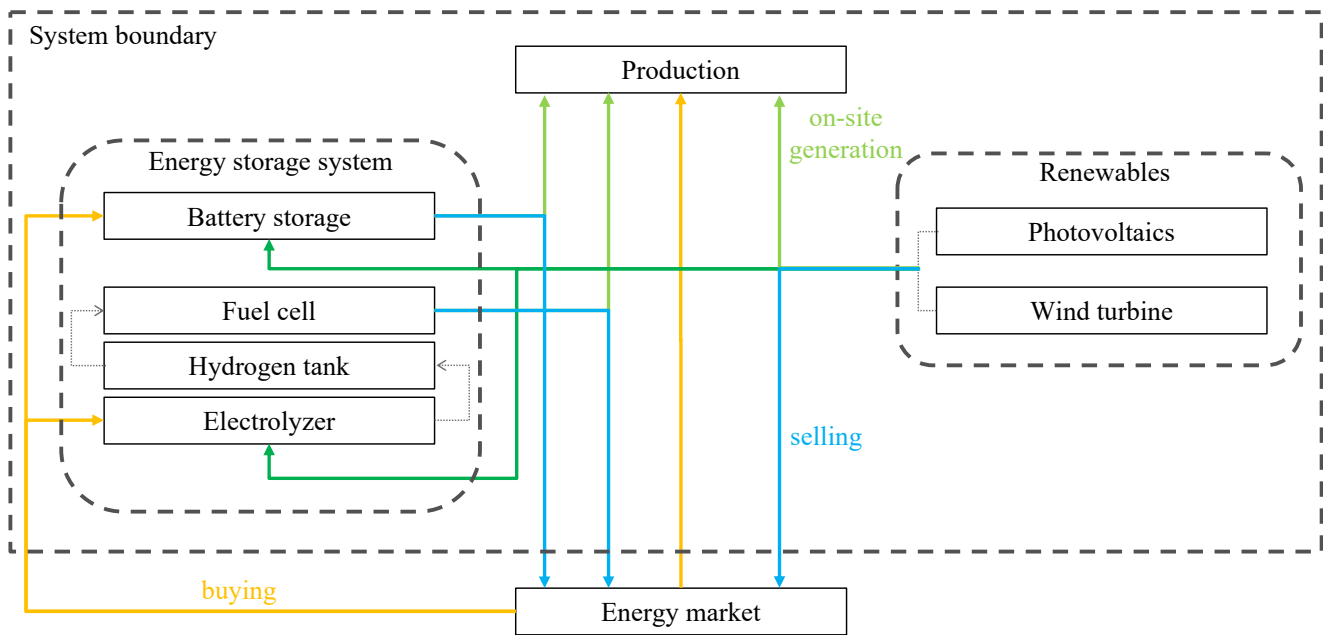
Figure 4: System boundaries of the considered production system including multiple energy sources and energy flows (own depiction).

could help make compromising decisions regarding these objectives. The authors suggest a further integration of cost and environmental impact of other resources into the optimization framework and see meaningful research potential in the consideration of scheduling problems under continuously changing energy prices.

Wichmann et al. (2019a) identify time-dependent energy prices as a neglected characteristic in energy-oriented planning approaches. Hence, the authors develop a general model formulation for the consideration of time-dependent energy prices in lot-sizing and scheduling. They derive a MILP, which introduces the missing considerations and investigates appropriate conditions for energy-oriented production planning. A numerical case study identified up to 9.69% of average energy costs and 1.04% total saving potential compared to conventional production could be identified. The authors also show that the best cost-saving potential is realized when there is high energy price volatility, high machine utilization and a diverse product portfolio. This particularly applies to energy-intensive industries. Future potential for research is seen in purely cost based planning approaches, faster solution procedure for larger instances and parallel-machine and multi-stage manufacturing approaches.

Gong et al. (2019) propose a many-objective integrated energy- and labor-aware flexible job shop scheduling problem tailoring a non-dominated sorting genetic algorithm-III (NSGA-III) for the optimization. To integrate energy awareness a state-based shop floor wide energy model is proposed with time-varying electricity and labor prices. The applied NSGA-III optimization method proves effectiveness for numerical experiments under RTP and TOU pricing. The methodology is suggested to serve as automated and en-

hanced decision support for factory managers to minimize production costs.

A paper considering hybrid flow shop scheduling with variable discrete production speed levels minimizing both energy costs and total tardiness was published by Schulz et al. (2020). Two multi-objective mixed-integer programming (MIP) formulations are given for the hybrid flow shop scheduling problem considering variable production speeds to reduce energy consumption at the expense of longer processing times. For the flow shop scheduling problem, two multi-objective mixed-integer program formulations are developed that consider variable production rates to reduce energy consumption. The conducted numerical case study reveals interdependencies between variable discrete production speed levels and energy costs, energy consumption and punctual delivery. For future work, it is desirable to develop heuristic solutions to solve larger problems within a reasonable computation time.

3.2. Modeling on-site renewable energy generation

Generally, on-site energy generation can be divided into schedulable and non-schedulable generation and articles on EAPP include schedulable, non-schedulable or both schedulable and non-schedulable energy generation. Renewable energy systems have become more popular in recent years as explained in Chapter 2. Abikarram and McConky (2017) investigate real time machine coordination for instantaneous load smoothing and photovoltaic intermittency mitigation. The paper focuses on power demand flexibility of industrial processes to reduce the variability in net demand. They develop a machine control logic that smoothens a machine fleet's power demand over time, decreasing the variability of net power sourced from the power grid of photovoltaic equipped

factories. They proof the potential of smoothing strategies to mitigate the impact of renewable energy source intermittency on the grid.

Golari et al. (2017) aim to determine the production volume, the inventory level and the renewable energy supply in each period in order to minimize the total production cost including energy costs. The authors present a three-step solution method. First, they outline a deterministic planning model to reach the desired level of green energy penetration, before extending by a multi-stage stochastic optimization model considering the uncertainties of renewables and finally an efficient modified Benders decomposition algorithm for finding the optimal production schedule based on a scenario tree. Numerical experiments verify the potential of realizing high level renewable penetration through on-site and grid renewable integration. New models are needed for considering both product demand and RGEN uncertainties.

Dynamic scheduling of a flow shop with on-site wind generation for energy cost reduction under real time electricity pricing is tackled by Zhai et al. (2017). They develop a dynamic scheduling approach minimizing the electricity cost of a flow shop with a grid-integrated wind turbine. A MILP model is formulated for energy management. An autoregressive integrated moving average time series model is used to provide updated wind speed and electricity prices as real data becomes available. The authors show that the energy efficient manufacturing schedule provides a 14.6% lower cost and 524.14 kg less CO_2 compared to a condition without energy objective or wind turbine.

Biel et al. (2018) address flow shop scheduling with grid-integrated on-site wind power using stochastic MILP. A two-stage stochastic optimization procedure determines a production schedule and energy management decision for a flow shop system. The first stage incorporates a bi-objective mixed integer linear program that minimizes total weighted flow time and expected energy cost. In the second stage, energy management decisions are adapted to real-time wind power data. The conducted hypothetical case study reveals the feasibility of the proposed approach to effectively handle the uncertain nature of wind power. In addition, the consideration of energy-related GHG emissions is identified as a field for further study.

3.3. Models considering energy storage systems

In this section, energy storage systems are especially considered. Additionally, this section also presents papers with comprehensive modeling that incorporates varying energy prices, renewable energy generation and ESS.

An early paper considering the combination of time-dependent and machine-dependent energy costs, renewable energy sources and energy storage was published by Moon and Park (2014). Solar and wind are considered as RGEN. The developed constraint programming and mixed-integer programming approaches indicate reduction potentials for total electricity costs and energy costs. By their fundamental research they paved the way for future research in this domain.

Schulte Beerbühl et al. (2015) tackle scheduling and capacity planning of hydrogen storage. They demonstrate the feasibility of their derived heuristic approach for translating non-linear plant characteristics of the planning problem to a convex and continuous non-linear solution space. Compared to linear modeling of an electrolyzer more realistic and meaningful economic insight can be generated for electricity-to-hydrogen-to-ammonia plants. The heuristics can combine capacity planning and scheduling for intermittently operated chemical processes that link the electricity market at the chemical market.

A paper to introduce the concept of Smart Energy-Efficient Production Planning (SEEPP) for a general job-shop manufacturing system in the presence of a grid-connected micro-grid system (MGS) deploying wind power generation has been published by Golpîra et al. (2018). They utilize electrical and thermal storage considering technology characteristics such as (dis-)charge efficiencies. Optimization of the proposed Robust Mixed Integer Linear Programming model indicates cost saving potentials of 1.95% compared to conventional manufacturing systems. Among others, they propose the integration of other RGEN into the micro-grid, e.g. from fuel cell, PV or micro turbine.

Optimizing renewable energy generation to minimize the total electricity cost for sustainable manufacturing systems under time-of-use energy tariffs is the objective of the paper published by Cui et al. (2019). The model framework includes power input from electrical grid and a MGS. The MGS comprises of the RGEN technologies wind turbines and solar panels, as well as an energy storage system. A rolling horizon approach is adopted to deal with the intermittency of renewables. Probability and predicted energy generation are integrated within a nonlinear mathematical programming model. Numerical experiments show substantial benefits of incorporating renewable energy sources.

An Energy-Oriented General Lot-Sizing Problem regarding Energy Storages (EOGLSP-ES) was developed by Wichmann et al. (2019b). It extends their proposed model (Wichmann et al., 2019a) described in Section 3.1 and addresses the missing consideration of energy storage in energy-oriented production management approaches. A numerical study reveals cost saving potentials of more than 20% for the case of large energy storages. Furthermore, more realistic modeling of energy storages is highlighted as a future field for research.

Pham et al. (2019) propose a two-stage optimization program for multi-site and micro-grid planning with the objective to achieve net-zero energy operations. In the first stage, production scheduling is optimized to meet the uncertain demand at minimal operational costs. In the second stage, size and siting of the micro-grid systems are determined to cover the electrical load of multiple facilities. Results show that net-zero energy operation is feasible and affordable in locations of favourable wind and solar generation. Additionally, analysis reveal cost-effective implementation of battery systems combined with solar despite high capital costs of storage devices. On-site renewable energy integration is proving

to be the ultimate key to realizing net-zero energy industrial operations.

Karimi and Kwon (2021) apply a MILP for their energy-aware production scheduling model incorporating on-site solar power generation and battery storage systems. More realistic technology characteristics, specifically dis-/charging rates and dis-/charging efficiencies are being adopted. Numerical experiments show that energy-aware scheduling can reduce energy costs by 23% and total costs by 7%. Utilization of solar energy generation and battery storage can save up to 36% of energy costs and 15% of total costs respectively.

Feng and Menezes (2022) develop a generalized mathematical model and characterize the optimal cost functions specially tailored for energy efficient renewable energy generation that utilize storage systems. They derive decision support for adopting actions at any state within the proposed wind-grid hydrogen system from a sensitivity analysis. Additionally, the authors propose combined energy storage technologies with various capacities, costs, response times and efficiencies as future research potential.

