



Necessity is the Mother of Invention: Rise of Creativity due to Constraints

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Abstract

Due to its unique nature, creativity it is an inseparable part of an innovative outcome. While creativity and innovation are significant indicators of organizational present and future success, it is reasonable to introduce an organizational approach to promote both phenomena. Since work environment is rarely abundant, a very special way of enhancing creativity is discussed and analyzed, known as “less is more”. This novel view refers to the ability of demonstrating creative thinking under a restriction of the favorable conditions. The prior interest of this Bachelor’s thesis is to reflect the possible positive impact of scarcity of time, budget, and monitoring on the level of creativity. Constraint-based creativity is indeed a real-life phenomenon, though limitations alone may rarely provide an enhancement of creative thinking and thus require supplementary effects.

Keywords: Constraints, Creativity, Innovation, Scarcity, Invention

1. Nature of creativity

The terms “invention”, “creativity”, and “innovation” have been a significant area of interest in the scientific research for the past few decades. A number of scholars devoted their empirical work to observing and analyzing the rise of these phenomena, realizing the importance of their existence in practice. Similarly, numerous organizations are constantly promoting an organizational culture which values novelty. This particular Bachelor’s thesis is dedicated to the essential conditions under which creativity of individuals may be enriched. However, the difference between this paper and a traditional view of scholars is quite apparent; the interest of this work is how creative performance may be enhanced among individuals who deal with diverse constraints or restrictions at the workplace. To be able to analyze the complex schema of this phenomenon, it is, in the first place, important to define the relevant terms and demonstrate the distinction between them, presenting various scholastic points of view.

Nowadays, organizations strongly believe that innovation drives modern society, determines major future directions or mechanisms, and opens doors to broader opportunities in the future. To understand what innovation is and how it is born, a clear definition of boundaries between this term and other relevant ones is essential. [Damanpour \(1991\)](#) described innovation as “(...) adoption of an internally generated or purchased device, system, policy, program, process, product, or service that is new to the adopting organization”,

considering aspects used in previous research and including various types of innovation in this explanation. Thus, innovation can be found nearly anywhere within an organizational system. While invention may also represent new ideas in a system, it is important to clarify that innovation is a successfully launched invention that as well gets commercialized ([Chandy et al. \(2006\)](#)). In other words, innovation is the final result of the chain which starts from creative idea generation, is followed by discovery, research, development, and invention; once an invention gets successfully launched on the market, it can be called an innovation ([Hauschildt \(2006\)](#)). Many ideas, however, fail at one or another stage of the innovative process due to companies’ lack of experience, assets, protection, or communication, making a truly successful innovation really difficult to accomplish, but absolutely worth promoting ([Hauschildt \(2006\)](#)). At the end of the day, who does not innovate, may quickly lose the competition to other organizations.

As one sees positive effects and progresses innovations provide and understands the reasons behind the organizations striving for becoming market leaders in their innovative activities, it is important to determine the mechanisms which most likely drive the innovative way of thinking. According to [Amabile \(1988\)](#), innovation is built on a number of ideas and may thus be interpreted as a successful execution of novel concepts within an organization. In order to be able to manage an innovation, one needs a number of promising creative ideas that could possibly serve as main basis for an

invention, and, in the best case, an innovation. In order to keep up with constant changes on the market, companies apply special organizational policies on a regular basis, such as creativity or innovation management. For this Bachelor's thesis, creativity is the relevant term which will be mentioned a plenty of times, though it is as well tightly connected to invention and innovation.

Creativity has been an incredibly popular topic among various research studies in the fields of psychology, economics, organizational behavior, and business in the last few decades. It is quite astonishing, for instance, that Google Scholar provides about 1.7 million results when one simply searches for the word "creativity". It goes without saying that the term has been interpreted a numerous number of times, changing its boundaries within the years of massive research and may still be defined in different ways depending on which various scholastic points of view one considers.

One of the interpretations was suggested by Rogers in 1954, who viewed creativity as a process and defined it as "(...) *the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people, or circumstances of his life on the other*". Stein (Stein (2014), p. 6) saw creativity as possible products, mentioning that it is newness that is valuable. Others viewed creativity as an individual's characteristics, explaining that it refers to one's personality and intellectual traits of certain individuals who are strongly dedicated to promoting the creative process (Lumsden and Findlay (1988)).

Thus, creativity can be viewed in multiple ways due to its ability to influence numerous parts of organization, shaping a new set of trends, values, and strategies. However, one needs to concentrate on a more general description of this term, especially for this work, as it is creativity of all kinds that is being analyzed in this paper. Amabile (1996) generalized this term by describing creativity as new and beneficial thoughts in any field and characterized it as a starting point and a compulsory sufficient condition for the innovative process. One of the broadest definitions of creativity was as well suggested by Zhou and Shalley (2003): "*Creativity is defined as a production of new and useful ideas concerning products, services, processes and procedures*". Additionally, it was stated that employees at any jobs or any organizational levels can show creative performance, not depending on whether their jobs were traditionally considered as creative jobs or not – it is the creative work that is important (Amabile et al. (1996)). Moreover, Amabile et al. (1996) confirmed that employee creativity made a significant contribution to organizational innovation and efficiency. We therefore define creativity as any novel and valuable problem solution that may affect an organizational system e.g. its creative strategies, production development, or changes in business processes.

Continuing the creativity research, Antes and Mumford (2009) suggested eight steps of creative activities processing. These include 1) problem identification, 2) information gathering, 3) concept selection, 4) conceptual combination, 5) idea generation, 6) idea evaluation, 7) implementation

planning, 8) monitoring. Within this model, diverse ways of thinking, such as convergent and divergent, have to be implemented. These are necessary for the recognition of future orientation as more beneficial for specific processes and activities (Antes and Mumford (2009)).

Clearly, creativity is a highly essential process for organizational segments, which needs to be developed and supported all along its way to an innovation. Today's organizations of all sizes manage to profit from their innovative activities, thus making creativity the phenomenon our whole society desires to aim at. Mumford et al. (2012) supported this vision by claiming that creativity is the source of the world progress. Thus, creativity plays a highly significant role in many aspects of the modern society - be it a new startup firm, a well-developed company with years of experience and a huge customer base, a large monopolist firm, a whole political system of a developed or a developing state, or an educational organization. In other words, creativity is a broad term that has the power of impacting various segments of an organization and a whole society, consisting of different components, following a number of process stages, and serving as the basis for inventions and, thus, innovations.

In the past decades, many scholars devoted years of research to different factors that trigger higher creative performance. Shalley et al. (2000) analyzed the so-called requirements for creativity, concentrating on work environment around a number of employees. Similarly, Cummings and Oldham (1997) introduced a complex system of factors that influence the employees' creativity potential, including e.g. job complexity, employee and co-workers' personalities, and type of supervision.

Many times, it is undoubtedly the existence of sufficient environment qualities that promotes creative thought and performance. One needs to establish a work environment that is characterized by high level of freedom, good project management, sufficient resources (such as facilities, equipment, information, time, people), cooperative and innovation-friendly culture, individual recognition etc. (Amabile (1988)).

However, organizations often have to deal with scarcity, meaning there is a lack of certain work conditions for an efficient undertaking of creativeness and innovativeness. Scarcity is thus undoubtedly a common routine in all organizations (Cunha et al. (2014)). In accordance, Shoss et al. (2012) stated that firms need to learn to function with a tighter bundle of resources rather than with the amount that is generally considered as favorable, as this provides them with a huge advantage in today's hypercompetitive surroundings. Thus, our specific interest for this paper is how diverse constraints individuals have to deal with may enhance their creative performance. Uniquely, restricting sufficient conditions may increase chances of creativity and serve as a promising beginning for the innovative process.

Thus, the purpose of the thesis is to present and analyze the valuable research findings on the connection between various constraints and the resulting level of creative outcomes. Numerous literature sources from the fields of psy-

chology, business, and economics will be considered to raise chances of correctness of different statements. Thus, various scholastic positions will be introduced and considered, which will expectantly ease future empirical research on the distinctive connection between limitations and creativeness in multiple fields.

In this Bachelor's thesis, three attentively selected constraints will be introduced and investigated. In every chapter, each devoted to one restricted dimension, a number of research studies with the most up-to-date and relevant outcomes will be held as relevant and precise enough to confirm the correctness or incorrectness of the main prediction that constraints leading to enhanced creative thought. As a result, this paper will deliver an important list of constraints which can be presented to a particular extent in order to successfully achieve the desirable creative outcomes. Furthermore, based on the relevant articles, an analysis of the affection process of such restrictions on the creative performance as well as possible additional effects will be implemented. Along with revision and argumentation, a number of figures will be introduced in order to ensure deeper understanding of the constraint-creativity relationships. Finally, this paper has a pure theoretical character, as it demonstrates various relevant research outcomes or statements and analyzes the connection between the numerous empirical findings in order to answer the very specifically formulated research question of this Bachelor' thesis.

2. Time limitations

2.1. Role of time and time constraints in organizations

One of the basic and most essential resources any individual necessity in order to show a certain level of performance is, naturally, the amount of time given for a task. Nowadays, organizations are often willing to develop various services, processes or products within a specific amount time. Thus, time is seen as a heavy investment that is usually strictly limited. Runco and Cayirdag (Runco and Cayirdag (2011), p. 485) claimed that time has been connected to the cognitive base of creativity, because it is responsible for the outcomes of some cognitive activities that are habitually part of the creative process. Obviously, it takes time for an individual to begin a task with a particular amount of information, process basic and ordinary ideas, and move on to the not yet discovered to develop the newness. When providing a sufficient amount of time for re-thinking and processing various ideas, individuals are not only given the opportunity to judge the current situation, but are able to look beyond the present-day moment (Runco and Cayirdag (2011), p. 488). Moreover, creativity demands hard work and repetition, both of which require an investment of time. Continuous repetition and review of the same conception is never just a fixed reappearance of the same; it allows an individual to discover a concept again and again and derive to different variations, helping to launch a better and more creative form of a new product (Gruber and Bödeker (2006), p. 215). In other

words, creativity is not a sudden process and demands decent amount of time.

Thus, time is a crucial resource that triggers individuals' creative thinking at different stages of their work process, which is presently broadly acknowledged in the field of creativity research. However, the proven importance of time does not necessarily mean that higher amount of time period increases the probability of a project success. On the one hand, abundance of time results in unnecessary redundancy of this valuable resource; on the other hand, though, time scarcity results in workload pressure and anxiety, which may weaken creative thinking. As both effects are naturally to be avoided, it is essential to estimate the right amount of time depending on the complexity of the projects under consideration of occurring side effects, which will be discussed in the following parts of this chapter.

2.2. Mediating effect of time restrictions resulting in pressure or urgency

Creative thought, while requiring a decent amount of time, frequently occurs towards the completion of the idea generation process (Wallach and Kogan (1965)). Naturally, if one sets a strict deadline for a task, therefore restricting the amount of time meant for the generation of a creative outcome, time constraint may consequence certain pressure, urgency, and job stress. In research, experiencing high urgency has been viewed as excessive workload pressure creating a barrier for individuals to show creativeness, especially if the pressure is used as an external control instrument (Amabile, 1993). According to Runco and Pritzker (Runco and Pritzker (1999), pp. 659–663), additional reasons why time limitations are seen as negative phenomena are the following stress or destruction from cognitive thinking.

