

Master Thesis: Entrepreneurial decision-making – Assessing the influence of creativity and imagination on effectuation and causation processes of German entrepreneurs

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Abstract

The purpose of this study is to investigate the effect of creativity and imagination on the decision-making processes of entrepreneurs. In this context, the two decision-making approaches causation and effectuation are central to this research. Causation implies the focus on a predefined goal, which is achieved by selecting and combining the right resources. Effectuation logic, however, refers to an opposing approach in which the given means are taken in order to select between possible effects that can be created with the given means. Previous and recent literature on causation and effectuation revealed that the need for further investigation of underlying factors has emerged. For the execution of this study, a nonexperimental quantitative research design is chosen. Therefore, the unit of observation are individuals, in total 97 entrepreneurs that are based in Germany. Results of the study indicate that neither creativity nor imagination is significantly correlated with the causation/effectuation approach. Furthermore, the research has led to the conclusion that there is no statistically significant moderating effect of imagination on the relationship between creativity and effectuation/causation. The study poses a contribution to the existing literature on effectuation and causation and provides novel insights into the positioning of creativity and imagination, which are considered highly influential character traits in entrepreneurship. Further research should follow up on the influence of other variables that are associated with the cognitive processes of an entrepreneur. In this regard, it is also recommended to execute similar research in other countries in order to achieve a cross-country comparison.

Keywords

Entrepreneurship, new venture creation, creativity, imagination, creative thinking, decision-making process, causation, effectuation

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Preface

As the final step for graduating in the master's program of Business Administration at University of Twente, this thesis investigates the influence of creativity and imagination on the effectuation and causation processes of German entrepreneurs.

Firstly, I would like to express genuine gratitude to my first supervisor Dr. M.R. Stienstra for guiding me through the entire execution of this research and for always providing me with his constructive advice. Secondly, I would like to take this opportunity to thank my second supervisor Drs. Patrick Bliet for his valuable feedback on my research. Finally, I would like to thank my family and friends, who have supported me throughout the whole process.

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1. Introduction

Entrepreneurial decision-making is widely considered an important and multifaceted phenomenon in the vast body of existing entrepreneurship literature. In many economically strong countries, such as Germany, the process is gaining in relevance and is hence also becoming the subject of academic literature. In particular in the context of new venture creation, which is according to Gartner (1985) the creation of new organizations and the related activities such as planning and organizing, entrepreneurial decision-making is assumed to be an influential variable. The last decade has witnessed a growth in the importance of the phenomenon, however already earlier Schumpeter and Opie (1934) considered it as a fundamental factor influencing economic development.

Central to entrepreneurial decision-making is the role of an entrepreneur, which is considered as an individual who brings production and service ideas into practice by taking risks and organizing work (Weber, 2014). Several authors have attempted to define the role of an entrepreneur, however, one of the most widely accepted methodologies has been developed by Joseph A. Schumpeter. Schumpeter and Opie (1934) claim that an entrepreneur is an innovator who creates creative destruction and is therefore the core element of economic change. Within this frame of reference, the question arises as to why entrepreneurs, which are positioned central to the new venture creation process, decide the way they do.

The paradigm of decision-making is of fundamental significance for different research areas and has been demonstrated to include several underlying components (Ortega et al., 2017). Gradually, in the past decades, many theories about decision-making have emerged. A notable theory is for instance the approach of Mintzberg et al. (1976), which provides a general model of the strategic decision-making process and identifies the basis structure underlying unstructured processes. Thus, Mintzberg et al. (1976) claim that the process is highly dynamic and consists of twelve elements illustrating three central phases: identification, development and selection. To take the decision-making process one step further and to enable a higher level of differentiation alternative approaches to entrepreneurial decision-making have gained significant interest. Consequently, over time many academic studies have examined the decision-making logic of entrepreneurs and how they approach the new venture creation process, such as causation and effectuation. The causation approach has been subject to entrepreneurship literature for decades and was validated by various researchers. Causation implies the focus on a predefined goal which is achieved by finding and combing the right resources (Chandler et al., 2011). In her study, Sarasvathy (2008) developed an alternative approach to entrepreneurial decision-making that can be used in situations of uncertainty and which is not based on past data. The basic idea behind the effectuation logic is that an entrepreneur fabricates opportunities from the existing resources instead of discovering and exploiting opportunities. Both approaches are opposed to each other and thus represent two different perspectives on how entrepreneurs make their decisions. Above all, current research on effectuation and causation lacks a closer examination of why entrepreneurs choose these decision-making logics and what variables influence them.

1.1 Background

Extant entrepreneurship literature continuously sheds light on the importance of creativity and imagination in various entrepreneurial contexts.

For many decades the field of creativity has been explored in diverse contexts and examples of use. Consequently, creativity research is highly complex and provides theoretical and

practical implications for different fields like philosophy, education, psychology and entrepreneurship. There is no clear consensus about a precise definition of the term in literature. For instance, creativity is identified as an 'act that redefines categories of analysis and recombines them to produce an object, process or perspective that did not exist before' (Caton, 2019, p.442). Hennessey and Amabile (2010) came up with a similar definition from a psychological perspective, as they define creativity as 'the generation of products or ideas that are both novel and appropriate' (p. 570). In this setting, Bharadwaj and Menon (2000) claim that most of the definitions have two things in common: the novelty and the appropriability of a solution for a specific problem. Barbot (2019) adds that creativity is not static and thus can be trained and nurtured.

Furthermore, the notion of imagination is frequently referred to in connection with creativity and is sometimes even used as a synonym (Gaut, 2003). According to Kier and McMullen (2018) imagination is defined as the 'ability to make mental images of things that may not exist in real life' (p. 2267). Researchers agree on the fact that imagination remains apparent throughout the whole life of an individual and happens in several contexts (Batey & Furnham, 2006). However different groups of scholars define imagination either as a faculty, an outcome, or a process (Frederiks, 2016). For the further course of the research, this concept will henceforth be seen as a cognitive process. There are various research areas in which imagination is fundamental for literature, like for instance biology and neurology. Nevertheless, since the biological and neurological background of this concept is less relevant to this research project, it will not be discussed in detail and imagination will be considered from an entrepreneurial perspective. The process of imagination includes notions of imagery and notions of mental simulation. In consequence, imagination enables individuals to reconsider events that already happened in the past and thus also enables the creation of various scenarios and hypotheses (Kier & McMullen, 2018).