3.4. Potential for future research in energy-aware production planning

Table 1 provides an overview of all referenced scientific articles in Section 3.1-3.3. Although the presented literature is a limited selection, it contributes meaningful resources for future potential of research on the solution method and modeling of the incorporation of energy-awareness, RGEN and storage technologies.

The analyzed literature utilizes mathematical programming approaches. The most prominent representatives are MILP as well as mixed-integer non-linear program MINLP and stochastic (mixed integer) programming models. Furthermore, heuristic approaches are often applied to solve larger problem instances or in combination with mathematical programming in multiple stage optimization. Additionally, there is a smaller amount of simulation-based approaches. In the scope of this thesis, the problem is formulated as a MILP, as is commonly found in the reviewed literature and in practice because of its relative computational efficiency. Similar to the multi-stage optimization approaches presented in the literature (e.g. Pham et al. (2019), Golari et al. (2017)), a two-stage optimization approach is also employed in this work to consider mid-term and long-term planning horizons.

Energy-awareness in production planning can be addressed by employing various optimization objectives and constraints, as implied by the previous sections. Furthermore, different assumptions, conditions and capabilities enabling improved energy efficiency can be found. Including these characteristics in production planning approaches can increase flexibility for energy-aware production planning and improve energy utilization and the resulting costs. Minimization of total operational costs regarding labor costs and energy costs is reflected in the objective of the developed MILP in this investigation. This allows for simultaneous consideration of both objectives.

A substantial number of papers reviewed previously emphasize on-site energy generation and storage systems as fields of potential future research (see Table 1. Furthermore, the investigation of new combinations of dimensions related to energy utilization and exploration of different circumstances for improved energy efficiency are suggested. A missing consideration of a combination of short-term and long-term energy storage systems can be highlighted. Also, unrealistic technology characteristics are mentioned multiple times as potential for improved model extensions. The missing consideration of a combined battery- and hydrogen-based ESS is addressed within the scope of this thesis. The suggested approach also aims to depict more realistic technology characteristics. The specific implementation of the derived research scope for this thesis is presented in Chapter 4.

4. Model implementation

This chapter highlights the concept of the model implementation. The problem's assumptions are presented in Section 4.1, followed by the detailed formulation of the targeted mixed-integer linear program including definition of the notation in Section 4.2 and the description of the model framework in Section 4.3.

4.1. Assumptions

The model formulation is based on the assumptions presented in the following. The planning horizon is finite. The model approach aims to determine decisions with a time resolution of one hour. To simplify the application of the model, the long-term planning horizon is assumed to be one year with 52 weeks, equivalent to 8736 hourly periods. The demand for products is constant. A predefined amount of jobs has to be completed per week. This aids the focus on energy-aware decisions. The jobs feature deterministic and machine dependent processing times. No warehousing of products is considered. Jobs are processed without interruption. Within each period a machine is in exactly one state. The electrical power demand of each production-related machine state is known and deterministic. The total energy consumption is based on the time each machine spends in a specific state. Five types of machine states are sufficient including "off", "setup", "idle", "process" or "turnoff". Machines are shut down at the end of a week. Workers are infinitely available and have equal productivity rates. Salary rates are day and shift dependent. Salaries for morning and day shifts are assumed to be fixed costs due to contractually defined wages. Only night and weekend shifts are considered additional variable costs included in labor costs. Time-dependent energy purchase and offer prices are known from the day-ahead market at the stock exchange. Energy offer prices are 0.1341 €/kWh below energy purchase prices to account for surcharges and taxes. Energy input and output are balanced. Surplus energy not being stored is completely sold on the market. The energy exchange between grid and production system is not

Table 1: Overview of referenced papers.

	Ding et al. (2016)	Wichmann et al. (2019a)	Gong et al. (2019)	Schulz et al. (2020)	Abikarram and McConky (2017)	Golari et al. (2017)	Zhai et al. (2017)	Biel et al. (2018)	Schulte Beerbühl et al. (2015)	Golpîra et al. (2018)	Cui et al. (2019)	Wichmann et al. (2019b)	Pham et al. (2019)	Karimi and Kwon (2021)	Feng and Menezes (2022)
Energy generation															
Power grid (off-site)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Adjustable on-site										✓					
Renewable energy (on-site)					✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Energy pricing															
Time-of-use (TOU)	✓	✓	✓	✓				✓			✓			✓	
Real-time pricing (RTP)			✓			✓	✓		✓	✓		✓			✓
Fixed price													✓		
Energy demand															
Processing	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓
Non-processing			✓						✓		✓	✓	✓		
Factory setup															
Flow shop				✓			✓	✓			✓				
Job shop			✓												
Single machine	✓	✓											✓		
Parallel machines	✓				✓									✓	
Energy storage															
(P2P)										✓	✓	✓	✓	✓	✓
(P2X)									✓						
(P2X2P)										✓					✓
Objective criterion															
Energy costs	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
Energy consumption					✓										
Environmental aspects															
Labor costs			✓			✓									
Other monetary						✓				✓	✓		✓	✓	✓
Other non-monetary	✓		✓	✓			✓							✓	
System objectives															
Single objective		✓			✓		✓		✓	✓	✓	✓	✓	✓	
Multi objective	✓		✓	✓		✓		✓						✓	✓
Optimization approach															
MILP	✓	✓	✓	✓		LP	✓	✓	LP	✓		✓	✓	✓	
MINLP									✓		✓				
Heuristic	✓							✓	✓						
Stochastic						✓					✓	✓			
Simulation					✓										
Others	✓		✓												✓
Planning horizon															
Short-term (≤ 24 h)	✓	✓	✓				✓	✓				✓			✓
Mid-term (> 24 h)											✓				
Long-term (weeks/months)					✓	✓			✓	✓			✓	✓	

restricted in any direction. Dis-/charging rates and efficiencies of the battery storage system (BSS) are constant. The efficiency of the electrolysis is constant. The fuel cell efficiency is load dependent. To better represent the characteristics of this technology, a non-linear load-efficiency curve is assumed. Storage and extraction capacities of the hydrogen storage system (HSS) are identical. Aging effects and dissipation losses are realized by loss rates that reduce the amount of energy stored at the beginning of a period by a constant percentage rate. ESS can be charged and discharged in a single period. This is not omitted despite conversion losses to serve as a tool to validate the models decisions. Stored energy can be sold back to the grid. Renewable production is deterministic and known from publicly available data.

4.2. Notation

The following section introduces the notation of the proposed model. The notation is based on decision variables, parameters and sets. The relevant sets and indices for periods, jobs, machines, machine states and shifts are displayed in Table 2.

There is decision variables dedicated for job scheduling, shift planning, energy flows and storage summarized in table 3. The starting period of a job is defined by the binary variable Y_{ijp}. All periods occupied by the same job are marked by X_{ijp}. The machine's state is defined by W_{ips}. The integer variable V_q specifies the amount of workers assigned to a shift. According to the framework proposed in Section 2.1 every energy flow between the components of the production system is quantified by an individual decision variable. The storage variables determine the state of charge of the BSS and fill level of the HSS. The variable λ_{bp} is introduced to establish the non-linear load-efficiency relation between fuel cell load and output.

The model parameters are presented in Table 4. Different parameter specifications are introduced within the derivation of test instances in Section 5.1.

4.3. Model Framework

Based on the presented notation, the model framework is derived in this section. The model framework comprises the objective function and constraints categorized for energy flow balancing, job scheduling, shift planning, storage management of the battery and hydrogen tank as well as binary and non-negativity constraints.

Objective function

$$
\begin{aligned}
min\ TC = \sum_{p\in P}\beta_p^{buy}\cdot\left(E_p^{gr\to de}+E_p^{gr\to bat}+E_p^{gr\to el}\right)\\
-\beta_p^{sell}\cdot\left(E_p^{re\to gr}+E_p^{bat\to gr}+E_p^{fc\to gr}\right)+\sum_{q\in Q}V_q\cdot\alpha_q
\end{aligned}
\tag{1}
$$

The objective function (1) minimizes the total relevant production-related costs, taking energy trading and variable labor costs into account. The objective function consists of three parts. Firstly, energy costs result

from the aggregated amount of energy bought from the grid $\left(E_p^{gr\to de}+E_p^{gr\to bat}+E_p^{gr\to el}\right)$ evaluated with the energy buy price β_p^{buy}. Secondly, energy earnings result from the aggregated amount of energy sold to the grid $\left(E_p^{re\to gr}+E_p^{bat\to gr}+E_p^{fc\to gr}\right)$ evaluated with the energy sell price β_p^{sell}. Energy costs and earnings are aggregated for all periods. The third part includes the labor costs as the product of the amount of workers V_q assigned to each shift q and the specific wage for the shift q aggregated for all shifts.

Energy flow constraints

$$
DE_p = \sum_{i\in M}\sum_{s\in S}W_{ips}\cdot e_{is} \qquad \forall\, p\in P \tag{2}
$$

$$
E_p^{gr\to de}+E_p^{re\to de}+E_p^{bat\to de}+E_p^{fc\to de}=DE_p \qquad \forall\, p\in P \tag{3}
$$

$$
E_p^{re\to gr}+E_p^{re\to bat}+E_p^{re\to el}+E_p^{re\to de}=re_p \qquad \forall\, p\in P \tag{4}
$$

$$
\begin{aligned}
EC = \sum_{p\in P}\left(E_p^{gr\to de}+E_p^{gr\to bat}+E_p^{gr\to el}\right)\cdot\beta_p^{buy}\\
-\sum_{p\in P}\left(E_p^{re\to gr}+E_p^{bat\to gr}+E_p^{fc\to gr}\right)\cdot\beta_p^{sell}
\end{aligned}
\tag{5}
$$

The energy flow constraints depict all relevant energy flows between components of the considered production system ensuring the exhaustive distribution of RGEN and fulfillment of energy demand. Constraint (2) calculates the energy demand (DE_p) in each period. Therefore, each machine's state-specific energy demand e_{is} is evaluated with the binary scheduling variable W_{ips} indicating the machine's state and aggregated for all machines. Constraint (3) ensures the feed-in of energy to meet the energy demand in each period. Therefore the energy input from grid ($E_p^{gr\to de}$), renewables ($E_p^{re\to de}$), battery ($E_p^{bat\to de}$) and fuel cell ($E_p^{fc\to de}$) is accumulated. Constraint (4) guarantees the distribution of the renewable energy production (re_p) to grid ($E_p^{re\to gr}$), battery ($E_p^{re\to bat}$), electrolyzer ($E_p^{re\to el}$) and demand ($E_p^{re\to de}$) in each period. Energy costs in constraint (5) are calculated as explained for the objective function (1).

Job scheduling constraints

$$
\sum_{i\in M}\sum_{p=1+}^{|P|-pt_{ij}+1}Y_{ijp}=1 \qquad \forall\, j\in N \tag{6}
$$

$$
\begin{aligned}
\sum_{t=p}^{p+pt_{ij}-1}X_{ijt}\ge pt_{ij}\cdot Y_{ijp}\\
\forall\, i\in M, j\in N, p\in\{1,...,|P|-pt_{ij}+1\}
\end{aligned}
\tag{7}
$$

$$
\sum_{j\in N}X_{ijp}\le 1 \qquad \forall\, i\in M, p\in P \tag{8}
$$

$$
W_{i,1,0}=1 \qquad \forall\, i\in M \tag{9}
$$

Table 2: Sets and indices.