Within the time scarcity and creativity relationship, it is time pressure that clearly appears to result when particular time constraints exist. It then may positively or negatively affect the level of creativity depending on its strength, playing the role of a mediator in this case.

In the modern society, important tasks require creative thinking and tend to be characterized by their specific level of urgency, making time scarcity a common phenomenon that individuals have to accept and continuously work with. Obviously, time pressure makes the situation much more critical and pushes people to accelerate processes while making important decisions, creating new outcomes, and judging their position based on these.

In the past research, many scholars devoted their research to the phenomenon of time pressure and its practical effects on individuals' behavior. One of the consequences of time pressure is the resulting limited processing of information, mostly because individuals themselves try to accelerate their rate of information processing (Stuhlmacher and Champagne (2000); Huber and Kunz (2007)). Another effect of the restricted amount of time is greater selectivity individuals tend to demonstrate when dealing with different types of information, trying to weigh the importance of various topics and tasks (Stuhlmacher and Champagne (2000)). In fact,



Figure 1: Mediating effect of pressure in time restriction-creativity relationship (Source: own rendering)

Zur and Breznitz (1981) argued that people often think of negative alternatives when being under time pressure and tend to observe the amount and the probability of losing in their current situation. Finally, poorer amount of time and higher time pressure may force individuals to combine the given information, e.g. by selecting different strategies or approaches for searching and examining various data. Naturally, many individuals would rather prefer some simpler approaches over more complex contexts due to the experienced higher urgency at the workplace (Stuhlmacher and Champagne (2000)).

The ability of dividing the amount of time given for a specific task into a number of different stages allowed Stuhlmacher and Champagne (2000) analyze how individuals make decisions at different steps – when knowing it is only the beginning and when being close to the deadline – which were rather different from one another. The interesting observation here is that when someone is given a certain amount of time for a specific task, the pressure becomes stronger with the time passing by. This means that individuals are not only obliged to deal with the constant urgency, but also feel greater job pressure as the project deadline is approaching the present moment (Stuhlmacher and Champagne (2000)). Additionally, it was stated that working under the conditions of urgency negatively affected creative performance of product managers while they were developing their marketing programs (Andrews & Smith, 1996). Similarly, Andrews and Smith (1996) found that the factor of time pressure reduced their involvement in exploratory thinking when dealing with diverse problems.

However, according to Andrews and Farris (1972), research and development scientists with the highest performance level including innovativeness, and thus creativity, had to deal with higher time pressure during their project. Moreover, not only did they have to face the urgency barrier, they actually showed the desire to feel the workload pressure the lower amount of time resulted in. Remarkably, one can mostly predict that individuals with such characteristics as active and communicative nature, higher intrinsic motivation, and deeper involvement in technical or organizational duties are the ones who truly desire experiencing time pressure at work in comparison to other types of employees who do not necessarily deal with this phenomenon at any times at all (Andrews & Farris, 1972).

One of the most sensational contributions to the scientific research on the impact of time scarcity on creative performance of individuals is the one suggested by Kamoche and

e Cunha (2001). They proposed that time pressure promotes improvisational innovation, meaning an enhanced creativity level as well. According to the authors, improvisation refers to the merging of the two activities - planning and execution - with the help of accessible resources. While improvisation is not always viewed in a positive way in scientific research due to its highly risky nature (Miner et al. (2001)), it is a highly essential skill individuals need to possess on today's fast changing and highly competitive markets (Cunha et al. (2014)). Whether time scarcity occurs as a planned or an unexpected event, it is the improvisational set of mind that is responsible for individuals' distinct initiative, demonstration of broad communication, acceleration of procedure development, and enlargement of the competitive advantage (Cunha et al. (2014)). In other words, by experiencing time pressure, individuals feel the urge to involve in the execution process without intense planning, which allows them to create novelty with what they have and deliver improvisational type of innovation outcomes.

Interestingly, the level of time pressure has to be considered when one talks about any urgency at all. While stating that scientists demonstrated higher level of creativity, Andrews and Farris (1972) additionally proposed that if the pressure was not optimal or simply inappropriate (too high to handle), performance tended to undergo the expected level. Similarly, Zakay (1993) stated that an adequate urgency provides individuals with the motivation to search for applicable solutions; individuals experiencing intolerable time pressure, though, tend to get influenced by negative emotions and generate solutions of lower value.

Furthermore, a remarkable point of view was presented in the introduction of the Activation theory, which demonstrates specific job design conditions and the employees' level of performance based on their behavioral as well as psychological responses to those conditions (Gardner and Cummings (1988)). The authors state that for individuals to be encouraged strongly enough or, in other words, optimally to perform better in diverse activities including creativity level, both time pressure and activation have to be situated at intermediate levels. As the theory was additionally developed by Gardner (1990), a linear relation between the presented activation (or performance, creativity) level of the employees and greater time pressure was recognized. This led to the following cohesion, that the higher the pressure, the higher the level of creative performance.

Significantly, Baer and Oldham (2006) made a massive contribution to the possible connection between time pres-

sure and, specifically, creativity level of employees. They showed a specific U-shaped correlation between the two factors, characterizing the observed phenomenon as a curvilinear relationship between the two essential factors. Their empiric research study delivers a very precise result: An intermediate level of time pressure influences the creativity level of employees positively, provided some moderating effects were present as well. While the U-shaped correlation between the two factors was displayed as an inverted function between the two factors, it strongly supported the statement declaring there was an optimal point on the function of time pressure. When the optimum is reached, an individual experiences an adequate level of pressure in his activities, deals with the specified deadline and, thus, the common job stress, which then motivate him to process more significant tasks quickly and generate most creative outcomes. Obviously, once the pressure becomes inappropriately strong and results in stronger anxiety, the creative performance of an individual is convinced to suffer more starting from a certain point. Thus, any additional pressure to the level of optimum will only undermine creative thinking of individuals and thus the total process outcomes (Baer and Oldham (2006)).

According to Figure 2, one can recognize the explicit curvilinear connection between time pressure and level of creativity as well as the existence of the optimal point, which supervisors should aim at when determining an amount of time for various tasks. Achieving the optimum will provide a suitable quantity of time followed by the corresponding and adequate time pressure. Additionally, Baer and Oldham (2006) stated that the presence of two moderating effects was highly decisive for the fulfilment of the described relationship, namely that individuals obtain high support for creativity from their colleagues and supervisors as well as demonstrate great openness to new experiences.

2.3. High support for creativity of individuals as a moderating effect

While trying to enhance creative thinking by simultaneously restricting time, highly stressful job situations for individuals are being created, which, depending on the case, can impact their performance results in different ways. Remarkably, certain supplementary conditions are necessary as a beneficial foundation for the actual fulfilment of the positive relationship between time scarcity and the level of creative performance; without those, the positive connection between the factors is to be doubted (Baer and Oldham (2006)). Thus, the actual positive influence of time restrictions on the level of creativity may be characterized not only by the resulting job stress, but by some additional external effects as well. In other words, there are crucial moderators in this complex schema that allow time limitation to trigger individuals to think in a creative way and thus show greater performance when searching for problem solutions.

Generally, moderator has been defined as a quantitative or qualitative variable that has the influence on the direction and the strength of a certain relationship between two factors (Baron and Kenny (1986)). In this specific case, moderating

effect serves as an additional conditional effect on the relation between time limitation and creative activities. Since the strength of the moderator is of high relevance, the impact of time restrictions on the level of creativity can be determined by the solidity of the moderator.

According to Mumford (2000), creativity is traditionally associated with a performance of a single individual working alone, which in reality much more often occurs as a team achievement. Creative thought should not be underestimated, as it is usually a highly complex process which may successfully be generated in a collaborative climate with a number of various points of view, brainstorming sessions, and various resources (Mumford (2000)). In the first place, it is essential to ensure that each individual understands and recognizes the viability of generating new ideas, for it is novelty that drives a creative process. Additionally, it stays important for managers to be able to identify individual and group achievement, as well as establish a reward system that encourages employees to show additional help to the colleagues (Basadur and Hausdorf (1996)).

Within the limited time and creative thinking relationship, social support for creativity of individuals is the most thoughtful moderator that has been broadly defined, described and researched in the past decades. In psychology, social support has obtained a high level of importance and can generally be defined as “(...) *the everyday help and reassurance that friends, relatives, colleagues and others give each other throughout their lives*” (Leach (2014)). Surely, the phenomenon of support is a specific human type of interaction that may originate from various sources. When talking about motivating specific individuals to perform in a more creative way, following forms of support may be relevant: leadership or supervisory support, co-workers’ support, and family or friends’ support (Madjar et al. (2002)). Certainly, obtaining sufficient support from all three sources is an ideal case which could provide the greatest probability of the relation between time scarcity, high urgency and, enhanced creativity level. In order to be able to evaluate possible impact of different kinds of support as one single moderating effect on the final creative thinking outcome, deeper literature evaluation and analysis of each of the mentioned sources of support appears reasonable.

Leadership representatives naturally have higher impact on many organizational processes than their subordinates. Among these processes is the ability to motivate employees to demonstrate higher creativity and innovativeness by being more supportive (Amabile and Gyskiewicz, 1987, p. 35). For instance, support of managers can be provided by ensuring spirits of confidence in the team members, or by creating a concrete vision, in other words, a positive appearance of the possible future end result (Mumford (2000)). According to Scott and Bruce (1994), leadership support relates to higher innovative behavior of the employees once the quality of the relationship between a subordinate and a supervisor is established, primarily because employees get to experience greater level of trust from a person above themselves within the organizational hierarchy.