1.2 Research Gap

Previous research on entrepreneurial decision-making has investigated the topic from different perspectives and has highlighted that there are various underlying variables for preferring effectuation over causation logic and vice versa. The increasing relevance of alternative views on decision-making and the increasing dynamic of entrepreneurial environments results in the need for further investigation of underlying factors (Fisher, 2012). In line with that, Arend et al. (2015) argue that for particular effectual logic and its antecedents need to be investigated in more detail in order to decrease the limitations of the theory. Consequently, the relevance of various variables arises, for which the influence on the application of effectuation and causation processes has been investigated in the past years. For instance, Brettel et al. (2014) have investigated the relationship between uncertainty and effectuation in manufacturing, while Stroe et al. (2018) analyzed the influence of entrepreneurial passion, risk perception and self-efficacy on effectuation and causation.

As claimed by Solomon et al. (2008) creativity is generally accepted as an important antecedent of entrepreneurial behaviour and is considered indispensable for entrepreneurial success. The ability of creative thinking enables entrepreneurs to foster innovation and business growth, while at the same handling changing environmental conditions and the resulting challenges (Shalley, 1991). In this context, the use of imagination within entrepreneurial environments has also gained importance, especially due to its close connection to the concept of creativity (Runco, 2014). Not only the use of creativity but also

the use of imagination in entrepreneurial processes is highly important for entrepreneurs, as it provides valuable information for uncovering opportunities (Cornelissen & Clarke, 2010; Sarasvathy, 2001). Many researchers acknowledge the use of forward-looking imagination as a source for creating newness within entrepreneurial settings (Chiles et al., 2013).

Despite the vast body of literature and the high interest in entrepreneurial decision-making, the influence of creativity and imagination on effectuation and causation processes has been neglected so far. However, the many parallels between the concepts show that there may well be a relationship between them. Due to the general acceptance of creativity and imagination as antecedents of entrepreneurial behaviour, investigating the mentioned relationship highly contributes to the existing literature on entrepreneurial decision-making. Ogilvie (1998) was among the first to highlight the need for dynamic creative action-based decision-making processes to improve the overall quality of decision-making within organizations. In this regard, the author especially called attention to the value of more research on how creativity and imagination influence the decision-making process. It should also be noted that previous work of Blauth et al. (2014) has already empirically demonstrated that the application of the effectuation approach has a significant positive effect on the level of creativity in new product development. However, the question arises as to whether this also applies in the opposite direction and thus, whether the creativity of an entrepreneur influences the choice of decision-making logic in entrepreneurial processes. Additionally, the paper intends to distinguish which decision-making logic is predominantly being followed by entrepreneurs and advances the theoretical understanding of the underlying variables of causation and effectuation.

Besides the contribution to academic literature, addressing this topic is also of practical relevance. The research seeks to offer a deeper understanding of creativity and imagination as underlying variables in the decision-making process of entrepreneurs. The outcomes might be relevant for managers and policymakers, as the information can be used to trace and understand past decisions. Besides, the study will provide entrepreneurs with insights into their own decision-making and how it is influenced by their capacity for creativity and imagination. Through this understanding and the self-assessment of personality traits in relation to the mentioned concepts, the research provided valuable information for entrepreneurs which may help to reflect on future decisions.

1.3 Research Question

Based on the research gap, the main objective of this study is to offer insights into a better understanding of the influence of creativity and imagination of German entrepreneurs on the choice of effectuation and causation logic. The paper further strives to identify how German entrepreneurs apply effectuation and causation logic in order to achieve entrepreneurial success. Based on the situation and complication the research aims to investigate the following central research question:

To what extent do creativity and imagination determine the application of effectuation and causation logic of German entrepreneurs?

The central research question contains the most important concepts of the research and aims to reflect the core research objective. To investigate the research question, a quantitative research approach will be used.

1.4 Imagination as a Moderator

Despite similar general understanding, underlying processes, and significance for entrepreneurship literature, the relationship between the two concepts of creativity and imagination should be delineated in more detail. A recent review of literature on this topic suggests that using imagination and being creative in different processes both use the same cognitive architecture and processes (Woolley et al., 2020). Imagination is seen as a highly important contributor to creativity. Research by Silverman (2016) underlines that and reveals that the use of imagination increases the level of creative output and supports creative thinking. Various researchers agree that imagination can be seen as a tool for creative thinking and allows individuals to think about things that are not real, whereas creativity is more practical and refers to using imagination to create something (Thompson, 2018). However, there are also researchers who attribute a higher relevance to the imagination, especially in the process of creating and managing new organisations.

Although imagination is recognized as an important factor in entrepreneurship literature, it plays a comparatively less important role in contemporary theories, as it is often included under creativity (Thompson, 2018). Since various researchers are calling for greater attention to be paid to the imagination in entrepreneurial decision-making, it is reasonable to assume that imagination moderates the relationship between creativity and decision-making logic. Especially since imagination is thought to be a major contributor to practised creativity (Silverman, 2016), the level of imaginativeness may be more important than expected in this regard and thus may regulate the relationship between creativity and causation and effectuation. Remarkably, Garud et al. (2015) emphasize that there are various processes in new venture creation that begin with imagination and for which the consequences are also owed to the use of imagination. Here, the research gap is illustrated, since it has not yet been investigated to what extent imagination influences the impact of creativity on decision-making logic. This could also be significant in other entrepreneurial research contexts since creativity and imagination are not always strictly delineated.

1.5 Outline of the Thesis

The paper is organized as follows: First, section one gives a brief overview of the most relevant literature of the paper. It examines the independent and dependent variables of the research: creativity, imagination and causation/effectuation. The chapter is rounded off with the formulation of hypotheses, which are formed based on the concepts of the theoretical framework and aim to examine the relationship between them and the mentioned research gap. In the second section of the paper, the methodology and the research design are outlined, which set the frame for testing the hypotheses. It contains information about the sample, the data collection, the data analysis and the variables of the study. Consequently, the next chapter presents the results of the study and contains hypothesis tests based on the given methodology. Ultimately, practical and theoretical implications are composed and limitations are discussed. Furthermore, the conclusions are drawn and the central research question is answered.

2. Theoretical Framework

The theoretical framework contains relevant literature to create a basic understanding of the research. Firstly, the concepts of creativity and imagination and their role in entrepreneurship

literature will be outlined. Additionally, the field of entrepreneurial decision-making is explored by distinguishing between causation and effectuation approaches.

2.1 Creativity

Since the research takes an entrepreneurial point of view, entrepreneurial creativity, in particular, should also be defined and delineated, as this will be one of the main subjects of the research. Due to constantly changing environments and rapid external developments, entrepreneurs are confronted with new challenges on a daily basis. Managing these tasks and challenges requires not only hard work but also entrepreneurial creativity (Anjum et al., 2020).