Index of period $p = 1, ..., |P|$	p
Set of periods p	P
Index of job $j = 1, ..., |N|$	j
Set of jobs j	J
Index of machine $i = 1, ..., |M|$	i
Set of machines i	M
Index of state $s = 1, ..., |S|$	s
Set of successor states s	T_s
Index of shift $q = 1, ..., |Q|$	q
Set of shifts q	Q
Subset of periods p in shift q	L_q

Table 3: Decision variables.

Machine i begins job j in period p	Y_{ijp}
Machine i processes job j in period p	X_{ijp}
Machine i in period p is in state s	W_{ips}
Amount of workers in shift q	V_q
Energy bought from grid [kWh]	$E_p^{gr \to de}, E_p^{gr \to bat}, E_p^{gr \to el} \geq 0$
Energy sold to grid [kWh]	$E_p^{re \to gr}, E_p^{bat \to gr}, E_p^{fc \to gr} \geq 0$
Renewable sources output within system [kWh]	$E_p^{re \to bat}, E_p^{re \to el}, E_p^{re \to de} \geq 0$
Stored energy for production [kWh]	$E_p^{bat \to de}, E_p^{fc \to de} \geq 0$
State of charge of the battery [kWh]	SOC_p
State of fill of hydrogen storage [kWh]	H_p
Break-point for linear interpolation of fuel cell load	λ_{bp}

$$W_{i,|P|,0} = 1 \qquad \forall \, i \in M \tag{10}$$

$$\sum_{s \in S} W_{ips} = 1 \qquad \forall \, i \in M, p \in P \tag{11}$$

$$\sum_{j \in N} X_{ijp} = W_{ip3} \qquad \forall \, i \in M, p \in P \tag{12}$$

$$W_{ips} \leq \sum_{k \in T_s} W_{i,p+1,k} \qquad \forall \, i \in M, p \in \{1, ..., |P|-1\}, s \in S \tag{13}$$

The job scheduling constraints ensure the scheduling of all jobs during the planning horizon. Constraint (6) guarantees that every job has a starting period once at one machine only. This should be realized at least the job's processing time before the last period of the planning horizon. Constraint (7) ensures the occupation of a machine for the whole processing time once started at the machine. If a job starts in a specific period ($Y_{ijp} = 1$), the binary scheduling variables W_{ips} are set to 1 for all periods ranging within the starting period and the completion period. That each machine processes only one job at a time is ensured by constraint (8). All machines are restricted to be turned off in the first period, turned off in the last period and only in one state at a time (constraints (9), (10), (11)). Constraint (12) forces the considered machine to be in operating mode when a job is produced. Constraint (13) only allows defined state transitions. In the subsequent period a machine's state can only be one of the states predefined by successor relations in T_s.

Shift planning constraints

$$\sum_{s \in \{2,4,5\}} \sum_{i \in M} W_{ips} \leq V_q \qquad \forall \, q \in Q, p \in L_q \tag{14}$$

$$LC = \sum_q V_q \cdot \alpha_q \tag{15}$$

The shift planning constraint (14) ensures a sufficient number workers assigned to a shift if machines need to be operated during periods of shift q. For all possible shifts of the set Q the corresponding periods L_q are scanned for machines in start up, shut down or processing mode. If these states occur for any of the machines, shift q is incorporated as many times as these states were counted. Labor costs in constraint (15) are calculated as explained for the objective function (1).

Battery storage constraints

$$SOC_p = \left(1 - loss^{bat}\right) \cdot SOC_{p-1} + \eta^{bat} \cdot \left(E_p^{gr \to bat} + E_p^{re \to bat}\right) \\ - \left(E_p^{bat \to gr} + E_p^{bat \to de}\right) / \eta^{bat} \qquad \forall \, p \in \{2, ..., |P|\} \tag{16}$$

$$SOC_p = \left(1 - loss^{bat}\right) \cdot soc^{init,first} + \eta^{bat} \cdot \left(E_p^{gr \to bat} + E_p^{re \to bat}\right) \\ - \left(E_p^{bat \to gr} + E_p^{bat \to de}\right) / \eta^{bat} \qquad p = 1 \tag{17}$$

$$SOC_{|P|} = soc^{init,last} \tag{18}$$

Table 4: Parameters.

Retail price (from grid) [€/kWh]	β_p^{buy}
Grid feed-in tariff (to grid) [€/kWh]	β_p^{sell}
Salary per worker and shift [€]	α_q
Energy demand of machine type i in state s [kW]	e_{is}
Processing time of job j on machine type i [ht!]	pt_{ij}
Renewable energy production [kWh]	re_p
Minimum usable battery capacity [kWh]	soc^{min}
Maximum usable battery capacity [kWh]	soc^{max}
Initial state of charge [kWh]	$soc^{init,first}$
State of charge in last period [kWh]	$soc^{init,last}$
One-way efficiency (dis-/charging) [%]	η^{bat}
Maximal dis-/charging per hour [kW]	$b^{max,rate}$
Loss of battery capacity per hour [%]	$loss^{bat}$
Minimum usable H$_2$-tank capacity [kWh]	h^{min}
Maximum usable H$_2$-tank capacity [kWh]	h^{max}
Initial H$_2$-tank fill [kWh]	$h^{init,first}$
H$_2$-tank fill in last period [kWh]	$h^{init,last}$
Efficiency of electrolysis [%]	η^{el}
Electrolyzer capacity [kW]	c^{el}
Fuel cell capacity [kW]	c^{fc}
Breakpoints for interpolation	b
Fuel cell load factor [%]	lf_b^{fc}
Fuel cell load	$l_b^{fc} = lf_b^{fc} \cdot c^{fc}$
Fuel cell efficiency factor in breakpoints [%]	ef_b^{fc}
Fuel cell efficient energy output in breakpoints	$eo_b^{fc} = ef_b^{fc} \cdot l_b^{fc}$
Dissipation loss of H$_2$-tank [%]	$loss^h$

$$soc^{min} \leq SOC_p \leq soc^{max} \qquad \forall\, p \in P \qquad (19)$$

$$\left(E_p^{gr \to bat} + E_p^{re \to bat} \right) \leq b^{max,rate} \qquad \forall\, p \in P \qquad (20)$$

$$\left(E_p^{bat \to gr} + E_p^{bat \to de} \right) \leq b^{max,rate} \qquad \forall\, p \in P \qquad (21)$$

The battery storage constraints aim to model realistic features of a BSS. Constraint (16) ensures the energy balance of the battery state of charge (SOC_p). The SOC_p is increased by the amount of energy supplied from the grid and renewable sources ($E_p^{gr \to re} + E_p^{re \to bat}$) after considering conversion losses η^{bat}. The SOC_p is decreased by the amount of energy fed into the grid and demand ($E_p^{bat \to gr} + E_p^{bat \to de}$) after conversion losses η^{bat} respectively. This approach also introduces an aging rate ($loss^{bat}$) proportional to SOC_p. Constraint (17) updates SOC_p in the first period considering the initial SOC, which is an input parameter that has to be specified. Constraint (18) defines the SOC_p in the last period, which is an input parameter as well. Constraint (19) limits SOC_p to an lower bound soc^{min} and upper bound soc^{max}. Constraint (20) and (21) restrict charging and discharging to the maximum rate $b^{max,rate}$.

Hydrogen storage constraints

$$
\begin{aligned}
H_p = \left(1 - loss^h\right) \cdot H_{p-1} + \\
\eta^{el} \cdot \left(E_p^{gr \to el} + E_p^{re \to el} \right) - R_p^{fc} \qquad \forall\, p \in \{2, ..., |P|\}
\end{aligned}
\qquad (22)
$$

$$
\begin{aligned}
H_p = \left(1 - loss^h\right) \cdot h^{init,first} + \\
\eta^{el} \cdot \left(E_p^{gr \to el} + E_p^{re \to el} \right) - R_p^{fc} \qquad p = 1
\end{aligned}
\qquad (23)
$$

$$H_{|P|} = h^{init,last} \qquad (24)$$

$$h^{min} \leq H_p \leq h^{max} \qquad \forall\, p \in P \qquad (25)$$

$$\left(E_p^{gr \to el} + E_p^{re \to el} \right) \leq c^{el} \qquad \forall\, p \in P \qquad (26)$$

$$R_p^{fc} \leq c^{fc} \qquad \forall\, p \in P \qquad (27)$$

The hydrogen storage constraints aim to model realistic features of a HSS similarly to the modeling of the battery storage. Constraint (22) ensures the fill level balance of the hydrogen tank (H_p). H_p is increased by the amount of energy supplied from the grid and renewable sources ($E_p^{gr \to el} + E_p^{re \to el}$) after considering conversion losses η^{el}. H_p is decreased by the amount of energy the fuel cell feeds into the

grid and demand (R_p^{fc}) after conversion losses handled in a separate application of the Special Ordered Sets 2 (SOS2). This approach also introduces an dissipation rate ($loss^h$) proportional to H_p. Constraint (23) updates H_p in the first period considering the initial tank fill, which is an input parameter. Constraint (24) defines H_p in the last period, which is an input parameter that has to be specified as well. Constraint (25) limits SOC_p to an lower bound h^{min} and upper bound h^{max}. Constraint (26) and (27) restrict the throughput when filling the hydrogen storage by the electrolyzer (c_{el}) and extracting hydrogen for the Gas-to-Power conversion (c_{fc}).

Special Ordered Sets 2 (SOS2) for interpolation

$$\sum_b \lambda_{bp} = 1 \qquad\qquad \forall\, P, \lambda_{bp} \in SOS2 \qquad (28)$$

$$R_p^{fc} = \sum_b \lambda_{bp} \cdot l_b^{fc} \qquad\qquad \forall\, p \in P \qquad (29)$$

$$\left(E_p^{fc\rightarrow gr} + E_p^{fc\rightarrow de} \right) = \sum_b \lambda_{bp} \cdot eo_b^{fc} \qquad \forall\, p \in P \qquad (30)$$

The SOS2 comprise of outsourced constraints dealing with the non-linear efficiency behaviour of the fuel cell. The SOS2 is applied since the actual efficiency curve is approximated by a piecewise linear function. Constraint (28) guarantees that all breakpoints sum up to one. This allows the breakpoint to act as a weight for the output relation. Thereby the λ_{bp} of the set of breakpoints must be part of the SOS2 compliant breakpoints. At most two breakpoints can be nonzero in one period and must be adjacent in a fixed ordered list. In combination with Constraints (29) and (30) this enables interpolation of the energy throughput and efficient output of the fuel cell related to its load point. Constraint (29) calculates the hydrogen tank throughput by adding the product of two adjacent breakpoint values with their corresponding load at the breakpoint. Respectively, the Constraint (30) calculates the efficient fuel cell output. Here, by adding the product of two adjacent breakpoint values with their corresponding efficient energy output of the piecewise linear function.