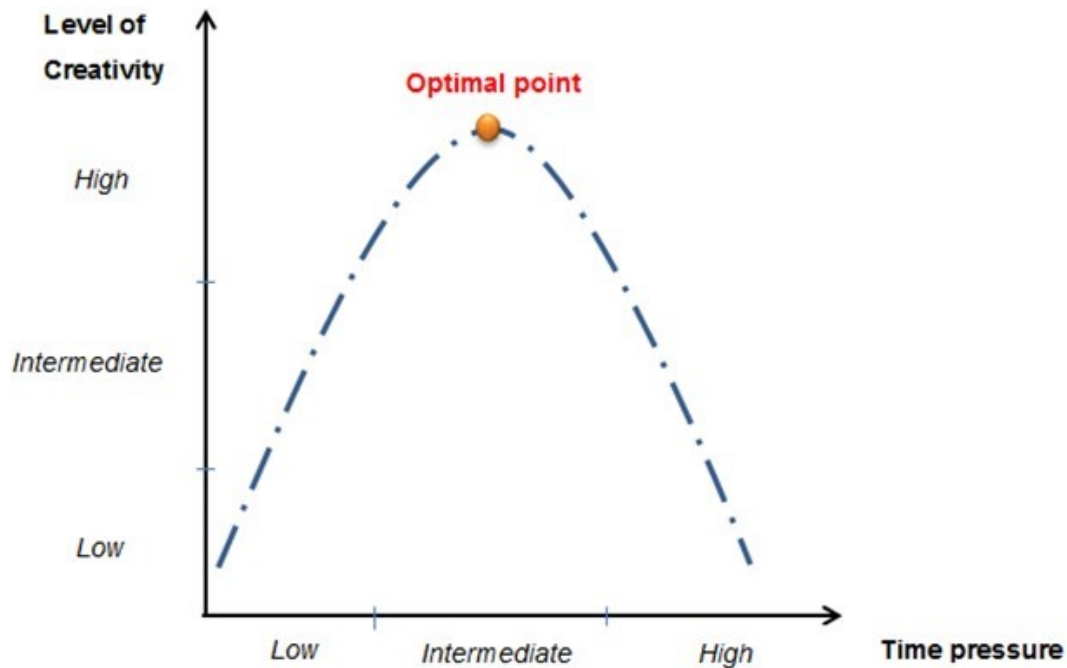


Figure 2: Inverted U-shaped connection between time pressure and level of creativity (Source: own rendering based on Baer and Oldham (2006))

In 2006, Baer and Oldham proposed that support from leaders has a number of influences on the subordinates. First, it provides them with the opportunity to explore and experiment with new and alternative routes to solving problems. Second, it delivers greater encouragement and a solid assistance in diverse idea considerations or discussions. Finally, support for creativity is the best possible way to distribute a very important message among the subordinates that their creative thinking is highly appreciated in the organization and seen as a great contribution. These special effects coming from the support of the supervisors, consequently, allow employees to enlarge their novel and valuable concepts' domain as well as to make certain that a suggested solution confidently provides a proper implementation for eliminating the existing problem (Baer and Oldham (2006)).

Thus, based on the relevant literature, it is fair to state that sharing one mutual goal with a subordinate and making him feel just as enthusiastic about the way creative thinking may impact the upcoming results is a key to a successful creative outcome, and, thus, innovations within an organization.

Next, team-member exchange is another potential foundation for an increased creative way of thinking of individuals. Because group work rather than individual activity is preferred for enhancing chances of creative performance (Mumford (2000)), showing reciprocal support between colleagues or other team members can serve as a helpful component of the complex creative process.

While analyzing work environment conditions and their impact on the creativity level of employees, Amabile et al.

(1996) associated this positive connection with profitable conditions working in a group may provide, e.g. diverse backgrounds of the members, common openness to novel concepts, and collective commitment to a project goal. Similarly, Cummings and Oldham (1997) proposed that for enhancing creative thinking, employees should help each other experience enthusiasm about achieving mutual goals, rather than distract from the important commitments. Thus, team-member support may be best represented by employees' dynamic interaction, which has gradually grown to become significant work contexts for modern organizations. Additionally, encouraging idea exchange and discussions are in many ways responsible for supporting creative potential of employees. Combined with the leadership support, team-member support is tolerates employees to develop and, ideally, maximize their creative potential, as well as deliver novel and useful concepts to their organizations (Oldham and Cummings (1996)).

Remarkably, reciprocal support can be realized by providing useful feedback or valuable information for co-workers. In addition to that, sharing task-relevant knowledge and expertise with the fellows who experience difficulties at work is an advantageous communication tool that can beneficially influence creative performance of employees. Particularly co-worker support is crucial in this case, because team-member interaction is very often less formal than with the team supervisors, for instance (Zhou and George (2001)). According to Zhou and George (2001), such forms of support can help co-workers stay focused on the task, trigger higher interest on the task goal, and believe in the possible success-

ful implementation of self-generated novel ideas in the future. Naturally, this tolerates individuals to generate creative ideas and concepts. Next, exchanging relevant technical knowledge provides many with a chance to be stimulated for learning and improvement on the job as well as seeing things from a different perspective. With higher stimulation, greater awareness of organizational processes, and diverse types of opinions, employees may broaden their domain of thoughts, obviously deciding for the one providing the most beneficial solution. Last, in a friendly and caring way, co-workers can beneficially affect one another by turning displeasing work condition into a pleasing one; they may as well increase each other's sense of confidence in their creative activities (Zhou and George (2001)).

Finally, another source of social support comes from people who might be absolutely unfamiliar with work projects, but are important to the individual himself – group of friends and family members. The study of Madjar et al. (2002) showed that support coming from an adult individual, be it a family member or a friend, contributed to the creative thinking within work projects of an employee. Surprisingly, this kind of support was proven to have contributed to the success of the creative process above the support coming from colleagues or supervisors, individuals who actually belonged to the job (Madjar et al. (2002)).

Based on massive research, it is fair to confirm the correctness of the possible positive relationship between time restrictions and individual creative performance. This connection is, however, only provided under existence of some additional effects, such as mediator and moderator. Though the mediating effect of time pressure has been seen as a negative effect in past research (Amabile, 1993; Runco and Pritzker (1999), pp. 659–663), some kind of pressure, as long as it does not achieve the uncomfortably high level, is often needed for individuals to show higher creativity while looking for solutions to problems of urgent and challenging nature (Andrews & Farris, 1972; Hennessey and Amabile (1998); Amabile, 1996). Social support has been identified as the primary moderating effect in the time scarcity-enhanced creativity relationship and may originate from three main different sources – supervisors, colleagues, as well as from friends or family (Madjar et al. (2002)). Undoubtedly, if some solid support for creativity is demonstrated from all the mentioned sources during the work activities of an employee, the moderating effect is increased. Thus, time pressure at the workplace, as long as it is still acceptable or adequate, contributes to the enhancement of creative thinking of individuals given social support for creativity is provided.

3. Financial constraints

3.1. Financial restriction as a driver of creativity

Comparable with the phenomenon of time scarcity, financial constraints can be viewed in both positive and negative ways when it comes to organizational creative, inventive, or innovative activities. As budget is often seen

as a central indicator of the organizational size (Camisón-Zornoza et al. (2004)), one can argue about the innovativeness of large and wealthy companies versus small newcomer firms when predicting the possible connection between the two factors. The world-known economist Schumpeter initially suggested that it is the new firms (entrepreneurs) that drive the innovation process (Schumpeter (1912), p. 172). However, a few decades later, Schumpeter (Schumpeter (1942), pp. 131-134) changed opinion by proposing that big firms with sufficient resources and greater power on the market that are more innovative. The causality of financial constraints on creativity has continuously been debated in the scientific research, simply because there have been various examples in practice.

The specific purpose of this chapter is to summarize and define the relevant literature on different samples where the precise relationship was detected. Moreover, it appears reasonable to analyze the complex schema of the positive connection between financial scarcity and level of creativity, as well as the possible conditions under which it is more likely to be fulfilled, such as mediating or moderating effects.

According to the traditional perception in scientific research, any innovative activity demands some sufficient financial resources that contribute to the generation of new ideas and their realization in future products or services (Amabile, 1996; Camisón-Zornoza et al. (2004); Cohen and Levinthal (1990); Damanpour (1991); Tushman and Nelson (1990)). As Prahalad and Mashelkar (2010) stated, a great number of innovations is built on the expectations of wealth and abundance, recognizing the rightness of “the more, the better” view. Correspondingly, supplying individuals with a decent financial budget has been one of the most important components of the creative and thus innovative processes, which may contribute to the effectiveness of team work (Gladstein (1984)).

While doing a meta-analysis of organizational innovation and size, Camisón-Zornoza et al. (2004) involved “financial resources” into the list of organizational size variables that could impact innovative activities, labeling them as organizational wealth as well as net assets. Since bigger organizations can afford operating with a higher financial budget, they most likely possess access to numerous resources and competencies, better technical know-how, and a professionally working crew; they are additionally able to bear costs of organizational failures as well as to take greater risks. The study showed a positive correlation between the size and innovativeness of organizations, which automatically means that organizational access to decent financial budget indeed enhances creative and innovative processes in firms (Camisón-Zornoza et al. (2004)).

Furthermore, Amabile (1996) considered “sufficient resources” as one of the necessary dimensions of the job surroundings, defining this term as accessibility to materials, funds, information and facilities when assessing work environment components that encourage individuals to show creativity. She as well suggested resources to be a psychological necessity for individuals to be convinced of the im-

portance of the project they work on. Interestingly, the study showed a surprising result: Resources were suddenly a less important dimension for organizational creativity, than, for instance, work group support or challenge (Amabile, 1996).

Similarly, Damanpour (1991) introduced an independent variable “slack resources” into his meta-analysis of moderators and determinants of organizational innovation, reasoning his expectation by the fact that resources “(...) allow organizations to purchase innovations, absorb failure, bear the costs of introducing innovations, and explore new ideas in advance of an actual need” (Rosner (1968) as cited in Damanpour (1991)). However, although a strong relationship was anticipated in the theoretical introduction of his work, data showed a negative correlation between slack resources and the level of innovativeness of companies. This finding led Damanpour (1991) to the idea of distinguishing slack resources into two different types, which could allow a more exact observation. The first type is “absorbed slack”, which is corresponding to excess costs and related to risk-taking; the second one is “unabsorbed slack”, which is corresponding to excess resources and not related to risk-taking.

Though in both of the studies described above (Amabile (1996); Damanpour (1991)), the causality of financial abundance on creativity level had been assumed but was not evidenced, none of the authors did come to a conclusion that it was financial constraint, exactly the opposite of what they had supposed, genuinely stimulated creative thinking.

Gibbert et al. (2014) enlightened the enhanced creativity of individuals due to financial scarcity, thus supporting the “less is more” vision. Remarkably, Cyert and March (Cyert and March (1963), p. 38) were among the first scholars to claim that a deficit of financial resources may increase creativity in organizations and thus to introduce and support the “less is more” view. It was furthermore stated, however, that constraints could not alone provide innovativeness within an organization. Thus, financial restrictions may not be seen as appropriate enablers of creativity and innovativeness, but do generate a need for creative thinking during problem solving processes (Cyert and March (1963), p. 38).

One of the most dominant works on this issue was done by Giddens (1981), p. 27, as the author suggested that constraints possess a dual nature, as enablers and forestallers. He indicates constraints as structures and defines them as “(...) rules and resources recursively implicated in the reproduction of social systems” (Giddens (1984), p. 377). Thus, structures are not only to be abstracted as creators of barriers for individual activities, but as enablers of organizational creativity, innovativeness and efficiency (Giddens (1976), p. 161).

Furthermore, a more recent view on this issue was presented by Cunha et al. (2014). The authors pointed out that scarcity of different dimensions, material resources being one of them, produced different types of product innovation; improvisational innovation occurs, as previously mentioned, when time is scarce. Provided an individual is supplied with a strictly limited bundle of resources, bricolage type of product innovation is expected to follow. Bricolage in-

novation is a French originated term that was introduced by Levi-Strauss (Levi-Strauss (1966), pp. 14-15). Baker (2007) described it as inventing by implementing combinations of the assets at hand to overcome difficulties. Thus, financial scarcity is not viewed as prevention but a source of motivation to be creative while searching for an effective problem solution. This can be best described by situations where individuals are obliged to work with what they have got at hand and to create new interpretations of existing surroundings, e.g. by putting old things to a new use (Gibbert et al. (2014)).