In her seminal work, Amabile (1997) defines entrepreneurial creativity as follows:

The generation and implementation of novel, appropriate ideas to establish a new venture (a new business or new program to deliver products or services). The primary novel, useful ideas may have to do with: (a) the products or services themselves, (b) identifying a market for the products or services, (c) ways of producing or delivering the products or services, or (d) ways of obtaining resources to produce or deliver the products or services. (p. 20)

For achieving this kind of creativity, the researcher recognizes the need of a combination of intrinsic and extrinsic motivation as a motivational synergy, which increases the level of personal involvement. More recently, Dayan et al. (2013) identified the following antecedents of entrepreneurial creativity: entrepreneurial alertness, intrinsic motivation, access to resources and expertise.

Caton (2019) attributes a valuable role to creativity in overcoming uncertainty in entrepreneurial processes, as it can be used to collect knowledge and reduce costs of the new venture creation process. Creative entrepreneurs are able to use knowledge in order to capture value for the venture. Within this frame of reference, Morris et al. (2001) found out that individual creative thinking is used to achieve competitive advantage and foster innovation. Not only on an individual level but also within teams and working groups creative thinking contributes to these concepts (Hirst et al., 2009). Furthermore, it is assumed that entrepreneurs that have a higher level of creativity are able to maintain a positive attitude and self-confidence in various entrepreneurial processes (Zhao et al., 2005). As mentioned earlier, another study that confirms the role of creativity in entrepreneurial processes was carried out by Solomon et al. (2008). In their model, the authors include creativity as an integral part of their model on entrepreneurial intention and underline a positive significant effect of creativity on entrepreneurial intentions. Thus, they found out that the creativity of an entrepreneur highly contributes to entrepreneurial activity within the process of creating new ventures. Recent research by Anjum et al. (2020) confirmed and substantiated this relationship by studying the example of Pakistani entrepreneurs. In line with Caton (2019) and Solomon et al. (2008), earlier research often recognized the entrepreneur's characteristics as the most decisive factor in the new venture creation next to new venture process considerations. For instance, Khan (1986) highlights that the characteristics of an entrepreneur can be analysed in order to predict the success of a new venture. The research emphasizes that the creativity and ingenuity of the entrepreneur most significantly correlate with new venture success. Several studies, for instance, Kirzner (1999) and Weber (2014) emphasize the same importance and therefore agree with the findings of Khan (1986).

2.2 Imagination

Similar to the already defined concept of creativity, imagination is also attributed an essential role in entrepreneurship literature, especially in the decision-making and opportunity creation process (Foss et al., 2008). Additionally, the use of imagination contributes to the process of new venture creation (Bjerke & Ramo, 2011; Kier & McMullen, 2020; Sarasvathy, 2008), business conception (Witt, 1998) and leadership (Garud et al., 2015).

Gartner (2007) defines entrepreneurial imagination as 'the generation of hypotheses about how the world might be: how the future might look and act.' (p. 614) Gartner's definition is in line with the findings of various researchers that argue that imagination is frequently used for creating opportunities in entrepreneurial settings (Chiles et al., 2013; Cornelissen & Clarke, 2010; Witt, 1998). In connection to this finding, Cornelissen and Clarke (2010) argue that entrepreneurs frequently use imagination for the creation of novelty and to find new combinations of resources within their entrepreneurial environment. Consequently, a link to the Schumpeterian approach to entrepreneurship can be established, as this approach assumes that opportunities are created by entrepreneurs by combining resources (Schumpeter & Swedberg, 1994).

Furthermore, the initial research on strategic planning by Giraudeau (2008) marks the importance of imagination in strategy formulation. According to the scholar, entrepreneurs make use of imagination to develop and adapt strategies for new ventures in order to react to changing and complex business environments. The author also states that strategies are flexible and can therefore be constantly adjusted. In agreement with Giraudeau (2008), Ogilvie (1998) already earlier found out that imagination is often used in top management to improve the quality of strategic decision-making. In this regard, he adds that this may be caused by the presence of ambiguity and constantly changing business settings.

In their study on entrepreneurial imaginativeness, the cognitive ability of an entrepreneur to be imaginative, Kier and McMullen (2018) suggest that there are three forms of imaginativeness in an entrepreneurial context: creative imaginativeness, social imaginativeness and practical imaginativeness. It is suggested that the mentioned forms of imaginativeness are the most relevant ones when it comes to entrepreneurial intent, as they especially assist in the new venture creation process, which is a frequently investigated topic in business literature. First, creative imaginativeness lets entrepreneurs anticipate the effects of applying new knowledge and makes product innovation easier. Social imaginativeness positively impacts communication and market responsiveness, whereas practical imaginativeness facilitates administration. The framework of the authors can be used to measure the imaginativeness of entrepreneurs and accordingly marks the value of different imaginativeness skills in the new venture creation process. These findings are in line with previous literature, which highlights the importance of imagination in the new venture creation process (Sarasvathy, 2008).

In conclusion, it is suggested that imagination is treated as an integral construct of entrepreneurship literature, which, however, still offers scope for investigation, especially with regard to the decision-making logic of entrepreneurs. What is certain is that past and

recent research imply that imagination is facilitating creative problem-solving and entrepreneurial behaviour (Kier & McMullen, 2018).

2.3 Causation and Effectuation

In her ground-breaking article of 2001, Sarasvathy established the theoretical concept of effectuation, which describes a specific logic of thinking that is used by entrepreneurs in the new venture creation process. Sarasvathy (2001) distinguishes between two alternative approaches and argues that both approaches are used depending on the situational factors and the stage of the new venture process. According to the author, the term effectuation refers to processes that 'take a set of means as given a focus on selecting between possible effects that can be created with that set of means' (Sarasvathy, 2001, p.245). In contrast, she defines causation as processes that 'take a particular effect as given and focus on selecting between means to create the effect' (Sarasvathy, 2001, p.245). Thus, effectuation logic fundamentally differs from causal logic, which is rather conventional and was often associated with the process of new venture creation in the previous Entrepreneurship literature. However, the author adds that both approaches belong to natural human reasoning and may take place simultaneously, overlapping and intertwining in different situations. This section outlines the theoretical underpinnings of both concepts and examines the differences between causation and effectuation.

2.3.1 Causation

According to Chandler et al. (2011), causation is a traditional decision-making logic and is deeply rooted in entrepreneurship literature, as it is derived from neo-classical microeconomics. In contrast to effectuation processes, causation processes imply the focus on a predefined goal which is achieved by finding the right means. The causation logic highlights the significance of existing capabilities and resources to maximize the expected returns. Causation is a valid decision-making logic in situations with a low level of uncertainty, however in highly unknown and uncertain contexts researchers disagree about the advantages of this decision logic (Blauth et al., 2014). Ortega et al. (2017) agree with this finding and reveal in their study that the logic of causation can be found in various sub-processes of new product development, however, there are also several processes that cannot be described with the causation approach.