Binary and non-negativity constraints

$$W_{ips} \in \{0, 1\} \qquad\qquad \forall\, i \in M, p \in P, s \in S \qquad (31)$$

$$X_{ijp}, Y_{ijp} \in \{0, 1\} \qquad\qquad \forall\, i \in M, j \in N, s \in S \qquad (32)$$

$$
\begin{aligned}
&E_p^{gr\rightarrow de}, E_p^{gr\rightarrow bat}, E_p^{gr\rightarrow el}, E_p^{re\rightarrow gr}, E_p^{bat\rightarrow gr}, \\
&E_p^{fc\rightarrow gr}, E_p^{re\rightarrow bat}, E_p^{re\rightarrow el}, E_p^{re\rightarrow de}, E_p^{bat\rightarrow de}, \\
&E_p^{fc\rightarrow de}, R_p^{fc}, SOC_p, H_p \geq 0 \qquad \forall\, p \in P
\end{aligned}
\qquad (33)
$$

$$V_q \in \mathbb{N}^0 \qquad\qquad \forall\, q \in Q \qquad (34)$$

$$\lambda_{bp} \geq 0 \qquad\qquad \forall\, b \in B, p \in P \qquad (35)$$

The scheduling variables W_{ips}, X_{ijp} and Y_{ijp} are defined as binary variables. All energy flows ($E_p^{source\rightarrow sink}$), fuel cell throughput (R_p^{fc}), state of charge (SOC_p), hydrogen tank fill (H_p) and breakpoints (λ_{bp}) are defined as floating point decision variables. The number of workers per shift (V_q) is defined as an integer value.

Solving the data sets presented in Section 5.1 for the planning horizon of one year requires huge computational power. Therefore, the data is being split into weekly data sets. For a first mid-term planning horizon, the model is applied to 52 weekly data sets, which add up to one year. Weeks start on Wednesdays to actively force the model to consider higher labor costs on weekends. For a second long-term planning horizon, only the energy demand derived from job scheduling and shift planning is used as a basis to optimize the energy management for a whole year. In the second stage all job scheduling constraints ((6)-(13)) and shift planning constraints ((14)-(15)) are neglected. While all labor related decisions are fixed, the objective function minimizes energy costs as formulated in Equation (5). Energy management decisions are made for all 8736 hourly based periods.

5. Results of numerical experiments

This chapter outlines the results of the numerical experiments that were conducted. Open-source data in combination with the previously described modeling framework allow for reproducibility of the proposed model. The model is programmed using the open-source programming language Julia (version 1.6.3) including the Julia Mathematical Programming (JuMP) package. The Gurobi Optimizer (version 9.1.2) is used under an academic license to solve the model (using a MacBook Pro with 3.1 GHz Dual-Core Intel Core i5 and 16 GB RAM, allowing a MIP-gap of 5%, MIP-Focus of 1 and time limit of 30 minutes). In Section 5.1, the test cases and derivation of input data is described. The results are presented and discussed in Section 5.2.

5.1. Description of test cases and input data

To evaluate and analyze the behavior of combined energy storage and energy management in energy-aware production planning, the model is applied to illustrative numerical experiments for a hypothetical factory.

The manufacturing system is based on differently characterized milling machines proposed by Ding et al. (2016). The research observes the operation of old manual manufacturing machines alongside advanced ones in manufacturing companies. The advanced machines generally feature higher energy demand and faster operation speeds. Accordingly, in this hypothetical case two manual machines alongside one automatic machine are considered. The different energy consumption rates per period for the different machine states are summarized in Table 5. The fulfillment of 50 jobs with varying processing speeds on the different machine types is considered for the planning horizon of one week.

Table 5: Data for hypothetical manufacturing company including automatic and manual machine type specifications (based on data from Ding et al. (2016)).

Production			
Jobs J		$J = 50$	
Machines M		$M = 3$	
Periods P		$P = 168$	
Machines	Automatic	Manual Type I	Manual Type II
Energy demand process (100%)	282 kW	27 kW	24 kW
Energy demand setup (115%)	324 kW	31 kW	28 kW
Energy demand idle (5%)	14 kW	2 kW	1 kW
Energy demand turnoff (15%)	42 kW	5 kW	4 kW
Time needed for setup/turnoff		1 h	
Processing speed	1-6 h	2-12 h	3-13 h

Shift costs for workers are based on tariffs from the iron and steel industry presented in Table 6. Day and swing shifts are already planned and do not cause any additional costs during the work week from Monday to Friday. Therefore, only the remaining shifts cause additional shift costs.

The energy storage specifications shown in Table 7 are drawn and adapted from multiple sources to fit the hourly based planning horizon. The efficiency of electrolysis is drawn from the Silyzer 300 manufactured by Siemens energy. This is a modular system based on PEM electrolysis. The electrolyzer and fuel cell capacities are both at 2000 kW and is oriented at a pilot project of the APEX Group, which also manufactures customer specific hydrogen pressure storage. 2000 kW capacity allows for storage of peak renewable energy supply and energy extraction for peak energy demand. The non-linear efficiency behavior of the fuel cell is adapted from a fuel cell performance investigation incorporated in a hybrid electric vehicle as presented in Appendix 1. Loss rates for both the hydrogen tank and battery storage are negligibly small. However, they are considered in these numerical experiments to model a more realistic energy storage system based on values calculated in Appendix 2. The maximal dis-/charging rate of the battery system is set equal to the rated maximum usable capacity to fully utilize the short-term storage. For example FREQCON produces battery storage systems of various capacities with the specified one-way efficiency.

Energy prices and data for renewable energy production are extracted from the Bundesnetzagentur (2020). To observe mostly crisis-free data, 2020 is chosen as a reference year. The actual Germany-wide energy generation as visualized in Figure 1 is taken as an indicator for renewable energy availability. Here, the generation fluctuation of the incorporated renewable system is mapped with Germany-wide renewable energy generation capacity of onshore wind and photovoltaics. The peak power is allocated such that the aggregated renewable energy production of the considered year could cover the energy demand of the annual production regardless of the respective time availability. In this case, a 500 kWp wind onshore turbine and a 400 kWp PV system suffice this condition while being oriented at the wind to PV ratio

of 60:40 to minimize their fluctuations (Sterner & Stadler, 2019, p. 135).

In order to observe effects of various storage allocations an initial set of combinations is optimized in a first stage, extended by further combinations of interest in a second stage and optimizations only with one storage type to complete the analysis. Cases 1 to 16 are optimized in the first stage. Four hydrogen storage capacities are combined with any of the four battery storage sizes shown in Table 8. The hydrogen tank capacities are chosen based on a first optimization utilizing an oversized hydrogen storage which revealed no deviation from the initial fill over 200 MWh. Therefore, a maximum hydrogen storage capacity of 400 MWh allows for positive and negative deviations. The other hydrogen storage sizes are chosen in linear degressive steps of 100 MWh. The initial set of battery storage capacities is chosen in steps of 200 kWh ranging around the peak energy demand of 383 kW. In the second stage, the initial cases are extended by even more battery capacities (Cases 17 to 28) to investigate the influence of the short-term storage in more detail, since higher cost saving potentials are identified for the short-term storage in the first stage. As the main goal of this work is to analyze effects of combined energy storage systems the optimizations with only one storage type are there to support the initial findings. All cases are compared to the optimization of a baseline scenario. This baseline scenario features no energy storage system with otherwise identical input parameters. Thus, it represents a production company that already utilizes renewable energy sources without means of storage.

5.2. Results and discussion

To validate and analyze the output of the developed model, various indicators and economic parameters are evaluated. Firstly, the influence of storage size allocation on the total operational costs is compared. Secondly, self-consumption rate (SCR), self-sufficiency rate (SSR) and energy surplus (SUP) are analyzed in more detail. Thirdly, the use of the combined ESS is investigated regarding utilization rates of storage capacities. Detailed investigations of optimized energy flows are consulted to provide further insights into energy management decisions.

Table 6: Day-dependent shift costs (based on data from IG Metall (2022)).

Shift costs per worker	Day shift	Swing shift	Night shift
Monday	0€	0€	234€
Tuesday	0€	0€	234€
Wednesday	0€	0€	234€
Thursday	0€	0€	234€
Friday	0€	0€	234€
Saturday	208€	208€	234€
Sunday	290€	290€	350€

Table 7: Nominal energy storage specifications (based on data from Siemens (2022)[1]; APEX Group (2022)[2]; Fletcher and Ebrahimi (2020)[3]; Töpler and Lehmann (2017)[4]; FREQCON (2017)[5]; (Sterner & Stadler, 2019, p. 300)[6]).

Hydrogen storage system	
Efficiency of electrolysis[1]	$\eta^{el} = 75.5\%$
Electrolyzer capacity[2]	$c_{el} = 2000$ kW
Fuel cell capacity[2]	$c_{fc} = 2000$ kW
Breakpoints for interpolation	$b = [1.0, 2.0, 3.0, 4.0]$
Fuel cell load factor[3]	$lf_b^{fc} = [0.00, 0.10, 0.60, 1.00]$
Fuel cell efficiency factor in breakpoints[3]	$ef_b^{fc} = [0.00, 0.54, 0.46, 0.37]$
Dissipation loss of H2-tank[4]	$loss^h = 0.00017\%$
Battery storage system	
Maximal dis-/charging per hour	$b^{max,rate} = soc^{max}$
One-way efficiency (dis-/charging)[5]	$\eta^{bat} = 98\%$
Loss of battery capacity per hour[6]	$loss^{bat} = 0.00035\%$

Table 8: Cases for hydrogen storage and battery storage capacity allocations in the first (gray) and second optimization stage (white).

H₂ \ Bat	0 kWh	100 kWh	200 kWh	400 kWh	600 kWh	800 kWh	1000 kWh	1200 kWh
0 MWh	base							
100 MWh		17	1	2	3	4	21	25
200 MWh		18	5	6	7	8	22	26
300 MWh		19	9	10	11	12	23	27
400 MWh		20	13	14	15	16	24	28

First, the total energy costs of all cases are compared to the optimization of the baseline scenario. The total cost calculation is based on the sum of the formulations (5) and (15). First optimizations showed that job scheduling and shift planning are mainly based on the availability of RGEN to minimize costly energy sourcing. Additionally, production plans and thus labor costs of the investigated cases do not change significantly (<2%) compared to the baseline scenario. Therefore, only total cost savings are considered, which are determined by effects of energy management. The results of the economic analysis are presented in Table 9.

Table 9 reveals four essential findings. First, increasing battery storage capacity leads to rising total cost savings. Compared line by line, the largest battery storage results in total cost savings that are 14.6 - 15% higher than in the respective scenario with the smallest installed battery capacity. This is also supported by the optimization with only battery storage showing an strict increase in savings potential. Second, there is a decreasing gradient of the savings poten-

tial with increasing battery storage capacity. The higher the capacity, the lower the increase in cost savings. By further increasing short-term storage capacity the saving potential approaches the share of total costs originating from energy purchase. Third, with increasing hydrogen storage capacity, the total cost savings increase slightly (<1%). The largest hydrogen storage capacity leads to slightly (0.4 - 0.8%) higher total cost savings than the respective scenario with the smallest hydrogen storage capacity. This is also supported by the optimization with only hydrogen storage showing a slight increase in savings potential (while 400 MWh does not fit the observation). Increasing short-term storage capacities influence total costs more significantly than increasing long-term storage capacities. This relation results from the more efficient utilization of short-term storage to decouple on-site energy generation from energy consumption, which is further investigated in subsequent analyses. Fourth, against expectations case 9, 13 and 14 (and the 400 MWh hydrogen storage case) do not fit the explored observations. This is due to a

conflict of the short-term and mid-term planning approach. Whilst the mid-term optimization achieves results matching the observed patterns, the long-term planning approach deviates from the observed pattern.