Supporting the issue of bricolage innovation, Senyard et al. (2014) accomplished an empirical research on level of innovativeness in resource-constrained newcomer firms. The study examined creative and innovative behavior of young and nascent firms with limited material resources, which are obviously not able to afford complex development processes or expensive assets. Next, the authors proposed that the more creative behavior of smaller firms with restricted resources can mainly be explained through the existence of two mechanisms: 1) bias for action, 2) bias for recombination. Wealthier companies propose that innovation requires a decent budget and thus do not make an effort to innovate and miss the opportunities and chances on the market; smaller firms, in comparison, show a bias for action by behaving in a bricolage way and showing higher enthusiasm to work with what is at hand, which helps them to overcome numerous difficulties (Senyard et al. (2014)). Analogous to Cunha et al. (2014), it was suggested that resource-constrained businesses may stimulate innovativeness by simply recombining (showing bias for recombination) the existing bundle of resources. The results of the empiric study by Senyard et al. (2014) provided the scientific research with an important message, that bricolage is an essential pathway to creativity and innovativeness in resource-restricted environments. Since the analyzed firms differed in the level of their bricolage commitment, it was additionally stated that greater levels of bricolage were followed by higher level of creativity and innovativeness.

However, bricolage is not always an option in terms of becoming a successful innovator, for it is commonly followed by unpredictable significances, possible ineffectiveness, combinations of unusual resources (Ciborra (1996)), which later results in second-best implications, imperfection, incompetence, lateness (Lanzara (1999)). Nonetheless, scarcity of financial and material resources is generally a very common organization occurrence, especially in firms that strive for higher effectiveness and only provide employees with a strictly limited budget. Thus, learning how to innovate with scarcity is the lesson close to reality.

By having clarified relevant scientific research on the positive impact of resource-constrained situations on creative and innovative behavior of individuals, it is reasonable to predict the potential conditions serving as a sufficient basis for the appropriate fulfilment of the described connection. Similar to the previous chapter which covers the issue of time restrictions, such additional conditions may be seen as mediating and moderating effects which will be introduced in the

following parts of this chapter.

3.2. Mediating effect of job dissatisfaction due to financial scarcity

While experiencing financial or material scarcity, individuals are continuously expected to deliver proficient problem solutions at their jobs. Naturally, having to work with what is at hand, not with what is desired, can reveal certain consequences.

In the mood and emotional context, financial constraints may lead to personal anxiety, work stress, and, thus, certain job dissatisfaction. Because resource scarcity is not the only possible source of employees' displeasure with work environment qualities (e.g. job complexity, working schedule etc.), the phenomenon of job dissatisfaction has obtained a broad attention in the scientific research, making it to the top analyzed constructs.

Habitually, scholars state that it is greater level of job satisfaction that is responsible for higher personal comfort of employees as well as higher organizational efficiency, which cannot be realized once individual workers are dissatisfied with their jobs (Bartol (1981); Iaffaldano and Muchinsky (1985)). Despite this strong proposition which was proved, a totally opposite point of view was suggested and, consequently, demonstrated: Job dissatisfaction may positively affect organizational creativity, innovativeness, and efficiency.

One of the earliest of such opposite suggestions was made by March and Simon (1958), as they spoke about the phenomenon where individuals strive for a radical change when being dissatisfied and exhausted at their workplaces. When disagreeing with the work environment conditions, employees tend to search for and, most importantly, discover more innovative ways of implementing the existing resources to improve their organizational surroundings (March & Simon, 1958; Staw (1984)). Such behavior, caused by job dissatisfaction, can be described as creative enhancement since creativity can be referred to processes of generating new and valuable concepts (Amabile, 1996).

Thus, based on the previous scientific research, it is rational to suggest that job dissatisfaction increases organizational performance and effectiveness by raising chances of higher creative thinking of employees. The exhausted sense of being of individuals who are not pleased with the work conditions, such as financial or material resource constraints, motivates them to be more creative and thus innovative in order to repair the current situation by implementing new ideas within the organizational system. Correspondingly, job dissatisfaction, resulting from financial scarcity and playing a role of a mediator in this connection, influences creative thinking of individuals; this particular relationship may be displayed as below.

According to Farrell (1983), Withey and Cooper (1989) following consequences may occur from individual job dissatisfaction:

1. Exit
2. Voice

3. Loyalty
4. Neglect.

Exit refers to situations where individuals, while being dissatisfied with the work conditions, simply quit the employing organizations by refusing from job obligations. On the other hand, voice implies to circumstances under which dissatisfied individuals choose to stay in their firms, attempt to find novel ways of allocation and (re)combination of the existing bundle of resources and thus improve the current situation; obviously, this kind of response may be characterized by the positive connection between resource scarcity, job dissatisfaction and level of creativity. Third, loyalty refers to situations in which individuals, similar to voice, choose to remain employed by their firms, though do not feel motivated strongly enough to bring, suggest, or implement any new changes and thus have to accept the current conditions. Finally, neglect is relevant when individuals stay in their firms but demonstrate passive behavior by showing lower determinations to change the situation (Farrell (1983); Withey and Cooper (1989)). Furthermore, Farrell (1983) developed the presented model of individual responses by confirming that the four different types of reactions to individual job dissatisfaction could be described by two abstract dimensions – active (exit, voice) or passive (loyalty, neglect) as well as constructive (voice) or destructive (exit, loyalty, neglect).

Considering the propositions of the model of response types to job dissatisfaction, Zhou and George (2001) stated that, "(...) organization members must have an active and constructive response to their dissatisfaction rather than an active and destructive response or a passive response" in order to enhance creativity given an individual is dissatisfied with the job. Thus, both active and constructive dimensions are absolute requirements for the fulfilment of a positive relationship between resource constraints and creativity level, which is only true for the type of response indicated as voice. Besides, in order to accomplish an expression of voice, employees have to recognize that their creative and innovative attempts must as well be effective and may at times demand specific costs (Withey and Cooper (1989)).

Furthermore, Zhou and George (2001) managed to test the influence of employees' displeasure on the level of their creative thinking by distributing questionnaires in a big manufacturing company and collecting data from both the supervisors and their subordinates. As a result, higher creativity was evidenced to be a following result of individual dissatisfaction, given certain conditions that provide the expression of voice as a response do occur. The strongest and initial additional effect was proved to be created by the high continuance commitment of individuals, which allows organizations to keep its employees even when they are dissatisfied with their current conditions - in this case, with the lack of the necessary resources. Similar to the issue of time restrictions, secondary additional conditions that provide a positive impact on employee creativeness are high support coming from co-workers, useful feedback from co-workers, as well as high level of organizational support. In other words, employees



Figure 3: Mediating effect of job dissatisfaction in financial scarcity-creativity relationship (Source: own rendering)

who experienced high level of job dissatisfaction but chose to stay employed by their organizations, received useful feedback from their co-workers as well as obtained high level of support from both co-workers and the organization on the whole, demonstrated higher level of creativity at the workplace (Zhou and George (2001)).

Thus, the positive connection between resource constraint and individual creativity was evidenced, given certain conditions existed. Material or financial resource constraints, followed by different levels of individual job dissatisfaction, may genuinely enhance creativeness and innovativeness if particular moderators exist. While the moderating effect of organizational support as well as co-worker support and feedback are the main concentration of the previous chapter, it is reasonable to devote the finalizing part of this chapter to the initial condition for the specific resource scarcity-creativity connection – high continuance commitment of employees.

3.3. High continuance commitment of individuals as a moderating effect

According to the previously described model of individual responses to job dissatisfaction (Farrell (1983); Withey and Cooper (1989)), only one out of the four options considers quitting organizational duties as an employee - exit. Obviously, leaving is a comprehensible reaction given there are harsh resource constraints with a simultaneous high expectancy of employers towards individual creativity. As Zhou and George (2001) suggested, organizational leave is in most cases associated with high costs and risks, such as searching for an alternate work possibility in a geographically restricted area, losing employment security etc. Should the potential loss of quitting be very high, considering there is a strong lack of other alternative options, employees tend to remain in their employing organizations. Thus, individuals are to some extent forced to stay at their workplaces as they experience high job necessity which overweighs their dissatisfaction, showing high continuance commitment (Meyer et al. (1990)).

For resource constraint to awaken creative thinking of employees, high continuance commitment is an essential, but not sufficient condition. The presence of this additional condition provides expression of voice, for it ensures that individuals continue their organizational duties despite experiencing high level of job dissatisfaction (Zhou and George (2001)). Thus, continuance commitment plays a role of a decisive moderating effect in this particular resource constraint-

creativity context, allowing employers to prevent the expression of exit and providing the basis for the next steps, which employees will take in response to their emotional state. This declaration was not only proposed and deeply described, but also empirically tested and proved by Zhou and George (2001); the findings can be displayed as in Figure 4 and Figure 5.

As seen above, higher employee job dissatisfaction leads to lower creativity when continuance commitment is low; however, creative thinking is gradually increasing once commitment of employees becomes greater. While continuance commitment is the initial condition for the fulfilment of the positive relation between job dissatisfaction and individual creativeness, co-worker useful feedback as well plays a significant role for this context. Although job dissatisfaction may already enhance creativity in the case when there is a high continuance commitment of employees but low coworker useful feedback, creative thinking is fundamentally enlarged once both high continuance commitment and high coworker useful feedback moderate. In other words, if the initial moderating effect - high continuance commitment - occurs, the creative outcome can be enhanced, but can only be maximized with the help of the secondary moderator - high coworker useful feedback.

Similar to Figure 4, high continuance commitment results in greater creativeness of employees once another additional moderator, namely high perceived organizational support, impacts the connection between the two factors. In comparison to Figure 4, creativity level only increases when both moderators are existent. The considerable conclusion here is that the high continuance commitment alone is not abundant for individual job dissatisfaction to deliver higher level of creativity” (Zhou and George (2001)).

By having demonstrated the cases indicating the impact of the initial moderator, it is fair to confirm the correctness of the following statement: Job dissatisfaction enhances employee creativeness, if they show high continuance commitment as well as additional conditions are provided, such as co-worker useful feedback or perceived organizational support.

Based on the considerable amount of empiric research on the connection between financial or material constraints and individuals’ reactions in terms of their creative thinking, it is reasonable to confirm the possibility of the positive relation between the two important factors (Cyert and March (1963); Cunha et al. (2014); Gibbert et al. (2014)), although the traditional point of view proposes the opposite (Amabile

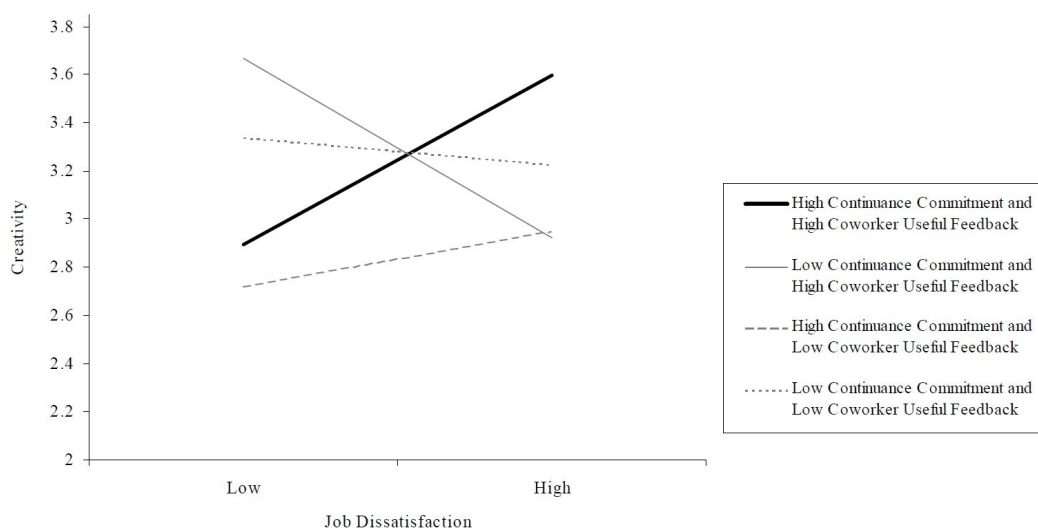


Figure 4: Moderating effect of high continuance commitment and coworker useful feedback in job dissatisfaction-creativity relationship (Source: Zhou and George (2001))

(1996); Camisón-Zornoza et al. (2004); Damanpour (1991); Gladstein (1984)).