In his comparison of decision-making theories in entrepreneurship, Fisher (2012) recognizes different concepts that are highly associated with the causation logic. Within this frame of reference, he mentions the following concepts: intentionality, opportunity identification and evaluation, planning, resource acquisition and the deliberate exploitation of opportunities (Fisher, 2012). The mentioned concepts are dominant theories of entrepreneurship literature and are largely subject to the logic of causation. In line with Fisher (2012), Shane and Venkataraman (2000) argue that in the causal view of entrepreneurship, identification and evaluation of objective opportunities explain the subsequent processes of entrepreneurship and thus serve as the starting point of causal logic. This aspect is also found in the work of Sarasvathy (2001), as she claims that the identification of opportunities is highly related to the outcomes of entrepreneurship. Consequently, causal logic mainly adapts the conservative view that markets are identified and rarely created. Additionally, it is stated that there are two boundary conditions for the application of causal logic: the existence of a market for a product or service prior to exploitation and the availability of historic information (Fisher, 2012). Looking at the framework of causation, it is noteworthy that the evaluation and identification of opportunities allow entrepreneurs to set targets and plan the exploitation of the

opportunity. Subsequently, according to the process model of causation, the entrepreneur engages in the process of collecting resources in order to find a solution to the identified opportunity. The steps of the causation approach can be found in Figure 1.

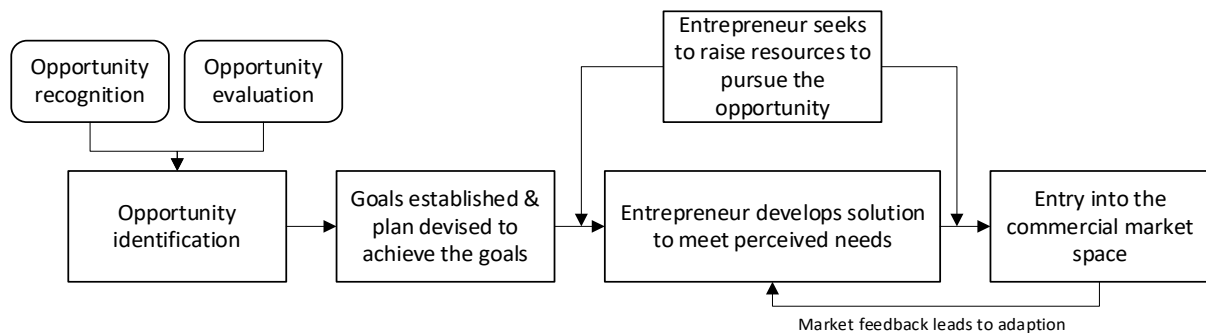


Figure 1. The causation process based on Sarasvathy (2001, 2008) and Fisher (2012).

As an example of a typical causation process, Sarasvathy (2001) mentions the logic of marketing books, which suggest analysing the current state and the environment of a venture in order to create a plan and set goals for the future. The example of the logic of marketing books follows up on previous findings on causation logic, as it infers the opportunity identification as a starting point and continues with goal establishment and resource collection.

Moreover, Høvig et al. (2018) found out that entrepreneurs applying causation logic have a limited tendency to share ideas within their network and thus fail to capture the associated value.

2.3.2 Effectuation

In recent years, a growing body of literature on effectuation has been identified and there are several researchers contributing to the concept of effectuation. The concept of effectuation assumes that in some cases circumstances in entrepreneurship are highly dynamic and unpredictable and therefore present the need for an adjusted decision-making process. As indicated, the basic idea behind effectuation is to start at the current state and to take the given means in order to shape the future of a new venture. Consequently, the effectuation approach is highly suitable for situations with a high level of uncertainty and goal ambiguity (Valliere, 2015). For particular, Sarasvathy was one of the first researchers to assert that causal logic is not appropriate for entrepreneurial processes, as they include many risks and uncertainties. Consequently, the approach emphasizes the importance of uncertainty, as uncertainty prevents predictions and the adaption of entrepreneurial strategies. Andersson (2011) highlights that effectuation logic is especially formed for situations where human actions are the most essential factor for structuring the outcomes of a venture.

Figure 2 illustrates the dynamic model of effectuation. To shape the future of a new venture and penetrate markets, the effectuation logic underlies four key factors:

- (1) Starting with means as opposed to establishing end goals;
- (2) applying affordable loss instead of expected return when evaluating options;
- (3) leveraging relationships instead of competitive analysis when assessing the relationship with other individuals and organizations;
- and (4) exploiting and not avoiding contingencies (Fisher, 2012, p. 1024).

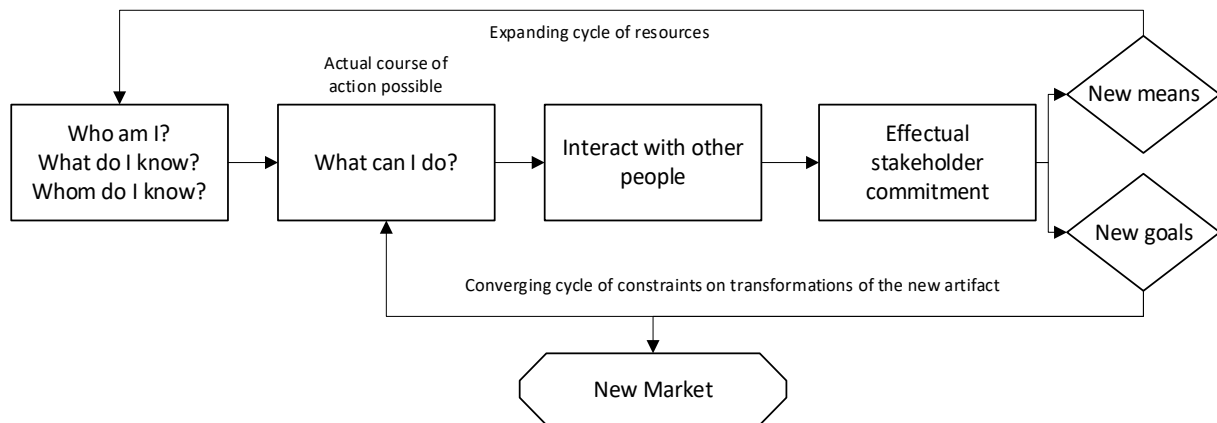


Figure 2. The effectuation process based on Sarasvathy and Dew (2005) and Fisher (2012).