Based on the economic analysis, large short-term energy storage systems, in combination with variously sized long-term energy storage, are of economic interest for production companies. The short-term storage capacity influences the total costs more significantly than the long-term storage capacities. The combination of a 1200 kWh battery and 300 MWh hydrogen storage shows the highest cost reduction potential with 29.3% compared to the baseline scenario. Furthermore, the proposed two-stage optimization approach reveals inaccurate performance for the individual cases 9, 13 and 14 which are treated as outliers for subsequent investigations.

In order to analyze energy-related effects, the solutions are compared regarding SCR, SSR and SUP as key performance indicators (KPI). The SCR (Equation 36) is defined as the share of on-site generated energy consumed locally. This includes renewable energy production for demand and stored energy minus stored energy capacities fed into the grid. The SSR (Equation 37) is defined as the share of local demand satisfied by on-site energy production, indicating the autonomy of the considered system (Luthander et al., 2015). On-site energy production comprises of renewable energy production for demand and stored energy minus extracted energy capacities stored from the grid. The SUP (Equation 38) is the proportion of the total amount of energy entering the system that is not used for production and the amount of energy needed for production (Wichmann et al., 2019b). Energy entering the system not used for production consists of renewable energy production sold to the grid and extracted energy capacities stored from renewables and sold to the grid. Energy conversion, dissipation and aging losses are considered as part of the system's demand. Mean roundtrip efficiencies are used to calculate temporarily stored energy quantities. The results of the presented KPIs are given in Table 10.

$$SCR = \frac{E_{total}^{re \to de} + E_{total}^{re \to bat} - E_{total}^{bat \to gr} + E_{total}^{re \to el} - E_{total}^{fc \to gr}}{re_{total}} \quad (36)$$

$$SSR = \frac{E_{total}^{re \to de} + E_{total}^{bat \to de} - E_{total}^{gr \to bat} \cdot 0.98^2 + E_{total}^{fc \to de} - E_{total}^{gr \to el} \cdot 0.334465}{DE_{total}} \quad (37)$$

$$SUP = \frac{E_{total}^{re \to gr} + \frac{E_{total}^{bat \to gr}}{0.98^2} + \frac{E_{total}^{fc \to gr}}{0.334465}}{DE_{total}} \quad (38)$$

Table 10 shows three essential findings. First, compared to the baseline scenario (SCR: 69.2%, SSR: 69.6%, SUP: 31.0%) all considered cases show significant improvement for all KPIs in relation to the considered allocation. Second, when comparing the largest battery storage capacity

with the respective smallest battery storage capacity, SCRs slightly (0.1 - 1.5%) decrease, SSRs increase (5.2 - 6.9%) and SUPs slightly increase (0.2 - 1.6%). This indicates that the more short-term storage capacity is available, the less on-site generated energy stays in the system to fulfill the energy demand, but more is stored and sold to the energy market in later periods. Autonomy still increases as only excess storage capacities are offered for energy trading. In contrast to the decreasing SCRs and increasing SUPs for the combined optimization, in the battery-only cases SCRs increase and SUPs decrease. This reveals that that self-consumption and surplus are traded off in favor of better self-sufficiency, which increases more strongly in the combined cases than in the battery-only cases. Third, when comparing scenarios of larger hydrogen storage capacity to the respective scenario with the smallest hydrogen storage capacity, there are slight increases for SCRs (0.9 - 2.1%), SSRs (0.3 - 0.8%) and SUPs (1.0 - 2.2%) also evident in the hydrogen-only cases. In case the short-term storage can be fully charged and there is surplus renewable energy that cannot be sold profitably on the energy market, it is stored long-term and used during later more cost-intense periods. The long-term storage thus acts as a backup system, which increases the usage of on-site generated energy within the production system. The higher the capacity, the more energy is stored for later use. This behavior can be confirmed by the exemplary energy flows depicted in Figure 5, except that the model decides to charge the battery storage at the end of a period of high renewable energy availability. Given full information on renewable energy availability and price developments, the battery storage is charged as late as possible to avoid unnecessary losses due to aging effects of the storage, because the loss rate of the battery system is higher than the loss rate of the hydrogen storage. Additionally, in the range of period 481 to 673 the energy stored in the hydrogen storage is partly utilized to bridge the low availability of renewable energy. Added to that, during low demand phases, energy surplus is immediately stored in the battery storage to assist during subsequent more energy-intense production phases. Even though the mid-term planning approach scheduled less energy intense jobs during that time, additional energy is purchased from the grid. Before period 649, energy is even purchased at a comparatively low price to be stored in the battery and used in more pricey subsequent periods. Beginning from period 673, more renewable energy is available and used to refill the hydrogen storage. Energy is never stored and extracted from a storage in the same period due to conversion losses. The results of this analysis show that storage systems increase the utilization of on-site generated energy and system autonomy. In combination, the short-term storage does not only increase autonomy, but also energy trading through utilizing storage capacities to temporally store cheap renewable energy and generate revenue in times of high energy prices. Whereas the long-term storage acts as a backup to store any surplus energy for shifting on-site generated energy to later periods on a mid-term basis. In contrast to short-term storage, larger long-term storage capacity decreases energy trading.

Table 9: Total cost savings [%] optimized for a yearly planning horizon compared to the baseline scenario related to the allocation of hydrogen storage and battery storage capacity.

Bat\\H₂	0 kWh	100 kWh	200 kWh	400 kWh	600 kWh	800 kWh	1000 kWh	1200 kWh
0 MWh	base	5.6	9.1	14.0	17.6	20.6	23.1	25.0
100 MWh	10.6	13.8	15.9	19.8	22.4	24.9	27.2	28.8
200 MWh	10.9	14.2	16.7	20.4	22.8	25.4	27.7	29.2
300 MWh	11.2	14.6	14.2	20.6	22.8	25.8	27.9	29.3
400 MWh	10.3	14.6	13.1	20.3	22.8	25.2	27.8	29.2

Table 10: Self-consumption rate, self-sufficiency rate and energy surplus [%] related to the allocation of hydrogen storage and battery storage capacity.

Bat\\H₂		0 kWh	100 kWh	200 kWh	400 kWh	600 kWh	800 kWh	1000 kWh	1200 kWh
0 MWh	SCR	69.2	71.4	73.5	76.5	78.6	79.9	81.3	82.1
	SSR	69.6	72.2	74.2	77.0	79.0	80.4	81.7	82.4
	SUP	31.0	29.1	26.9	24.0	21.9	20.8	19.3	18.5
100 MWh	SCR	94.2	94.1	94.0	93.5	93.1	93.0	92.7	92.6
	SSR	79.9	81.3	82.1	83.5	84.1	85.2	86.0	86.5
	SUP	6.1	6.2	6.3	6.8	7.2	7.3	7.7	7.8
200 MWh	SCR	94.6	94.5	94.5	94.2	93.7	93.8	93.6	93.4
	SSR	80.1	81.4	82.5	84.0	84.5	85.7	86.4	86.9
	SUP	5.7	5.8	5.7	6.1	6.6	6.5	6.8	7.0
300 MWh	SCR	94.8	94.8	93.9	94.9	94.7	95.0	94.7	94.7
	SSR	80.1	81.5	80.3	84.1	84.7	86.3	86.8	87.4
	SUP	5.4	5.5	6.4	5.4	5.6	5.3	5.7	5.7
400 MWh	SCR	95.4	95.0	94.0	95.0	95.0	94.7	94.8	94.7
	SSR	79.8	81.6	80.2	84.0	84.9	85.6	86.8	87.3
	SUP	4.8	5.2	6.3	5.3	5.3	5.6	5.6	5.6

To analyze the use of the combined ESS, the utilization rates (UR) of storage capacities are compared. The URs are computed as follows:

$$H_2 - UR = \frac{\sum_{p \in P} H_p}{h^{max} \cdot 8736} \tag{39}$$

$$Bat - UR = \frac{\sum_{p \in P} SOC_p}{soc^{max} \cdot 8736} \tag{40}$$

Table 11 presents the utilization rates of the considered storage capacities. The UR is defined as the quotient of the aggregated actual storage fill and the aggregated storage capacity over all periods. Three main findings can be derived. First, hydrogen tank URs (H₂-UR) range between 71.1 - 77.8%. The storage fill level on average ranges near a three-quarter filling, which indicates its operation as a steady storage system able to deal with fluctuations. This is due to a small storing/extracting rate compared to its storage size. Comparatively, battery URs (Bat-UR) range between 26.8 - 36.4%. The short-term storage is identified by a strongly fluctuating SOC with partly emptied periods when there is low renewable energy generation, resulting in low URs. Battery-based stored energy quantities are mostly only stored to be used in subsequent periods. This is due to the dis-/charging