However, additional conditional effects – mediators and moderators - play an extremely significant role for an appropriate fulfilment of this relationship. Dealing with financial scarcity most likely leads to rather stressful situations with the resulting job dissatisfaction of individuals, which can be identified as a mediating effect in this relationship. High continuance commitment of employees, being an initial moderator, ensures that employees remain in their companies despite being displeased as well as perform better to improve job surroundings, thus enhancing individual creativity. When further moderators, such as co-worker feedback and support as well as organizational support, are present, creativity level of employees can be captured at its highest.

4. Monitoring restrictions

4.1. Supervisors' monitoring activities and their impact on individual creative performance

Generally, impacts on creativity can originate from individual characteristics (personality, cognitive style), contextual characteristics (relationship with supervisors and co-workers, job complexity, rewards, work settings etc.), and interactions between both (Shalley et al. (2004)). In the scientific research, it is widely recognized that organizational contextual factors may significantly impact the level of creative performance in a way that is, consequently, heavily depending on employees' creative personalities (Hennessey and Amabile (1998); Cummings and Oldham (1997); Woodman et al. (1993)). Supervisor style of work, monitoring strategy, and particular attitude towards an employee's activities can be indicated as contextual characteristics describing one's work environment. They may therefore provide a significant influence on the creative and innovative outcomes of the subordinates as well as whole organizations.

Monitoring has been a widespread topic in the scientific research for the past few decades. According to Higgins and Kram (2001), monitoring can be seen as developmental support shown by a more senior person within an organization. Thus, an employee's activities are discussed, supported, and guided by an individual who possesses a higher-ranked position and is relevant to the job content. One of the central definitions of a mentor was suggested by Levinson et al. (Levinson et al. (1978), p. 97): "(...) the mentor is ordinarily several years older; a person of greater experience and seniority (...) a teacher; adviser or sponsor". Among the essential missions of a mentor is generation of a creative role model for the subordinate individual. As suggested in the social cognitive theory by Bandura (Bandura (1986), p. 52), individuals are expected to demonstrate a similar kind of behavior that is presented by others in their organization. Observing a creative role model provides an employee with the incentive to demonstrate a higher engagement in creativity actions as well; this occurrence was evidenced and defined as organizational learning or modeling (Bandura (1986), p. 52). Another task a supervisor or mentor may fulfill in order to enhance creative thinking among subordinates, is to ensure the presence of suitable work conditions, since individuals have to be able to gain relevant skills and motivation to produce new strategies and ideas (Zhou (2003)).

Additionally, Amabile (1979) proposed that supervisory encouragement may increase creativity of employees in a way that it contains open interactions and high perceived support; this kind of attitude can ensure lower probability of employees involving fear of undesirable criticism into their activities, which could damage their intrinsic motivation, a mediator that is essential for creative thinking. In 1996, Amabile et al. (1996) evidenced the proposed relationship between supervisory positive encouragement and creativity of employees, receiving a solid result from the study: Supervi-

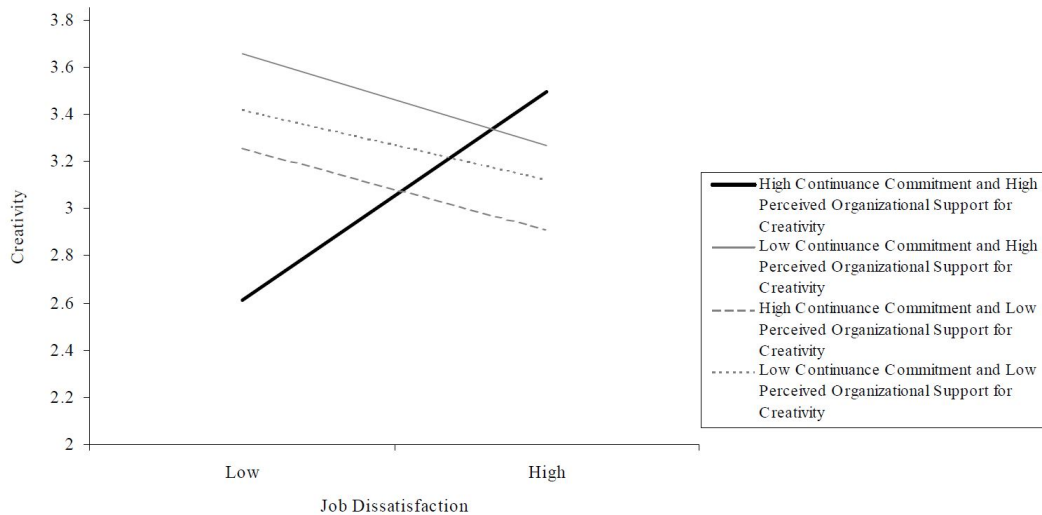


Figure 5: Moderating effect of high continuance commitment and perceived organizational support in job dissatisfaction-creativity relationship (Source: Zhou and George (2001))

sory encouragement made it to top six work incentives that impacted individual creativity in the strongest and most positive way. Their description of a motivating supervisor refers to an individual who serves as a respectable model, formulates goals properly, and supports the team work and single contributions within the group (Amabile et al. (1996)).

Although previous research provides us with deep knowledge about advantageous practices of supervisors who manage to motivate their employees to generate creative ideas and strategies, there are certainly suitable limitations to such practices as well. According to Deci and Ryan (1987), it is only supportive supervisory style that is actually responsible for promoting creativity among employees. According to the authors, supportive mentors are to mentors who genuinely care about possible needs of subordinates, motivate them to communicate their thoughts and worries with others, provide developmental feedback as well as creativity-relevant skills and knowledge. Thus, a supportive mentor delivers higher incentives to work efficiently and generate new ideas, strategies, as well as recombination of resources. Due to favorable conditions, individuals experience higher interest in pursuing their career and demonstrate higher creative performance (Deci and Ryan (1987)).

Remarkably, a controlling supervisory style could lower intrinsic motivation of employees and, as a consequence, harm the development of a creative process of individuals and organizational teams on the whole (Deci et al. (1989)). According to the authors, a controlling mentor can be identified due to his or her close monitoring behavior, strong decision making process including those of employee's duties, and a not developmental, but rather controlling feedback. Such governing type of work prevents subordinates from communicating their thoughts and approaches and producing novel concepts. Additionally, controlling practice of supervisors creates some task-irrelevant concern and fear of the possible disapproves or future negative feedback, thus

pushing employees to only work applying the already known methods and lose much of their motivation. All of the mentioned circumstances accordingly harm their creative performance (Deci and Ryan (1987), Deci et al., 1989). These findings confirm the proposition that restricting monitoring activities to the point where it is only supportive, but not criticizing or controlling, is an important tool for enhancing individual creativity level.

Zhou (2003) devoted deeper empirical research to the phenomenon of close monitoring and its particular negative influence on creativity. According to Zhou (2003), supervisor close monitoring can be best described by the degree to which mentors observe their employees to make sure they only do what they were precisely told to, complete their jobs in the previously communicated ways, and avoid working with new methods which supervisors may criticize. Earlier, Zhou and George (2001) correspondingly specified that close monitoring may lead to employees' awareness of being continuously observed, estimated, and controlled; such perception is a promising factor for lowering one's creative thinking. Similarly, the study results of Andrews and Farris (1967) showed that teams working on scientific subjects achieved the most creative outcomes at times when their mentors or supervisors provided them with greater space for individual thinking and engagement, as well as broader possibilities to actually impact essential decision making processes on a higher organizational level.

Consequently, a supportive, but not controlling supervisory style of work is necessary to improve creative thinking of employees; it is thus justified that the monitoring activities of organizational supervisors or mentors need to be restricted to the point where they show support, provide developmental feedback, and motivate subordinates to show higher efficiency and perform in a creative way, but not regulate all processes, including employee's activities, by strictly controlling them. Certain monitoring limitations are thus reason-

able to recommend for an enriched engagement in creativity-relevant activities of the subordinates within their organizations.

4.2. Awakening intrinsic motivation of subordinates as a mediating effect

As described above, supervisor behavior is a fundamental factor influencing the direction of a subordinate's following activities, in a way that it may whether motivate him to show higher creativity at work or may not. Scientific research indicates that a supportive supervisory style of work is followed by higher intrinsic motivation of an employee (Deci and Ryan (1987)).

In this case, monitoring constraints refers to restricting supervisory activities by excluding controlling functions, which can enhance creative thinking of subordinates. When constraining monitoring activities to the point where supervisors only show developmental support and feedback, individuals obtain more freedom to think and advance novel ways of applying things. Because monitoring is thought to fulfil the important task of motivating an individual to work more effectively and creatively (Zhou (2003)), it is rational to eliminate monitoring activities that propose controlling functions. Supervisory controlling damages intrinsic motivation of an individual and engages employees in irrelevant work activities associated with external concerns about doing certain things in convinced ways (Deci and Ryan (1987); Deci et al., 1989). Equally, when supervisors exclude close monitoring from their work activities, employees' intrinsic motivation is not reduced but enhanced according to Zhou (2003). Specifically, such monitoring constraint results in greater amount of freedom employees experience and thus focus on the concrete job duties. Under restricted monitoring, which may only include supportive ways of mentoring, individuals obtain the opportunity perceive their role models without involving fear or worries; they as well become intrinsically motivated to acquire creativity-relevant abilities and easily experiment with those, showing higher level of creativity (Zhou (2003)).

Thus, limitations of certain harmful monitoring activities may provide greater level of freedom and higher intrinsic motivation of individuals. In this sense, enhanced intrinsic motivation of employees is seen as a positive consequence of monitoring restrictions and, according to Amabile (1996), a required component to enhance individual creative performance (along with expertise as well as creative thinking abilities); it could therefore be observed as an appropriate mediating effect for this specific relationship.

As presented in figure 6, mediating effect of intrinsic motivation which employees gain due to the diminished close monitoring activities improves their creativity level. It is thus seen as a certain bridge between the relevant restriction and level of creativeness among employees.