Besides, Andersson (2011) suggests that there is a strong link between born-global firms and the application of the effectuation logic, as born-global firms are particularly established in environments that are uncertain and do not deliver much guidance for the entrepreneur. In line with the findings of Andersson (2011), Sarasvathy (2008) describes the effectuation logic as a 'general theory of decision-making in uncertain situations' (p. 227). More recent literature by Prashantham et al. (2019) contributes to effectuation research by emphasizing the influence of effectuation logic on the speed of new venture internationalisation. The authors hence provide an example of application and prove that an effectual approach in terms of network building increases the initial entry speed and international scope speed of new ventures. Based on that, it can be stated that it can be recommended for entrepreneurs to be aware of the effectual approach to network-building in order to facilitate the desired network-building.

To capture not only the relevance of network-building but also other main factors of effectuation, Sarasvathy has extended and concretized her thinking framework about effectuation in 2008, which is now widely accepted as an integral part of decision-making literature. Following the key factors of the process model of Sarasvathy and Dew (2005), Sarasvathy (2008) distinguishes between five behavioural principles of effectuation, which are applied by entrepreneurs to shape the unpredictable future of new ventures:

1. Bird-in-hand principle: Expert entrepreneurs begin with the resources that are available and aim to create solutions with the given means in the new venture creation process.
2. Affordable Loss principle: Expert entrepreneurs investigate what they are willing to lose and limit their risk by understanding this principle.
3. Lemonade principle: It is suggested that mistakes and surprises are part of the process and that they are analysed to create new markets and opportunities instead of imagining worst-case scenarios.
4. Patchwork Quilt principle: Building new partnerships is essential and can contribute to the development of a project and can reduce uncertainty in new venture creation.
5. Pilot-in-the-plane principle: The effectual approach argues that the future can be significantly influenced by the actions of an individual and that the desired outcomes can be achieved by controlling these activities.

Thus, these principles make up effectual logic and each of them stands for an approach to decision-making, in which the entrepreneur is seen as the creator of opportunities. In their

meta-analysis, Read et al. (2009) confirm that three of the effectual principles are positively correlated with new venture performance. The researchers found out that applying the Lemonade, Patchwork Quilt and the Pilot-in-the-plane principle has a positive effect on new venture performance and therefore underline the practical benefits of using these principles while creating a new venture.

2.3.3 Differences between Causation and Effectuation

In her article, Sarasvathy (2001) provides a clear differentiation of the causation and the effectuation approach. Both concepts are contrasted based on the following seven categories of differentiation: givens, decision-making selection criteria, competencies employed, context of relevance, nature of unknowns, underlying logic and outcomes. The differentiation of the two concepts is graphically shown in Table 1.

Categories of Differentiation	Causation Processes	Effectuation Processes
Givens	Effect is given	Only some means or tools are given
Decision-making selection criteria	Help choose between means to achieve the given effect Selection criteria based on expected returns Effect dependent: Choice of means is driven by characteristics of the effect the decision maker wants to create and his or her knowledge of possible means	Help choose between possible effects that can be created with given means Selection criteria based on affordable loss or acceptable risk Actor dependent: Given specific means, choice of effect is driven by characteristics of the actor and his or her ability to discover and use contingencies
Competencies employed	Excellent at exploiting knowledge	Excellent at exploiting contingencies
Context of relevance	More ubiquitous in nature More useful in static, linear, and independent environments	More ubiquitous in human action Explicit assumption of dynamic nonlinear, and ecological environments
Nature of unknowns	Focus on the predictable aspects of an uncertain future	Focus on the controllable aspects of an unpredictable future
Underlying logic	To the extent we can predict the future, we can control it	To the extent we can control the future, we do not need to predict it
Outcomes	Market share in existent markets through competitive strategies	New markets created through alliances and other cooperative strategies

Table 1. Contrasting Causation and Effectuation (Sarasvathy, 2001, p. 251).

In conclusion, causation and effectuation are approaches that are in contrast to each other while still both being deeply rooted in the literature about decision-making and new venture creation. In this regard, causation is considered a well-defined and coherent, uni-dimensional construct, while effectuation is considered a formative, multidimensional construct (Ortega et al., 2017).

2.4 Hypotheses

On the basis of the theoretical framework, several hypotheses are formed and tested in this study. As stated before, the study aims to investigate the relationship between creativity and imagination and the causation and effectuation processes of entrepreneurs. The theoretical underpinnings of the concepts of this research provide several possible relationships between the constructs. Formulating hypotheses based on the theoretical framework enables the research to carry out statistical tests in order to investigate the assumed association regarding strength and direction.

Literature on effectuation has provided empirical evidence for the suitability of applying the effectuation logic in situations of uncertainty. Sarasvathy (2008) claims that the behavioural effectuation principles embody techniques to control uncertain situations in new venture creation. Remarkably, the use of these techniques might be connected to the use of creativity in entrepreneurial processes. As Caton (2019) stated, creativity is attributed a valuable role in overcoming uncertainty. He also argues that entrepreneurs use their creativity for collecting data and reducing costs in situations with an uncertain future. Based on the combination of these findings, the following hypotheses are formulated:

H1.A: A significant positive relationship exists between *Creativity* and using the *Effectuation* approach in entrepreneurial decision-making.

H1.B: A significant negative relationship exists between *Creativity* and using the *Causation* approach in entrepreneurial decision-making.

Previous research has shown that using the effectuation decision-making logic refers to taking the given means and shaping the future actively (Sarasvathy, 2001). Hence, effectuation logic relates to the Schumpeterian perspective of entrepreneurship in which opportunities are rather created than discovered. In the same way, it is suggested that imagination highly contributes to opportunity creation (Chiles et al., 2013; Cornelissen & Clarke, 2010; Foss et al., 2008; Witt, 1998) and can be used by entrepreneurs to establish scenarios that outline the combination of resources (Cornelissen & Clarke, 2010; Kier & McMullen, 2018). Based on that, it can be assumed that entrepreneurs with a higher imaginativeness tend to prefer the effectual logic in the decision-making process.

H2.A: A significant positive relationship exists between *Imagination* and using the *Effectuation* approach in entrepreneurial decision-making.

H2.B: A significant negative relationship exists between *Imagination* and using the *Causation* approach in entrepreneurial decision-making.