rate, which is set equal to the storage capacity itself and allows for quick storage and extraction of stored capacities. Figure 6 depicts the exemplary utilization of the combined energy storage system for most of the cases. The hydrogen storage is filled until half of the year by storing large amounts of surplus on-site renewable energy and purchasing large amounts of energy from the energy market when prices are low. During pricey periods, the hydrogen is then converted back to electric energy and used to satisfy the energy demand of the production. In the second half of the yearly planning horizon, stored energy quantities also continuously provide energy during pricey periods and are reduced until the initial fill is reached at the end of the year. In contrast, the described fluctuating SOC of the battery storage is shown as well. Second, increasing battery storage capacity leads to higher battery utilization. Larger battery storage capacity results in a Bat-UR increase (8.3 - 9%) compared to the respective scenario with the smallest battery storage capacity. However, the effect on the hydrogen storage utilization is ambiguous as H₂-URs increase and drop (-4 - 1.3%) for the different storage capacities also seen for the hydrogen-only cases. Therefore, the sankey diagrams in Figure 7 reveal detailed information on the storage utilization. For the exemplary comparison of Case 20 and 28, the increase of short-term storage capacity leads to increased energy flows enter-
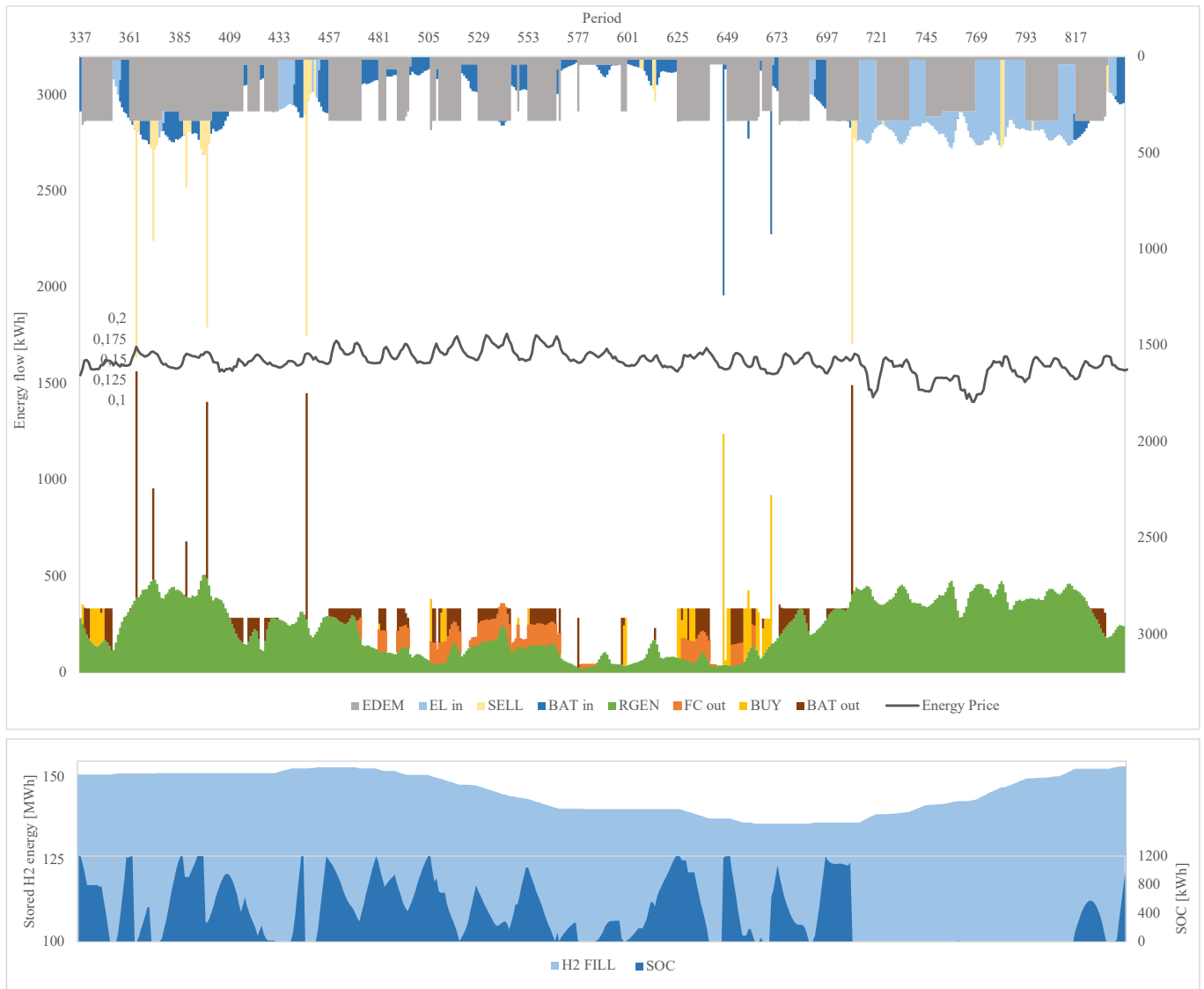
Figure 5: Exemplary energy flows and storage utilization of case 27 depending on energy price fluctuations and renewable energy availability of case 27 (300 MWh:1200 kWh) from period 337 to 840 (own depiction).

ing and leaving the battery storage. Because of its high efficiency, the battery is preferred over the hydrogen storage. In accordance with previously conducted investigations, there is an increased energy surplus that is sold on the energy market utilizing the battery storage system to generate additional revenue. Besides, the significantly increased energy flow entering and leaving the battery storage indicates the decoupling of RGEN and energy consumption, which is a reason for the explored cost saving potentials as less energy needs to be purchased from the grid. Furthermore, there is less energy surplus that can be stored long-term in the hydrogen tank. Interestingly, there is no clear increase in the battery-only cases as well. While the introduction of a hydrogen storage leads to lower utilization of the battery storage compared to the battery-only cases it also reveals that in combination battery storage focuses more intensely on short-term storage and only increases storage duration with increasing storage capacity. Third, increasing hydrogen storage capacities lead to decreasing URs of both storage systems. Bat-URs slightly (0.6 - 1.6%) decrease and H_2-URs decrease (0.3 - 5.6%) with larger hydrogen storage capacity compared to the respective scenario with the smallest hydrogen storage capacity. This indicates that larger long-term storage capacities reduce the demand for short-term stored energy quantities. Instead of being stored for a short period of time for short-term energy trading, energy quantities can be stored long-term to provide price hedging. Decreasing H_2-URs occur due to only slightly increasing energy flows entering and leaving the hydrogen tank, while the capacity increases more significantly for the considered cases, resulting in unused capacities. This relation can be seen in Figure 7 when comparing 7c with 7b. Moreover, the large gap at the output of the HSS can be seen, which on average accounts for 60% energy losses due to energy conversion and dissipation. In contrast, for

the BSS these losses amount to an average of only 4%. This also explains the lower cost reduction potential for increased hydrogen storage capacities compared to battery storage.

In conclusion, three results can be obtained based on the conducted analyses. First, the utilization of combined energy storage systems reduces total costs by up to 29.3% compared to the baseline scenario. This is achieved by the combination of a 1200 kWh battery and 300 MWh hydrogen storage. This corresponds to a 1:250 ratio of battery storage capacity over hydrogen storage capacity and a 3:4:1000 ratio (renewable power over battery capacity over hydrogen capacity) in relation to the renewable energy plant peak power. The larger the storage capacities, the higher cost savings can be achieved. Even higher saving potentials can be expected if battery storage capacities are further increased. Battery storage capacity has a stronger effect on the cost savings than the hydrogen storage capacity. Second, autonomy of production systems can be improved. Whereas the combination of short-term and long-term show contrary effects. Increasing the capacity of short-term storage encourages energy trading. Whilst increased long-term storage capacity reduces energy surplus and increases autonomy. Third, battery storage is preferred because of its high efficiency. The hydrogen storage acts like a backup enabling mid-term price hedging in times of low renewable energy availability or high prices.

6. Conclusions and Outlook

This chapter surmises the results of this research, with Section 6.1 discussing implications for science and practical application and Section 6.2 outlining prerequisites for the proposed approach and directions for future work.

6.1. Practical implications

The problem investigated in this thesis is the utilization of combined battery- and hydrogen-based energy storage within an energy-aware production planning framework with existing renewable energy generation.

The proposed two-stage optimization approach suggests the utilization of combined battery- and hydrogen-based energy storage as typical representatives of short- and long-term ESS for production companies that utilize renewable energy power plants. On the one hand, highly efficient short-term energy storage should be incorporated in hybrid energy systems to achieve significant energy cost savings. On the other hand, to gain independence from the energy market and increase the utilization of on-site renewable generated energy, the combination with a long-term energy storage system like the considered hydrogen storage is beneficial. The explored cost-optimized 1:250 ratio of battery storage capacity over hydrogen storage capacity indicates the sufficiency of small-sized short-term storage and an optimized utilization of comparatively large sized long-term storage. Energy management decisions mainly have to be made based on renewable energy availability. In phases of low renewable energy availability (below peak demand), charging of the battery storage should be prioritized to bridge the daily RGEN

fluctuations. At the same time, additionally extracted energy from the hydrogen storage has to feed the energy demand for production. Even sourced energy quantities from the market should be considered for short-term storage if prices are sufficiently low. In case storage capacities are exhausted or the extraction of energy from the hydrogen storage is no longer lucrative in respect of future refill opportunities, energy should be sourced from the energy market to satisfy energy demands. In phases of high renewable energy availability (above peak demand), refilling the hydrogen tank should be prioritized while the production demand can be sufficiently provided by RGEN and supplemented with short-term storage and extraction utilizing the battery system. If there is surplus energy supply characterized by low energy prices at the spot market, energy should be sourced from the grid to fill the hydrogen storage at low cost. Energy should only be sold to the grid if the company's own energy demands are satisfied and retail prices are sufficiently high. This can even be short-term stored energy that is sold when retail prices are high (energy arbitrage). These conclusions deserve a word of caution as they depend on the specific scenario chosen for this investigation, which is further discussed in Section 6.2. Unlike material costs and the predominant share of labor costs, energy costs can be actively influenced by management decisions. Therefore, the consideration of energy-aware production planning plays a significant role for saving costs of energy-intensive production companies. If connected to a decentralized energy network, the considered production system acts as a so-called "prosumer": The production company not only consumes energy, but also generates energy for the grid. Energy is either immediately fed into the grid when there is energy surplus from on-site renewable energy generation and sold on the energy market, or it is temporarily stored and offered to the market when retail prices are sufficiently high. Furthermore, in case of reduced energy demand of the production system due to more efficient processes or fewer machines, renewable energy plants still generate electricity. This surplus electricity can be used manifold. The model shows that stored energy can be sold profitably in later periods. Full information on the availability of renewable energy and energy price fluctuations allows for the sale of stored energy quantities at the right timing for the profit margins explored by the model optimization. However, profit margins of lower extend could still be achieved if energy management monitors energy demand and price fluctuations to offer energy in times of relatively high prices. Unused storage capacities could also act as decentralized energy storage for the electricity grid. This capability could be used for smoothing voltage fluctuations and stabilize the electricity network. The surplus stored hydrogen could also be sold on future markets for hydrogen as proposed by Fraunhofer Institute (2019). This opens a second opportunity of generating revenue. As a result, the considered production system adds to a more decentralized energy system and enhances sector-coupling with the trade of green hydrogen.

To conclude, the utilization of combined ESS implemented by the proposed energy-aware production planning

Table 11: Utilization rates of storages [%] related to the allocation of hydrogen storage and battery storage capacity.

Bat \ H$_2$		0 kWh	100 kWh	200 kWh	400 kWh	600 kWh	800 kWh	1000 kWh	1200 kWh
0 MWh	H$_2$-UR	base	—	—	—	—	—	—	—
	Bat-UR		43.2	42.2	42.3	42.7	42.9	43.3	43.6
100 MWh	H$_2$-UR	74.3	75.4	75.8	76.3	76.2	75.8	76.2	76.7
	Bat-UR	—	28.1	29.2	31.7	33.4	34.9	36.2	36.4
200 MWh	H$_2$-UR	77.3	77.8	77.6	77.0	76.9	76.3	76.7	76.7
	Bat-UR	—	27.5	28.9	31.6	33.0	34.8	35.7	36.4
300 MWh	H$_2$-UR	76.5	76.6	76.2	76.9	76.8	76.9	77.3	77.0
	Bat-UR	—	26.8	28.3	30.2	32.3	34.1	35.1	35.8
400 MWh	H$_2$-UR	75.9	75.1	75.0	73.0	73.1	71.5	71.3	71.1
	Bat-UR	—	26.8	27.6	30.2	32.1	33.9	34.9	35.8
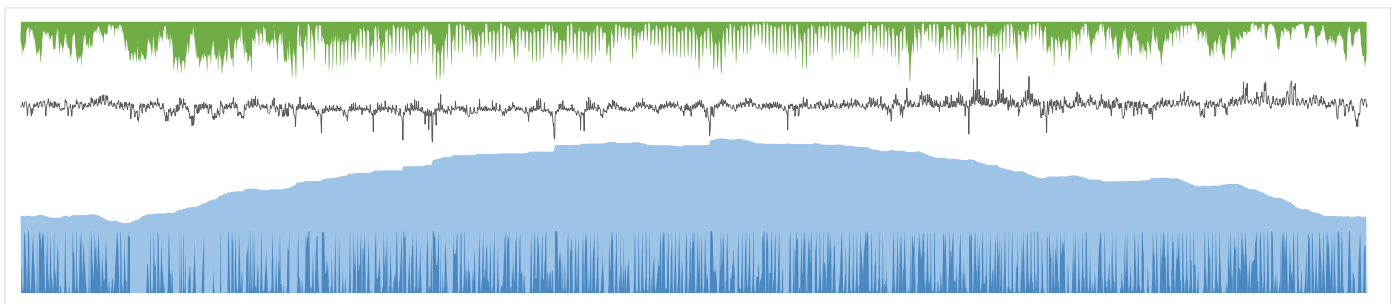
Figure 6: Exemplary energy storage utilization of case 27 with grey line: energy price level (0.03 - 0.31 €/kWh), light blue: hydrogen storage fill (136000 - 300000 kWh), blue: SOC (0 - 1200 kWh), green: RGEN (6 - 696 kWh) (own depiction).

approach would not only lead to a considerable reduction of energy costs, but would also support the transition from conventional power plants to renewable power generation.