According to Csikszentmihalyi (1988), p. 337, intrinsic motivation is a decisive factor for creative-relevant tasks; not dependent on how inventive a person might be, if he or she is uninterested, it is indeed tough to ever become enthusiastic

enough to actually produce any creative ideas and outcomes. Intrinsic motivation is thus an indicator that may rather be distributed to the individual characteristics, but is generated through certain contextual factor restrictions, e.g. through monitoring constraints. As Oldham and Cummings (1996) stated, creative performance is likely to depend on a variety of individual and contextual factors, as well as their interactions with one another. According to Amabile (1983), intrinsic motivation can be viewed as a state and a trait, because even if individuals have high interest in applying the relevant skills at their workplace, this interest has to be sustained by the contextual social factors – in this case, in a less controlling or close supervisory monitoring. Thus, intrinsic motivation represents both own attitude towards definite tasks as well as individual perception of certain motives to get involved into those responsibilities (Amabile (1983)).

Amabile (1983) also managed to show that even when individuals possess the necessary capabilities and traits for creativity (such as domain-relevant skills and creativity-relevant skills), their creative effort results are greatly dependent on the important factor of their intrinsic motivation. In a later research Amabile (1988) specified that intrinsic motivation is a key ingredient to creativity. Additionally, Rogers (1954) stated intrinsic motivation to be a significant source of creativeness of individuals, as it involves voluntary activities of searching for new alternatives and their combinations. Furthermore, intrinsically motivated individuals tend to be more flexible, due to their motivation of new challenges and high interest in the task given. In reply, they show higher creativity at their workplaces (Hennessey and Amabile (1998)).

An analogic point of view was empirically tested and evidenced in a more recent research. The empirical study of Choi (2004) maintained that high intrinsic motivation is related to greater level of creative performance. Dewett (2007) accomplished an empiric research on employee level of creativity in various environments and determined the significance of intrinsic motivation of individuals on the level of their creative performance, mostly because highly motivated individuals feel the encouragement from supervisors, possess higher level of self-efficacy, and are more likely to take risks or try new concepts. Similarly, Prabhu et al. (2008) came to an empirically tested conclusion that high level of intrinsic motivation has a positive impact on creativity of employees considering individuals possess certain personality traits, such as openness to experience and self-efficacy. Summing the empirical research indications up, the assessment allowed Jesus, S. N. de et al. (2013) to confirm the positive impact of high intrinsic motivation on the level of creativity in product innovation. Their meta-analysis concentrated on the revision of the empiric studies on the relevant topic published in the past decade, between 1990 and 2010.

Thus, intrinsic motivation is seen as an individual factor, which is generated through the influence of the contextual factor restrictions and their combinations, in this case, constraints of supervisor close monitoring activities. Since several empirical studies have evidenced the strong positive impact of intrinsic motivation of individuals on the level of their

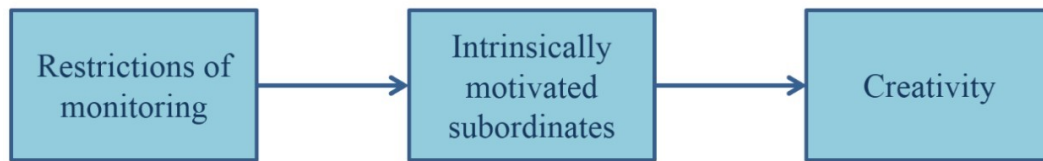


Figure 6: Mediating effect of high intrinsic motivation of subordinates in monitoring limitation-creativity relationship (Source: own rendering)

creative performance, this specific kind of individual motivation can be indicated as a mediating effect of the close monitoring constraints-creativity level relationship.

Similar to the two dimensions we observed earlier - time limitations and financial resource restraint in relation to creativity - another additional condition, namely a moderator, may support the positive connection between close monitoring restrictions and creative performance. According to Zhou (2003), the strengthening moderators are supervisory developmental feedback as well as presence of highly creative coworkers. Undoubtedly, both of the proposed moderating effects are highly essential and do genuinely relate to individual efficiency and creative performance, as Zhou (2003) empirically tested. However, as this chapter is devoted to the phenomenon of individual intrinsic motivation and its significant influence on one's organizational behavior, it makes great sense to analyze it from a different prospective.

4.3. Moderating effect of high intrinsic motivation of supervisors

Some deep literature review has been done on the style of supervisor behavior on employees' thinkable responses to the specific types of leading style. Nevertheless, is restricting close monitoring the only important step supervisors could make to enrich the enhancement of creativity level? Scientific research allows us to suppose that there is more to the work of supervisors.

While intrinsic motivation of employees is a promising factor for higher creativity of employees already, high intrinsic motivation of their supervisors is a fundamental factor that may certainly strengthen the described connection. This way, individuals get to experience a cognitive and innovative leadership style, which becomes a source for their own creativeness. Thus, creative efforts deliver much more efficient outcomes when both the leader and the employee demonstrate innovative and cognitive behavior (Tierney et al. (1999)).

The corporate term describing the relationship between a leader and a subordinate is called dyadic organizing, literally meaning there are two elements (or persons) in a system; peculiarly, it was the central interest of the research work by Graen and Scandura (1987). The significant aspect of the descriptive model of dyadic organizing is the fact that there is generally a sequence of three phases, namely 1) role taking, 2) role making, and 3) role routinization.

First, role taking is an important process of the supervisor's efforts to recognize various creativity-relevant skills and

talents of the subordinate in the most efficient way. Next, role making is the actual dyadic relationship formulation between a supervisor and a subordinate. Last, role routinization is responsible for mutual attempts to enhance efficient functioning and establishment of reciprocal understanding. Thus, the described model indicates how vital the role of a supervisor is. For instance, should the process of role taking fail, some poor role making might occur, followed by a biased role routinization. However, if the sequence runs successfully, a mutual understanding of visions and a highly efficient collaboration may result (Graen and Scandura (1987)). In other words, it is genuinely up to supervisors to practice the accurate type of monitoring, recognize an employee's potential, concerns, and interests, as these actions promote organizational and individual competence.

An important component of the described relationship between a supervisor and a subordinate is the quality of the leader-member-exchange, which could drastically impact the level of creativeness of individuals in multiple ways. According to Tierney et al. (1999), high leader-member-exchange results in more challenging tasks, readiness to take work-related risks, as well as higher recognition of mutual work. These consequences tend to enhance individual creativity, as Amabile (1988) and Ford (1996) evidenced.

Consequently, supervisors who are intrinsically motivated are likely to show greater personal willingness to engage into the processes of role taking, making, as well as routinization. Moreover, they can build a healthy, understanding, and a less controlling relationship with their subordinates by practicing an intensive leader-member-exchange, thus awakening higher level of creativeness of their subordinates. The moderating effect of this relationship can be clarified by the simple fact that high intrinsic motivation, similar to tasks or obligations, can be communicated and transported.

Tierney et al. (1999) accomplished an empirical study on the impact of high, middle, and low intrinsic motivation of leaders on the creative performance of the employees, given subordinates were intrinsically motivated. The data provided a result as in Figure 7.

As displayed above, high intrinsic motivation of subordinates tends to contribute to their level of creativity, which supports our concentration in 4.2. An additional curious observation is, naturally, the evidence of the moderating effect of a highly intrinsically motivated leader, which strengthens the described relation and enhances overall creative outcomes. Thus, it is reasonable to approve that the more in-

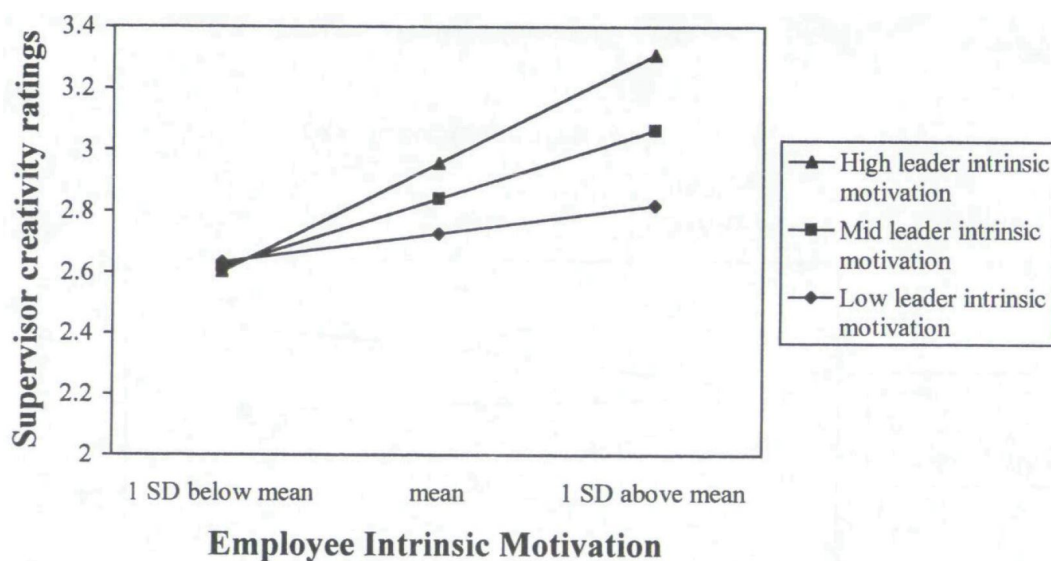


Figure 7: Moderating effect of high intrinsic motivation of leaders in employee intrinsic motivation-creativity relationship (Source: Tierney et al. (1999))

trinsically motivated leaders are (moderator), the higher the level of creativity of subordinates is, given subordinates are motivated themselves (mediator).

Overall, the meaningful literature review of the empiric research confirms the positive impact of close monitoring restrictions on creativity. Excluding controlling activities and showing only supportive leadership style in monitoring activities results in higher freedom for a subordinate; greater freedom may then intrinsically motivate employees to try new things and combinations or perceive higher risks at job-related tasks. High intrinsic motivation of subordinates affects as a mediator between the monitoring constraint and the level of creativity. The relationship may be drastically strengthened by the high intrinsic motivation of a supervisor, which functions as a moderator. It is mainly responsible for establishing a healthy dyadic organizing, an understanding relationship, and an intensive leader-member- exchange. At this point, the level of creativity may be maximized, which shows the significance of the supervisory style of work and its impact on individual creativity.

5. Constraints as an aspiring source of creativity

While creative and innovative outcomes are essential indicators for organizational performance, it has been the purpose of this Bachelor's thesis to produce a theoretical research overview on creating favorable conditions for enhancing individual creativity. In opposition to the traditional "the more, the better view", the "less is more" topic has been discussed and considered in the previous chapters. Since corporations have to manage scarcity of various resources and work environment conditions, it is rational to reflect the possibilities of enhancing creativeness among individuals with things they have at hand. Danneels (2002) specified that emerging awareness on innovative processes in resource-scarce sur-

roundings may become a central contribution for determining new organizational techniques, because environmental conversions make former competences outdated. Thus, operating with less is a naturally common description of our everyday life as well as the working process of numerous organizations, which may improve creative outcomes if one learns how to face scarcity in a proper way.