The theoretical framework revealed that both creativity and imagination are influential and relevant factors in entrepreneurship and new venture creation. Therefore, both concepts are potential influencers on the choice of effectuation and causation. However, while creativity plays an important role and is firmly anchored in many models, it remains questionable what role imagination plays within this framework. Based on the work of Garud et al. (2015), it can

be assumed that imagination is more influential than expected and not only a tool of creativity. Thus, the following hypotheses can be made:

H3.A: Creative Imaginativeness moderates the relationship between Creativity and the use of Causation/Effectuation.

H3.B: Social Imaginativeness moderates the relationship between Creativity and the use of Causation/Effectuation.

H3.C: Practical Imaginativeness moderates the relationship between Creativity and the use of Causation/Effectuation.

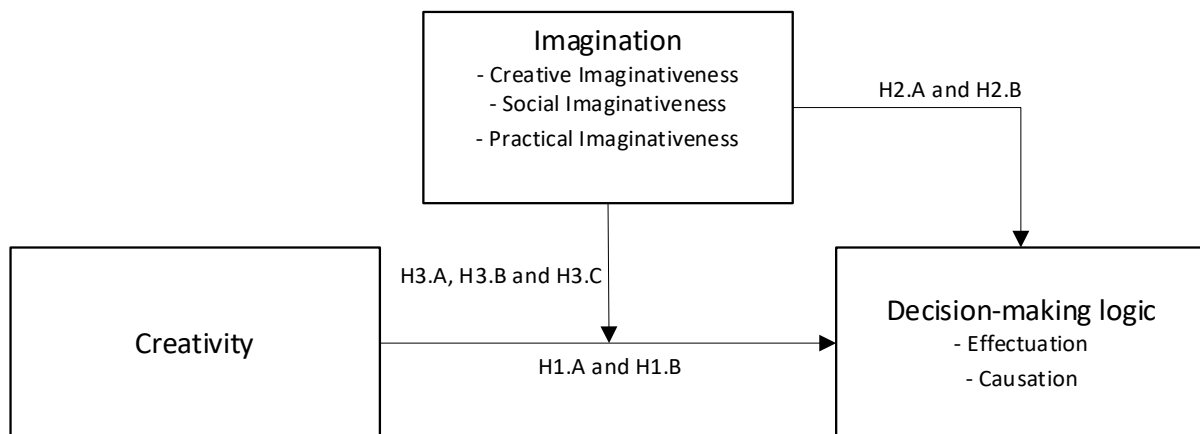


Figure 3. Model summary.

3. Methodology

3.1 Research Design

The paper seeks to address the influence of creativity and imagination on the causation and effectuation processes of German entrepreneurs in new venture creation. Accordingly, the research aims to evaluate the validity of influential variables in previous entrepreneurship literature. To achieve the aim of the research and answer the central research question, a nonexperimental quantitative research design is chosen.

3.2 Data Collection and Sample

In Social Sciences, there is a wide range of methods for data collection. For this research, it is particularly important to collect existing and new data. First, an extensive literature review is carried out to identify the most important underlying factors of entrepreneurial decision-making.

As stated by Sapsford and Jupp (2006) administered questionnaires belong to the primary methods for collecting quantitative data and can be used to provide a reliable data basis for data analysis. Thus, this data collection method is highly suitable for the aim of this research and will be used to collect quantitative data in this research.

According to Schmude et al. (2008), the field of entrepreneurship has gained ground in Germany and has re-emerged since the 1990s. The increasing importance of the field has led to trends like social entrepreneurship and has increased the number of initiatives and programs supporting entrepreneurs (Cagarman et al., 2020). Germany is therefore a solid

example of a country that appreciates entrepreneurship and offers good conditions for new venture creation. The sample of German entrepreneurs was provided with an online questionnaire which was administered in German, as it is the native tongue of the entrepreneurs of the sample. To ensure a simple execution and secure storage of the data, the questionnaire was executed through the online platform Qualtrics. The dataset was gathered in May and June 2021 and contains the response of 102 respondents. However, 10 responses were incomplete. 5 of the incomplete responses needed to be removed for the analysis, while the other 5 could be used because only one value of the complete survey was missing. These missing values were statistically imputed by SPSS by the series mean, resulting in a sample size of $N= 97$. Table 2 contains the frequencies of the gathered data set.

Furthermore, the research addresses a specific focus group in order to ensure the validity of the research. Consequently, the initial sample of the research is composed of participants which are founders or co-founders of an organization that is headquartered in Germany. The chosen sample includes founders with different levels of experience and different business segments. For instance, the sample includes both entrepreneurs with years of experience and start-up entrepreneurs that recently started their business. The participants of the study were either contacted via online channels like LinkedIn and Mail or through the personal network of the researcher.

Variable	Frequency
Age	0-25: 18
	26-35: 36
	36-45: 21
	Above 45: 22
Nationality	German: 88
	Not German, European: 5
	Not German, Not European: 3
Gender	Male: 68
	Female: 28
	Non-binary: 0
	Prefer not to say: 1
Entrepreneurial Experience (in years)	Less than 2 years: 35
	2-5 years: 24
	6-10 years: 13
	11-20 years: 5
	More than 20 years: 20
Number of created firms	1: 53
	2-3: 39
	4-5: 2
	More than 5: 3
Number of employees	1: 31
	2: 17
	3-5: 21
	6-10: 12
	11-49: 11
	50-249: 4
	250 or more: 1

Business Sector	Primary Sector: 1 Secondary Sector: 10 Tertiary Sector: 42 Quaternary Sector: 44
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Table 2. Frequencies of the dataset.

3.3 Measurement

As explained, the research strives to give more insight into how the creativity and imagination of entrepreneurs impact the use of entrepreneurial decision-making approaches. In order to study this topic and possible underlying variables, the questionnaire includes questions that aim to measure the effectuation and causation processes of the sample. Additionally, the questionnaire contains items that measure the creativity and imagination of the different entrepreneurs in the sample. Lastly, it is also important to include control variables in the research to capture possible influences that are not part of the research objective of the study. The whole questionnaire including the measurement of the different concepts was developed in English and consequently translated to German since the aim of the research is to investigate the decision-making logic of German entrepreneurs. Furthermore, a validation of the translations has taken place.

3.3.1 Dependent Variables: *Causation and Effectuation*

By addressing the underlying key factors of causation and effectuation, the theoretical framework of the research has identified two opposing approaches to entrepreneurial decision-making. To measure the application of both concepts among the sample of the research, the scale of Chandler et al. (2011) is used. Here it is important to distinguish that in the study of Chandler et al. (2011) two scales were set up, however in this study first and thus shorter variant is used. Additionally, the scale has been adapted by the researcher to reflect the most important factors and categories of differentiation which are illustrated in Table 1. Therefore, the scale was adjusted to 5 items per concept and contains a total of 10 items that are intended to measure the application of the two decision-making logics within the sample. In order to achieve the highest possible significance in the context of the research, the 5 items with the highest factor loadings are selected for each decision-making approach. All items are measured with a 5-point Likert scale which ranges from 'strongly disagree' to 'strongly agree'.