6.2. Outlook

This thesis introduces a model for EAPP-BHS. More realistic technology characteristics, a combined ESS and the tracking of energy flows have been incorporated in the model. However, these model extensions also significantly increase computation time. Therefore, the computational efficiency remains a challenge despite the proposed two-stage optimization approach, which widely generates valid results. For a single weekly optimization run, the solution time was on average 14 minutes, which sums up to 12 hours optimization time for the long-term optimization stage. A few exceptional weeks took 30 minutes being responsible for explored outliers. Here, solver settings could be adapted to get more consistent results. The long-term optimization stage only took 2 minutes on average. Because of neglecting job scheduling and shift planning constraints, the second optimization stage is much faster than the first optimization stage, but relies on valid results of the more time critical first optimization stage. Therefore, an iterative optimization approach could have improved results. Here, data points from the yearly based optimization could serve as input for the initial fill and SOCs for a second optimization iteration. This was not part of the scope of this thesis. Hence, the identified outliers where not considered for concluding results derived from the conducted analyses steps.

The conducted analyses allowed to gain a better understanding of the potential and interdependencies of combined battery- and hydrogen-based energy storage systems for energy-aware production planning with renewable energy generation. The suitability of the combination of long-term and short-term energy storage systems to increase the utilization of on-site renewable energy generation and hedging against short- and mid-term energy price fluctuations was confirmed. An optimized ratio of battery to hydrogen storage capacity was identified. But, this ratio depends on the specific production case and prerequisites considered in this thesis, which are discussed in the following.

First, the assumptions presented in Section 4.1 and described input data for the numerical experiments in Section 5.1 create the framework for the derived solutions. The current state of technology is considered, but technological evolution may impact the managerial decisions in hybrid energy systems, thereby potentially requiring changes of input parameters to consider different technology specification scenarios. Additionally, the model is designed to find a cost-optimized solution given full information on renewable energy availability and price fluctuations. As a result RGEN-oriented production plans of the baseline scenario and considered test cases occur. In reality, such flexibility could only be achieved in fully automated workshops that are able
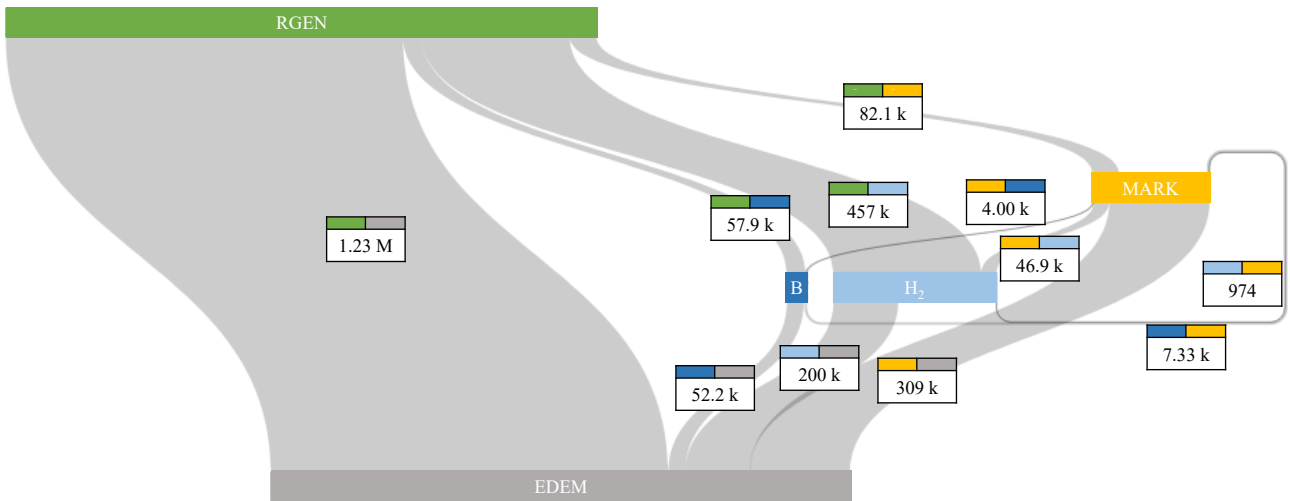
(a) Case 20: 400 MWh hydrogen storage, 100 kWh battery storage
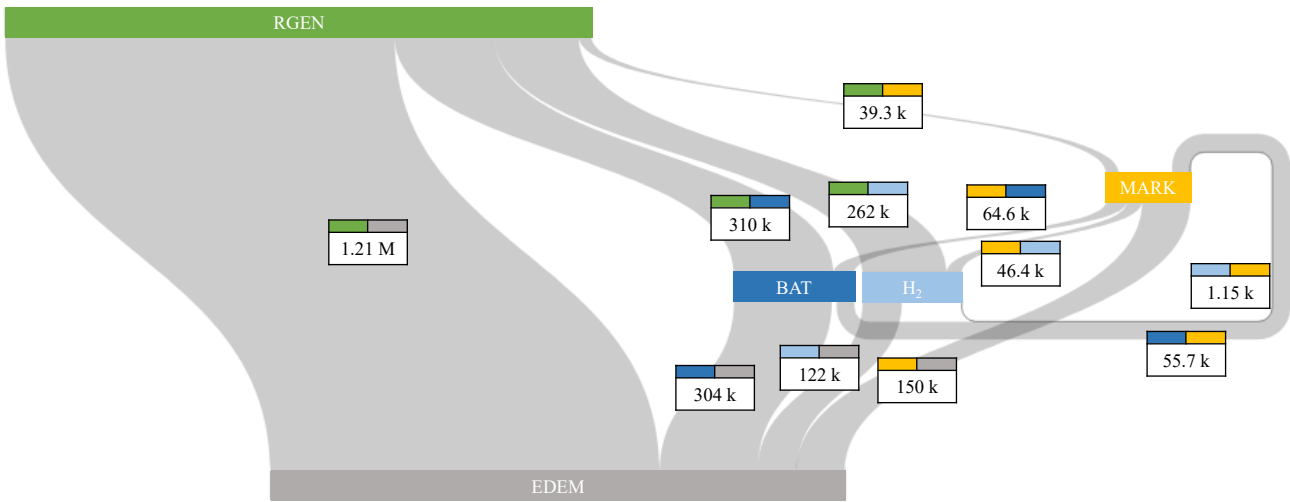
(b) Case 28: 400 MWh hydrogen storage, 1200 kWh battery storage
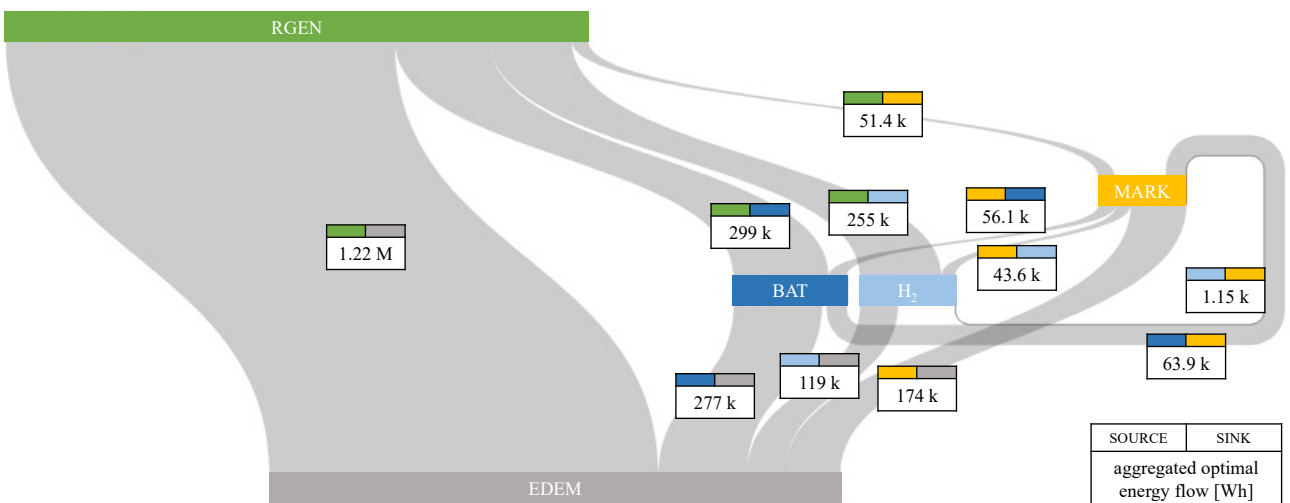
(c) Case 25: 100 MWh hydrogen storage, 1200 kWh battery storage

Figure 7: Sankey diagrams of aggregated optimized energy flows.

to quickly respond to real-time operational decisions. Thus, the model is limited to decision support regarding the sizing of storage capacities and energy management, but does not qualify as a planning tool for future production planning. Moreover, the model is limited to one-stage production systems with parallel machines without warehousing. Second, the chosen renewable energy generation system (500 kWp wind onshore turbine and a 400 kWp PV) features a quite balanced energy generation output throughout the year. Potentially, systems relying on only one renewable energy source, nowadays mostly solar power, can benefit more from the combined storage system. Then long- and short-term storage could specialize even more on their scope of storage duration. Third, investments of the proposed ESS are not considered within the scope of this thesis. It remains questionable if energy saving potentials of combined ESS amortize in reasonable time. Fourth, the proposed model does not include a comprehensive consideration of energy consumption. Non-production processes included in the production company or waste heat utilization could be incorporated by more comprehensive models. For example, waste heat from the considered energy conversion by the assumed electrolyzer and fuel cell system could be used to satisfy local heating demands of the company's facilities. For the explored cost-optimized case approximately 180 MWh (60%) of the converted energy could not be used due to conversion losses mainly resulting in waste heat. This waste heat could be used to improve energy utilization and thus reduce total costs.