The specific area of interest of this paper has been the positive impact of diverse constraints on the level of creativity under specific circumstances, such as mediating or moderating effects, based on some insightful literature review. By stating the opposite of what is traditionally proposed, namely that an abundance of various environment dimensions is needed to raise individual creativity, this paper recapitulates how numerous scholars evidenced cases of the positive constraints-creativity relationship. The contribution of this paper is that it reflects the propositions of diverse scholars who empirically tested individuals working in organizations of various sizes, active in a number of fields of the society at different points of time. Ideally, this work focuses on raising the readers' awareness of the advantageous side of scarcity.

In the previous chapters of this work, three attentively selected and most relevant dimensions of work environment were discussed and analyzed, namely scarcity of time, financial or material budget, and close monitoring activities.

In chapter 2, the connection between time restrictions and individual creativity is evaluated. Since nearly most of tasks tend to have a previously fixed deadline, time dimension commonly characterizes most organizational processes. A specific limitation of time leads to time pressure or urgency of different levels, depending on how harsh the restriction is. Though some scientific research shows the negative effects of time pressure, it is reasonable to provide some pressure, as long as it is still adequate, for enhancing individual creativ-

ity. The empiric study by Baer and Oldham (2006) shows that an optimal point on the U-shaped function of time pressure and creativity has to be provided to obtain the most creative outcome. Thus, an optimal level of time pressure affects the enhancement process of creativity as a mediator and can be realized as well as strengthened when some moderating effects exist. According to Baer and Oldham (2006), support for creativity and openness to new experience are the necessary components to enable creative thinking. The deeply analyzed moderator, namely high support for creativity, appears to come from three main sources: supervisors, colleagues or team-members, and friends or family (Madjar et al. (2002)). In addition, the stronger support is, the more positive is the impact of appropriate time pressure on creativity level.

Next, the relation between financial or material scarcity and creativity level is the main subject of chapter 3. Similar to time restrictions, limiting financial budget for an individual may be viewed negatively as it leads to continuous job stress and thus personal dissatisfaction of working individuals. However, Zhou and George (2001) evidenced a positive effect of job dissatisfaction on creativity of individuals due to the existence of some necessary additional components. Thus, job displeasure can serve as a mediating effect for an improved creative thought and may be strengthened by the initial moderating effect of high continuance commitment of employees. This condition appears to ensure that dissatisfied employees choose to remain in their organizations and work on changing the job surroundings, showing higher level of creativity, driven by their job dissatisfaction. Further moderators that enable higher creativity are co-worker feedback and support as well as organizational support. Under these circumstances, financial resource constraints may lead to enhanced creativity of employees despite the greater level of their dissatisfaction.

Finally, chapter 4 is dedicated to the restrictions of close monitoring activities in order to raise chances of successful creative thinking. While a supervisor's role may often be decisive in individual performance, it is reasonable to limit or, most effectively, exclude controlling from supervisory monitoring activities. By eliminating close monitoring activities, the mediating effect of the raised intrinsic motivation of individuals is ensured due to higher self-efficacy of individuals. While massive research already shows the benefits of intrinsic motivations in terms of creativity (Csikszentmihalyi (1988); Amabile (1983, 1988); Rogers (1954)), it may actually alone lead to higher creativity among individuals. However, this relationship can be strengthened by the moderating effect of high intrinsic motivation of a supervisor, which creates a well-established dyadic organizing as well as intensive leader-member-exchange; this beneficially results in an understanding relationship between a supervisor and a subordinate. Accordingly, considering close monitoring activities are restricted, intrinsic motivation of an individual is enhanced and creative thinking enriched. The higher the intrinsic motivation of the supervisor, the stronger the effect of the monitoring constraint on the level of creativity is.

Thus, empirical research insights show that under cer-

tain circumstances, limitations may even be more effective for raising the level of creativity than an abundance of time, budget, or monitoring. Additional conditions, such as mediators and moderators, are however needed to ensure the rise of creativeness. These specific relationships between constraints and enhanced creative performance may overall be displayed in the summarizing Figure 8.

As in most research cases, this paper possesses some limitations. Although the general statement of the positive constraint-creativity relationship was not always indicated while reviewing research papers, some solid literature was found on the fulfillment of this connection only when additional effects exist. Thus, constraints alone could not always provide higher level of creativity without the supplementary help of moderators. Scarcity of time and budget leads to negative responses of individuals (pressure and dissatisfaction), which can serve as basis for enhanced creativity given individuals are positively affected by the guiding moderating effects, e.g. a job surrounding (great organizational support for creativity) or an individual quality (high continuance commitment). However, the third dimension – scarcity of close monitoring – already provides a positive response of an individual (high intrinsic motivation), which may increase individual creativity without the complementary help of a moderating effect.

Next, in order to ensure the clarity of the thesis structure, three restricting dimensions were observed, each possessing one mediator and one moderator. In reality, most confidently, a greater number of restricting dimensions may exist which may also promote creativity. Likewise, there might be a chain of mediating effects and a higher number of moderators relevant for the positive scarcity-creativity connection. Because creative process is a complex organizational development that has been discussed intensively in a great amount of research works, a strict structure was taken for this paper to demonstrate an example of how constraints may lead to higher creativity. Previous empirical research lists a number of other additional effects, such as task attractiveness, extrinsic motivation, sufficient knowledge or information, openness to new experiences etc.; all of them may as well positively affect creativity level. Within the observed dimensions, a limited number of effects was selected due to their great relevancy, high importance, and frequency of mentions by different academic scholars.

Finally, this thesis observes the relationship between two important factors in their best-case scenario. It reflects the way relevant creative responses of individuals arise in constrained conditions, which does not necessarily mean that these circumstances are an actual proper recipe for enhanced creativity. The paper basically shows that scarcity may promote individual creativity in some cases, thus making a contribution to the development of the "less is more" view.

In conclusion, this paper may become as a beginning point for future empirical research of how organizational teams find creative and innovative solutions when facing various restrictions of different levels, e.g. very high, medium,

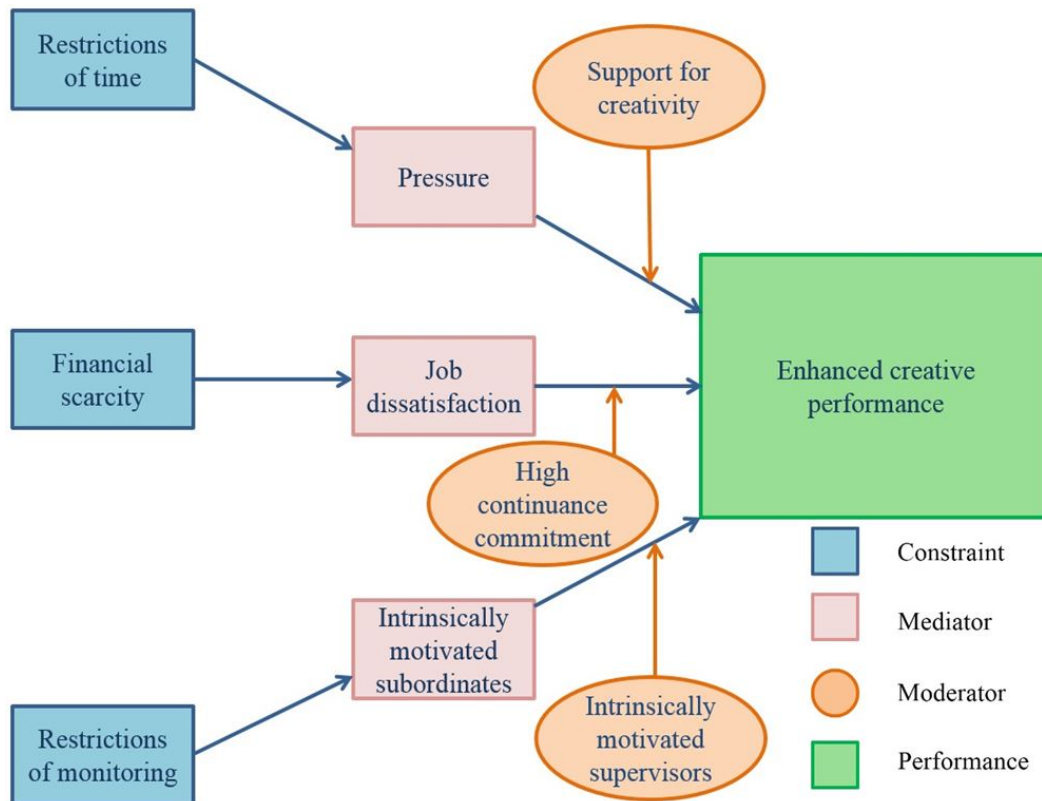


Figure 8: Overall schema of the relevant constraints-creative performance relationship (Source: own rendering)

or low. Demonstrating the proper strength of restrictions may contribute to organizational learning of promoting creativity when facing the common phenomenon of scarcity. Another suggestion for future directions might be an examination of how constraint- originated creativity can be transformed into a proper innovation; this could be introduced as a post-creativity analysis. Another notable point could be an empirical research of how individuals with diverse unchangeable background issues, e.g. family surroundings, may respond to scarcity of the necessary conditions at work. This might assist organizational management when determining a certain segment of individuals who are given greater amount creativity-relevant tasks than others, who are less likely to demonstrate creativeness based on their personal information.

To sum it up, scarcity is a common phenomenon in organizations which does not necessarily need to be avoided but profited from. Therefore, some deeper knowledge on how constraints raise creativity can become a decisive argument for organizational creative and innovative success. Thus, one may turn the negative into the positive and, most importantly, drastically profit from it. “Less is more” is not only a view, but is a possibly strong foundation for future practical directions and some great solutions that will surely drive our society.