3.3.2 Independent Variable: *Creativity*

A number of different scales have been developed to measure the creativity of an individual (Domino, 1994; Silvia et al., 2012; Torrance, 1972). Due to the research design of this thesis and the limited amount of time and resources, we decided that the Creativity Orientation Scale (COS) of Furtwengler (2021) is the best way to assess the creativity of our sample.

Furtwengler (2021) conducted an exploratory factor analysis and provided a three-factor solution with one factor not considered to be salient: Factor 1 (Creative-Averse Orientation), Factor 2 (Creative-Approach Orientation) and Factor 3. Therefore, in this research, a shorter version of the scale with fewer items is selected. Firstly, Factor 3 will be excluded as it only accounts for 8.31% of the variance in the research. Secondly, Hair (2009) provides thresholds to be used for factor loading cut-offs. Based on this work and the desired sample size of approximately 100 participants of the research, items with factors loadings below .55 are excluded. As a consequence, in the further progress of the research, these factors will be

combined to create a scale for the creativity of the individual participants. The items of the COS are measured with a 7-point Likert scale which ranges from 'strongly disagree' to 'strongly agree'.

3.3.3 Independent/Moderating Variable: *Imagination*

Imagination is considered highly relevant for creating opportunities in entrepreneurial settings (Chiles et al., 2013; Cornelissen & Clarke, 2010). To capture the extent to which the entrepreneurs within the sample are able to use imagination, their imaginativeness is measured by using the scale of Kier and McMullen (2018), which distinguishes between creative, social and practical imaginativeness. In this case, a shortened version of the scale of Kier and McMullen (2018) is used to avoid feasibility problems during data collection. Each type of imaginativeness is measured with 4 items which gives a total number of 12 items. Similar to the use of the scales of Chandler et al. (2011) and Furtwengler (2021), the use of all items would go beyond the scope of the research, so 4 items with the highest factor loadings were selected for each type of imaginativeness. Similar to the measurement of the decision-making logic, the items are measured on a 5-point Likert scale ranging from 'strongly agree' to 'strongly disagree'.

3.3.4 Control Variables

Besides the independent and the dependent variable, it is highly necessary to control for variables that might influence the outcomes of the research. As stated by Davino and Fabbris (2013) control variables are variables that are not the subject to the research, however, might influence the results of the study. Accordingly, the research frame contains several control variables to ensure the validity of the research.

First, the demographic components age, gender and nationality are measured. For particular, there are several studies that call attention to a positive and statistically significant association between the female gender and choosing the causation logic in entrepreneurial decision-making (Felipe Luiz Neves Bezerra de et al., 2019).

Furthermore, the questionnaire measures the previous education of the respondents by collecting data about the highest educational level that was completed. Dew et al. (2009) found evidence for the tendency of MBA students to choose the causation logic in the decision-making process during new venture creation. Thus, it is proven that it could possibly be that the respondents' prior education influences the selection of the decision-making approach.

In addition, the questionnaire includes control variables that aim to measure the experience of the entrepreneur. Consequently, it is asked how many companies the respondent has founded, how many years the respondent has been active as an entrepreneur and the total number of employees. This is important due to the fact that experience is a vital factor in decision-making literature, as entrepreneurs make different decisions based on different experiences (De Winnaar & Scholtz, 2019).

Lastly, it is controlled for the area the entrepreneur is operating in. The questionnaire contains the item industry sector to capture the different areas of operation.

3.4 Data Analysis

Through the use of quantitative data analysis methods, we were able to analyse the sample data that was gathered through the administered questionnaire. To test the various

hypotheses and be able to draw conclusions about the research objective, it was decided that the best procedure for this is hierarchical linear regression. All data analysis procedures and statistical tests were carried out with the statistical software IBMS SPSS (Version 26).

3.4.1 Hierarchical Linear Regression Assumptions

Following the literature of Hair (2009) several assumptions have to be met in order to use hierarchical regression. Therefore, the following five key assumptions are described and tested in order to demonstrate the appropriateness of using hierarchical linear regression: linearity, constant variance of the error term, independence of the error term, normality of the error term and multicollinearity.

The first assumption implies that there is a linear relationship between the dependent variable and each of the independent variables. Especially for interpreting the regression coefficients meaningfully, linearity plays an important role. In order to examine the linearity assumption, Figures 5 and 6, which can be found in Appendix B contain a graphical analysis of the variables in terms of a scatterplot. The scatterplot shows that there is a linear relationship between the dependent and independent variables.

Another assumption of hierarchical linear regression is the constant variance of error terms, which is also known as homoscedasticity. Accordingly, the variance of the residuals should be equal at each level of the independent variable. According to the work of Hair (2009), there are several ways for checking homoscedasticity. In this study, the scatter plots of the relevant variables are used. The scatterplots of Figures 9 and 10 reveal that there is homoscedasticity and that the data set meets the assumption.

The third assumption includes the independence of error terms. This assumption implies that residuals should be uncorrelated and can be tested by using the Durbin-Watson statistic. Again, Hair (2009) came up with values that indicate, if there is auto-correlation in the data set. Due to the fact that all values are in-between 1.5 and 2.5, it can be assumed that there is no auto-correlation and that the assumption is met.

	<i>Causation</i>	<i>Effectuation</i>
<i>Creativity</i>	1,922	1,744
<i>Creative Imaginativeness</i>	1,888	1,732
<i>Social Imaginativeness</i>	1,898	1,722
<i>Practical Imaginativeness</i>	1,919	1,708

Table 3. Results of the Durbin-Watson test.

Fourthly, for hierarchical linear regression, it is important that the normality of error terms is present. A frequently used test in this regard is the Shapiro-Wilk test. The Shapiro-Wilk test tests the hypothesis that the error terms are normally distributed. As visualized in Table 5, for most of the variables of the research the hypothesis of the test cannot be rejected. Therefore, it can be assumed that the error terms of these variables are normally distributed. Nevertheless, the results of the test show that there are two significant outcomes for the variables *Creative Imaginativeness* and *Social Imaginativeness*. In Appendix B Q-Q plots of these variables can be found, which confirm that the assumption of normality is not met for the two variables.