The following research directions can be derived for the future. First, forecasted technology scenarios could be applied to the model to investigate future potentials of combined ESS (cryogenic hydrogen storage, lithium-air batteries). Second, the presented cases can be generally extended in two dimensions. Larger battery storage capacities and smaller hydrogen storage capacities can be considered to investigate the model's behavior at approaching boundaries. Furthermore, different renewable power plant setups with more seasonally concentrated renewable energy generation and the model performance for different years could be tested. Third, more comprehensive energy management could be addressed by the consideration of non-production energy demand or waste heat utilization. And fourth, there is a gap for energy-aware production planning tools that incorporate energy management within micro-grid systems based on predictions for renewable energy generation or energy price developments to allow for improved decision support.

7. Summary

This thesis proposes a model for energy-aware production planning. The considered production system contains a production (maximum power demand: 383 kW), a wind turbine (capacity: 500 kWp), a photovoltaic system (capacity: 400 kWp), a battery (capacity: 100 - 1200 kWh) and hydrogen storage (capacity: 100 - 400 MWh) with an electrolyzer and fuel cell. Trading with the energy market is allowed in both directions for purchase and sale of electricity. Time-dependent feed-in tariffs and retail prices are considered for the German energy market in 2020. Renewable energy generation is based on average Germany-wide availability. The objective of this thesis is to investigate the utilization of combined battery- and hydrogen-based energy storage systems. To achieve this objective, Chapter 2 describes the characteristics of energy-aware production planning are described focusing on the European energy market, on-site renewable energy generation and storage technologies. Based on a literature review in Chapter 3, the missing consideration of combined short-term and long-term energy storage systems is identified. In Chapter 4, a formal mathematical model is developed as a mixed-integer linear program on the basis of the identified problem framework. Special features of the model compared to related research are the depiction of energy flows between the system components, especially in exchange with the considered combined energy storage system and the consideration of more realistic technology properties. Mathematical optimization of the model minimizes labor and energy costs. In Chapter 5, the model is applied to hypothetical numerical experiments. The influence of storage capacities on total costs, system autonomy, self-consumption, energy surplus and storage utilization rates is analyzed. For this purpose, different allocations of storage capacities are optimized using the model. The results show that the highest cost savings of 29.3% can be achieved with a renewable plant to battery to hydrogen storage capacity ratio of 3:4:1000 for the considered scenario. Based on the results from the numerical experiments, implications for a beneficial application of the proposed energy-aware production planning approach and for sizing storage capacities are derived in Chapter 6. Furthermore, the application of the model to other cases and possible extensions are suggested as fields for future research.

References

Abikarram, J. B., & McConky, K. (2017). Real time machine coordination for instantaneous load smoothing and photovoltaic intermittency mitigation. *Journal of Cleaner Production, 142*, 1406–1416. https://doi.org/10.1016/j.jclepro.2016.11.166

APEX Group. (2022). *CO2 neutral industrial park* [APEX]. Retrieved August 26, 2022, from https://www.apex-group.de/our-offer/park/

Bänsch, K., Busse, J., Meisel, F., Rieck, J., Scholz, S., Volling, T., & Wichmann, M. G. (2021). Energy-aware decision support models in production environments: A systematic literature review. *Computers & Industrial Engineering, 159*, 107456. https://doi.org/10.1016/j.cie.2021.107456

Biel, K., Zhao, F., Sutherland, J. W., & Glock, C. H. (2018). Flow shop scheduling with grid-integrated onsite wind power using stochastic MILP. *International Journal of Production Research, 56*(5), 2076–2098. https://doi.org/10.1080/00207543.2017.1351638

BMU (Ed.). (2016). Klimaschutzplan 2050 - Klimaschutzpolitische Grundsätze und Ziele der Bundesregierung, 92.

Bundesnetzagentur. (2020). *SMARD - strommarktdaten*. Retrieved July 15, 2022, from https://www.smard.de

Copil, K., Wörbelauer, M., Meyr, H., & Tempelmeier, H. (2017). Simultaneous lotsizing and scheduling problems: A classification and review of models. *OR Spectrum, 39*(1), 1–64. https://doi.org/10.1007/s00291-015-0429-4

Cui, W., Li, L., & Lu, Z. (2019). Energy-efficient scheduling for sustainable manufacturing systems with renewable energy resources. *Naval Research Logistics (NRL)*, 66(2), 154–173. https://doi.org/10.1002/nav.21830

Ding, J.-Y., Song, S., Zhang, R., Chiong, R., & Wu, C. (2016). Parallel machine scheduling under time-of-use electricity prices: New models and optimization approaches. *IEEE Transactions on Automation Science and Engineering*, 13(2), 1138–1154. https://doi.org/10.1109/TASE.2015.2495328

European Commission (Ed.). (2021, July 14). Directive of the european parliament and of the council.

European Environment Agency. (2021, April 13). *EEA greenhouse gases - data viewer — european environment agency*. https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

Feng, Y., & Menezes, M. B. (2022). Integrated production and renewable energy generation in the presence of hydrogen energy storage. *Production and Operations Management*, 31(5), 2222–2236. https://doi.org/10.1111/poms.13674

Fletcher, T., & Ebrahimi, K. (2020). The effect of fuel cell and battery size on efficiency and cell lifetime for an l7e fuel cell hybrid vehicle. *Energies*, 13(22), 5889. https://doi.org/10.3390/en13225889

Fraunhofer Institute (Ed.). (2019). A hydrogen roadmap for germany - executive summary, 7.

FREQCON. (2017, December). *FREQCON datasheet*. Retrieved August 26, 2022, from https://www.freqcon.com/wp-content/uploads/FREQCON-datasheet-grid-storage-BESS.pdf

Golari, M., Fan, N., & Jin, T. (2017). Multistage stochastic optimization for production-inventory planning with intermittent renewable energy. *Production and Operations Management*, 26(3), 409–425. https://doi.org/10.1111/poms.12657

Golpîra, H., Rehman Khan, S. A., & Zhang, Y. (2018). Robust smart energy efficient production planning for a general job-shop manufacturing system under combined demand and supply uncertainty in the presence of grid-connected microgrid. *Journal of Cleaner Production*, 202, 649–665. https://doi.org/10.1016/j.jclepro.2018.08.151

Gong, X., De Pessemier, T., Martens, L., & Joseph, W. (2019). Energy- and labor-aware flexible job shop scheduling under dynamic electricity pricing: A many-objective optimization investigation. *Journal of Cleaner Production*, 209, 1078–1094. https://doi.org/10.1016/j.jclepro.2018.10.289

IG Metall. (2022, August 1). *Tariftabellen eisen- und stahlindustrie*. Retrieved July 15, 2022, from https://www.igmetall.de/tarif/tariftabellen/eisen-und-stahlindustrie

Karimi, S., & Kwon, S. (2021). Comparative analysis of the impact of energy-aware scheduling, renewable energy generation, and battery energy storage on production scheduling. *International Journal of Energy Research*, 45(13), 18981–18998. https://doi.org/10.1002/er.6999

Kost, C., Shammugam, S., Fluri, V., Peper, D., Memar, A. D., & Schlegl, T. (2021). Levelized cost of electricity renewable energy technologies (F.-I. für solare Energiesysteme, Ed.), 48.

Lenz, K., Lenck, T., & Peter, F. (2019). The liberalisation of electricity markets in germany. https://static.agora-energiewende.de/fileadmin/Projekte/2019/Liberalisation_Power_Market/Liberalisation_Electricity_Markets_Germany_V1-0.pdf

Liu, Y., Dong, H., Lohse, N., Petrovic, S., & Gindy, N. (2014). An investigation into minimising total energy consumption and total weighted tardiness in job shops. *Journal of Cleaner Production*, 65, 87–96. https://doi.org/10.1016/j.jclepro.2013.07.060

Luthander, R., Widén, J., Nilsson, D., & Palm, J. (2015). Photovoltaic self-consumption in buildings: A review. *Applied Energy*, 142, 80–94. https://doi.org/10.1016/j.apenergy.2014.12.028

Matthes, D. F. C., Greiner, B., Ritter, D. N., Berlin, D., & Cook, V. (2017). EKI – Der Energiekostenindex für die European Climate Foundation (ECF), 49.

Moon, J.-Y., & Park, J. (2014). Smart production scheduling with time-dependent and machine-dependent electricity cost by considering distributed energy resources and energy storage. *International Journal of Production Research*, 52(13), 3922–3939. https://doi.org/10.1080/00207543.2013.860251

Palatel, A. (2017). Isolated hybrid energy systems for remote locations. In *Encyclopedia of sustainable technologies* (pp. 205–216). Elsevier. https://doi.org/10.1016/B978-0-12-409548-9.10145-9

Pham, A., Jin, T., Novoa, C., & Qin, J. (2019). A multi-site production and microgrid planning model for net-zero energy operations. *International Journal of Production Economics*, 218, 260–274. https://doi.org/10.1016/j.ijpe.2019.04.036

Schäfer, K. F. (2022). *Systemführung: Betrieb elektrischer Energieübertragungsnetze*. Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-36199-0

Schulte Beerbühl, S., Fröhling, M., & Schultmann, F. (2015). Combined scheduling and capacity planning of electricity-based ammonia production to integrate renewable energies. *European Journal of Operational Research*, 241(3), 851–862. https://doi.org/10.1016/j.ejor.2014.08.039

Schulz, S., Buscher, U., & Shen, L. (2020). Multi-objective hybrid flow shop scheduling with variable discrete production speed levels and time-of-use energy prices. *Journal of Business Economics*, 90(9), 1315–1343. https://doi.org/10.1007/s11573-020-00971-5

Siemens (Ed.). (2022). Datasheet silyzer 300. Retrieved June 22, 2022, from https://assets.siemens-energy.com/siemens/assets/api/uuid:a193b68f-7ab4-4536-abe2-c23e01d0b526/datasheet-silyzer300.pdf

Sterner, M., & Stadler, I. (Eds.). (2019). *Handbook of energy storage: Demand, technologies, integration*. Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-55504-0

Terbrack, H., Claus, T., & Herrmann, F. (2021). Energy-oriented production planning in industry: A systematic literature review and classification scheme. *Sustainability*, 13(23), 13317. https://doi.org/10.3390/su132313317

Töpler, J., & Lehmann, J. (Eds.). (2017). *Wasserstoff und Brennstoffzelle: Technologien und Marktperspektiven*. Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-53360-4

Wichmann, M. G., Johannes, C., & Spengler, T. S. (2019a). An extension of the general lot-sizing and scheduling problem (GLSP) with time-dependent energy prices. *Journal of Business Economics*, 89(5), 481–514. https://doi.org/10.1007/s11573-018-0921-9

Wichmann, M. G., Johannes, C., & Spengler, T. S. (2019b). Energy-oriented lot-sizing and scheduling considering energy storages. *International Journal of Production Economics*, 216, 204–214. https://doi.org/10.1016/j.ijpe.2019.04.015

Yue, M., Lambert, H., Pahon, E., Roche, R., Jemei, S., & Hissel, D. (2021). Hydrogen energy systems: A critical review of technologies, applications, trends and challenges. *Renewable and Sustainable Energy Reviews*, 146, 111180. https://doi.org/10.1016/j.rser.2021.111180

Zhai, Y., Biel, K., Zhao, F., & Sutherland, J. W. (2017). Dynamic scheduling of a flow shop with on-site wind generation for energy cost reduction under real time electricity pricing. *CIRP Annals*, 66(1), 41–44. https://doi.org/10.1016/j.cirp.2017.04.099