References

- Amabile, T. M. Effects of external evaluation on artistic creativity. *Journal of Personality and Social Psychology*, 37(2):221–233, 1979.
- Amabile, T. M. The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2):357–576, 1983.
- Amabile, T. M. A model of creativity and innovation in organizations. *Research in Organizational Behavior*, 10(1):123–167, 1988.
- Amabile, T. M. Creativity in context: The social psychology of creativity. Boulder, CO: Westview, 1996.
- Amabile, T. M. and Gryskiewicz, S. S. *Creativity in the R&D laboratory*. Greensboro: Center for Creative Leadership, 1987.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., and Herron, M. Assessing the work environment for creativity. *Academy of Management Journal*, 39(5):1154–1184, 1996.
- Andrews, F. M. and Farris, G. F. Supervisory practices and innovation in scientific teams. *Personnel Psychology*, 20(4):497–515, 1967.
- Andrews, F. M. and Farris, G. F. Time pressure and performance of scientists and engineers: A five-year panel study. *Organizational Behavior and Human Performance*, 8(2):185–200, 1972.
- Andrews, J. and Smith, D. C. In search of the marketing imagination: Factors affecting the creativity of marketing programs for mature products. *Journal of Marketing Research*, 33:174–187, 1996.
- Antes, A. L. and Mumford, M. D. Effects of time frame on creative thought: Process versus problem-solving effects. *Creativity Research Journal*, 21(2-3):166–182, 2009.
- Baer, M. and Oldham, G. R. The curvilinear relation between experienced creative time pressure and creativity: moderating effects of openness to experience and support for creativity. *Journal of Applied Psychology*, 91(4):963–970, 2006.
- Baker, T. Resources in play: Bricolage in the toy store (y). *Journal of Business Venturing*, 22(5):694–711, 2007.
- Bandura, A. *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs: Prentice-Hall, 1986.
- Baron, R. M. and Kenny, D. A. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6):1173–1182, 1986.
- Bartol, K. M. Vocational behavior and career development, 1980: A review. *Journal of Vocational Behavior*, 19(2):123–162, 1981.
- Basadur, M. and Hausdorf, P. A. Measuring divergent thinking attitudes related to creative problem solving and innovation management. *Creativity Research Journal*, 9(1):21–32, 1996.
- Camisón-Zornoza, C., Lapedra-Alcamí, R., Segarra-Ciprés, M., and Boronat-Navarro, M. A meta-analysis of innovation and organizational size. *Organization Studies*, 25(3):331–361, 2004.
- Chandy, R., Hopstaken, B., Narasimhan, O., and Prabhu, J. From invention to innovation: Conversion ability in product development. *Journal of Marketing Research*, 43(3):494–508, 2006.
- Choi, J. N. Individual and contextual predictors of creative performance: The mediating role of psychological processes. *Creativity Research Journal*, 16(2-3):187–199, 2004.
- Ciborra, C. U. The platform organization: Recombining strategies, structures, and surprises. *Organization Science*, 7(2):103–118, 1996.
- Cohen, W. M. and Levinthal, D. A. Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1):128–152, 1990.
- Csikszentmihalyi, M. Society, culture, and person: A systems view of creativity. In *In Sternberg RJ (Ed.), The Nature of Creativity: Contemporary Psychological Perspectives*, pages 325 – 339. New York: Cambridge University Press, 1988.
- Cummings, A. and Oldham, G. R. Enhancing creativity: Managing work contexts for the high potential employee. *California Management Review*, 40(1):22–38, 1997.
- Cunha, M. e., Rego, A., Oliveira, P., Rosado, P., and Habib, N. Product innovation in resource-poor environments: Three research streams. *Journal of Product Innovation Management*, 31(2):202–210, 2014.
- Cyert, R. M. and March, J. G. *A Behavioral Theory of the Firm*. Englewood Cliffs: Prentice-Hall., 1963.
- Damanpour, F. Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34(3):555–590, 1991.
- Danneels, E. The dynamics of product innovation and firm competences. *Strategic Management Journal*, 23(12):1095–1121, 2002.
- Deci, E. L. and Ryan, R. M. The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology*, 53(6):1024, 1987.
- Deci, E. L., Connell, J. P., and Ryan, R. M. Self-determination in a work organization. *Journal of Applied Psychology*, 74(4):580, 1989.
- Dewett, T. Linking intrinsic motivation, risk taking, and employee creativity in an r&d environment. *R&D Management*, 37(3):197–208, 2007.
- Farrell, D. Exit, voice, loyalty, and neglect as responses to job dissatisfaction: A multidimensional scaling study. *Academy of Management Journal*, 26(4):596–607, 1983.
- Ford, C. M. A theory of individual creative action in multiple social domains. *Academy of Management Review*, 21(4):1112–1142, 1996.
- Gardner, D. G. Task complexity effects on non-task-related movements: A test of activation theory. *Organizational Behavior and Human Decision Processes*, 45(2):209–231, 1990.
- Gardner, D. G. and Cummings, L. Activation theory and job design-review and reconceptualization. *Research in Organizational Behavior*, 10:81–122, 1988.
- Gibbert, M., Hoegl, M., and Valikangas, L. Introduction to the special issue: Financial resource constraints and innovation. *Journal of Product Innovation Management*, 31(2):197–201, 2014.
- Giddens, A. *New rules of sociological method: A positive critique of interpretative sociologies*. London: Hutchinson, 1976.
- Giddens, A. *Contemporary critique of historical materialism. Volume 1: Power, property and the state*. London: MacMillan, 1981.
- Giddens, A. *The constitution of society*. Cambridge: Polity Press, 1984.
- Gladstein, D. L. Groups in context: A model of task group effectiveness. *Administrative Science Quarterly*, 29(4):499–517, 1984.
- Graen, G. B. and Scandura, T. A. Toward a psychology of dyadic organizing. *Research in Organizational Behavior*, 9, 1987.
- Gruber, H. E. and Bödeker, K. *Creativity, psychology and the history of science*. Springer Science & Business Media, 2006.
- Hauschildt, J. Innovationsmanagement–wo liegen die schwachstellen. *Zeitschrift Führung und Organisation*, 75(3):177–178, 2006.
- Hennessey, B. A. and Amabile, T. M. Reality, intrinsic motivation, and creativity. *American Psychologist*, 53:674–675, 1998.
- Higgins, M. C. and Kram, K. E. Reconceptualizing mentoring at work: A developmental network perspective. *Academy of Management Review*, 26(2):264–288, 2001.
- Huber, O. and Kunz, U. Time pressure in risky decision-making: effect on risk defusing. *Psychology Science*, 49(4):415, 2007.
- Iaffaldano, M. T. and Muchinsky, P. M. Job satisfaction and job performance: A meta-analysis. *Psychological Bulletin*, 97(2):251, 1985.
- Jesus, S. N. de, Rus, C. L., Lens, W., and Imaginário, S. Intrinsic motivation and creativity related to product: A meta-analysis of the studies published between 1990–2010. *Creativity Research Journal*, 25(1):80–84, 2013.
- Kamoche, K. and e Cunha, M. P. Minimal structures: From jazz improvisation to product innovation. *Organization Studies*, 22(5):733–764, 2001.
- Lanzara, G. F. Between transient constructs and persistent structures: designing systems in action. *The Journal of Strategic Information Systems*, 8(4):331–349, 1999.
- Leach, J. *Improving Mental Health Through Social Support: Building Positive and Empowering Relationships*. London: Jessica Kingsley Publishers, 2014.
- Levi-Strauss, C. *The savage mind*. University of Chicago Press, 1966.
- Levinson, D., Darrow, C., Klein, E., Levinson, M., and McKee, B. The seasons of a man's life. New York: Alfred A. Knopf, 1978.
- Lumsden, C. J. and Findlay, C. S. Evolution of the creative mind. *Creativity Research Journal*, 1(1):75–91, 1988.
- Madjar, N., Oldham, G. R., and Pratt, M. G. There's no place like home? the contributions of work and nonwork creativity support to employees' creative performance. *Academy of Management Journal*, 45(4):757–767, 2002.
- March, J. G. and Simon, H. A. *Organizations*. New York: Wiley, 1958.
- Meyer, J. P., Allen, N. J., and Gellatly, I. R. Affective and continuance commitment to the organization: Evaluation of measures and analysis of concurrent and time-lagged relations. *Journal of Applied Psychology*, 75(6):710–720, 1990.

- Miner, A. S., Bassof, P., and Moorman, C. Organizational improvisation and learning: A field study. *Administrative Science Quarterly*, 46(2):304–337, 2001.
- Mumford, M. D. Managing creative people: Strategies and tactics for innovation. *Human Resource Management Review*, 10(3):313–351, 2000.
- Mumford, M. D., Medeiros, K. E., and Partlow, P. J. Creative thinking: Processes, strategies, and knowledge. *The Journal of Creative Behavior*, 46(1):30–47, 2012.
- Oldham, G. R. and Cummings, A. Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 39(3):607–634, 1996.
- Prabhu, V., Sutton, C., and Sauser, W. Creativity and certain personality traits: Understanding the mediating effect of intrinsic motivation. *Creativity Research Journal*, 20(1):53–66, 2008.
- Prahalad, C. K. and Mashelkar, R. A. Innovation's holy grail. *Harvard Business Review*, 88(7/8):132–141, 2010.
- Rogers, C. R. Toward a theory of creativity. *ETC: A review of general semantics*, 11:249–260, 1954.
- Rosner, M. M. Economic determinants of organizational innovation. *Administrative Science Quarterly*, 12(4):614–625, 1968.
- Runco, M. A. and Cayirdag, N. *Time*. In M. A. Runco, & S. R. Pritzker (Eds.), *Encyclopedia of creativity*, 2nd Ed., 485–488. San Diego: Academic Press, 2011.
- Runco, M. A. and Pritzker, S. R. *Encyclopedia of creativity*. Volume 2. San Diego: Academic Press, 1999.
- Schumpeter, J. *Capitalism, Socialism and Democracy*. New York: Harper, 1962, 1942.
- Schumpeter, J. A. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Harvard University Press, 1934, 1912.
- Scott, S. G. and Bruce, R. A. Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3):580–607, 1994.
- Senyard, J., Baker, T., Steffens, P., and Davidsson, P. Bricolage as a path to innovativeness for resource-constrained new firms. *Journal of Product Innovation Management*, 31(2):211–230, 2014.
- Shalley, C. E., Gilson, L. L., and Blum, T. C. Matching creativity requirements and the work environment: Effects on satisfaction and intentions to leave. *Academy of Management Journal*, 43(2):215–223, 2000.
- Shalley, C. E., Zhou, J., and Oldham, G. R. The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management*, 30(6):933–958, 2004.
- Shoss, M. K., Witt, L., and Vera, D. When does adaptive performance lead to higher task performance? *Journal of Organizational Behavior*, 33(7):910–924, 2012.
- Staw, B. M. Organizational behavior: A review and reformulation of the field's outcome variables. *Annual Review of Psychology*, 35(1):627–666, 1984.
- Stein, M. I. *Stimulating creativity*, volume 1. New York: Academic Press, 2014.
- Stuhlmacher, A. F. and Champagne, M. V. The impact of time pressure and information on negotiation process and decisions. *Group Decision and Negotiation*, 9(6):471–491, 2000.
- Tierney, P., Farmer, S. M., and Graen, G. B. An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, 52(3):591–620, 1999.
- Tushman, M. L. and Nelson, R. R. Introduction: Technology, organizations, and innovation. *Administrative Science Quarterly*, 35(1):1–8, 1990.
- Wallach, M. A. and Kogan, N. A new look at the creativity-intelligence distinction. *Journal of Personality*, 33(3):348–369, 1965.
- Withey, M. J. and Cooper, W. H. Predicting exit, voice, loyalty, and neglect. *Administrative Science Quarterly*, 34(4):521–539, 1989.
- Woodman, R. W., Sawyer, J. E., and Griffin, R. W. Toward a theory of organizational creativity. *Academy of Management Review*, 18(2):293–321, 1993.
- Zakay, D. The impact of time perception processes on decision making under time stress. In *Time pressure and stress in human judgment and decision making*, pages 59–72. Springer, 1993.
- Zhou, J. When the presence of creative coworkers is related to creativity: role of supervisor close monitoring, developmental feedback, and creative personality. *Journal of Applied Psychology*, 88(3):413–422, 2003.
- Zhou, J. and George, J. M. When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 44(4):682–696, 2001.
- Zhou, J. and Shalley, C. E. Research on employee creativity: A critical review and directions for future research. *Research in Personnel and Human Resources Management*, 22:165–218, 2003.
- Zur, H. B. and Breznitz, S. J. The effect of time pressure on risky choice behavior. *Acta Psychologica*, 47(2):89–104, 1981.