Model	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
<i>Creativity</i>	.096	96	.038	.976	96	.094
<i>Creative Imaginativeness</i>	.134	96	.000	.952	96	.002
<i>Social Imaginativeness</i>	.121	96	.002	.960	96	.007
<i>Practical Imaginativeness</i>	.089	96	.069	.984	96	.331
<i>Causation</i>	.090	96	.064	.979	96	.152
<i>Effectuation</i>	.106	96	.013	.979	96	.155

a. Lilliefors Significance Correction

Table 4. Results of the Shapiro-Wilk test.

Lastly, it has to be made sure that there is no perfect multicollinearity. In order to apply hierarchical linear regression, it needs to be ensured that no independent variable is perfectly expressed as a linear combination of other independent variables. To verify that there is no collinearity, the variance inflation factors can be investigated. Hair (2009) provides threshold values that indicate whether collinearity exists. Table 5 indicates that all variance inflation factors are below 2 and confirms that the assumption of no perfect multicollinearity is met.

Model	Collinearity Statistics			
	DV: <i>Causation</i>		DV: <i>Effectuation</i>	
	Tolerance	VIF	Tolerance	VIF
<i>Creativity</i>	.902	1.108	.902	1.108
<i>Creative Imaginativeness</i>	.870	1.149	.870	1.149
<i>Social Imaginativeness</i>	.956	1.046	.956	1.046
<i>Practical Imaginativeness</i>	.949	1.054	.949	1.054

Table 5. Collinearity Statistics, DV: *Effectuation*.

3.4.2 Reliability of Scales

Previous research on entrepreneurial decision-making has shown that checking the reliability of the used scale is a critical part in the context of the research. According to Allua and Thompson (2009), Cronbach's Alpha is widely considered the most accepted measure of internal consistency. Therefore, Cronbach's Alpha is used in this research in order to measure the reliability of the different scales. Again, Hair (2009) provides a rule of thumb indicating that the Cronbach's Alpha should be greater than or equal to .6 in order to be considered acceptable.

Scale	Number of items	Cronbach's Alpha
<i>Creativity</i>	7	.552
<i>Creative Imaginativeness</i>	4	.844
<i>Social Imaginativeness</i>	4	.811
<i>Practical Imaginativeness</i>	4	.491
<i>Causation</i>	5	.543
<i>Effectuation</i>	5	.554

Table 6. Cronbach's Alpha.

Table 6 reveals that Cronbach's Alpha for *Creativity* ($\alpha=.552$) is considered as poor using the rule of thumb of Hair (2009). The scales *Creative Imaginativeness* and *Social Imaginativeness*, which were adopted from the work of Kier and McMullen (2018) both show a very good strength of association with ($\alpha=.844$) and ($\alpha=.811$). Further, it is remarkable that the scale *Practical Imaginativeness*, which is also from the model of Kier and McMullen (2018) shows a poor internal consistency with ($\alpha=.491$). Besides, the scores of the *Causation* and *Effectuation* scales also both reveal a poor internal consistency with ($\alpha=.543$) and ($\alpha=.554$), although both scales come from the study of Chandler et al. (2011) that has been widely used for measuring causation and effectuation.

In the existing literature, there are several potential reasons for low scores of Cronbach's Alpha. Cho and Kim (2015) state that common reasons for a low Cronbach's Alpha are a low number of items within a scale or a poor interrelatedness between the different items. Since it was not possible to include more items in the study and all the scales used were validated several times, the low scores of the Cronbach's Alphas are probably due to the small number of items. In particular the scale of Chandler et al. (2011) has been validated in several other studies like for instance in DeTienne and Chandler (2010).

In addition, various sources like for instance Hinton (2004) suggest that if there are fewer items than 10 on a scale that also a lower Cronbach's Alpha can be accepted. Taking this rule of thumb into consideration, a Cronbach's Alpha between .5 and .7 shows moderate reliability.

4. Empirical Findings

4.1 Hierarchical Linear Regression Findings

In order to test the hypotheses and investigate the influence of *Creativity* and *Imagination* on *Causation* and *Effectuation*, a hierarchical regression analysis was conducted. In accordance with the research aim, the analysis is divided into two parts. In the first step, the hierarchical linear regression is executed with *Causation* as the dependent variable. Afterwards, the same regression is conducted with *Effectuation* as the dependent variable. Furthermore, in both steps, the control variables mentioned in Section 3.3.4 are taken into consideration. Thus, for both dependent variables, a total of three models for conducting the regression were generated. In the first stage of the hierarchical regression, the effect of the control variables on the dependent variables is tested. Secondly, the independent variables *Creativity*, *Creative Imaginativeness*, *Social Imaginativeness* and *Practical Imaginativeness* were entered. In the third step, the hypothesized interaction effect of Hypothesis H3.A-H3.C was entered.

4.2 Causation as the Independent Variable

First, as mentioned Model 1 includes the control variables *Age*, *Gender*, *Education*, *Experience1*, *Experience 2*, *Employees* and *Business Sector*. The overall model is not statistically significant ($F=.932$, $p=.563$). Nevertheless, the control variables account for 24.7% of the total variation in the variable *Causation*. The individual control variables do not significantly contribute to the regression model and the results are therefore found in Appendix C.

In the second model, the independent variables *Creativity*, *Creative Imaginativeness*, *Social Imaginativeness* and *Practical Imaginativeness* are added. Again, the overall model is not statistically significant ($F=.879$, $p=.641$). Model 2 explains 27.6% of the total variation in *Causation*. The results show that there is no significant effect of the variable *Creativity* on *Causation* ($\beta=-.025$, $p>.05$). Moreover, the regression coefficients of the variables *Creative*

Imaginativeness ($\beta=.044$, $p>.05$), *Social Imaginativeness* ($\beta=.116$, $p>.05$) and *Practical Imaginativeness* ($\beta=.38$, $p<.05$) are also not statistically significant.

Lastly, Model 3 includes the possible moderation effects that are mentioned in the Hypotheses. Hence, the interaction effects of the variables *Creativity_x_CreativeImaginativeness*, *Creativity_x_SocialImaginativeness* and *Creativity_x_PracticalImaginativeness* are investigated. Similar to Models 1 and 2, the overall model is not statistically significant ($F=.878$, $p=.650$). Again, including more variables increases the explained variation in *Causation*, as Model 3 explains 30.5% of the variation in *Causation*. In addition, the results show no statistically significant moderation effects of the interaction terms on the effect of *Creativity* on *Causation*.

Variable	Model 2		Model 3					
	β	T	β	T				
Constant	1.54	.833	.715	.553				
<i>Creativity</i>	-.024	-.123						
<i>Creative Imaginativeness</i>	.044	.500						
<i>Social Imaginativeness</i>	.116	1.296						
<i>Practical Imaginativeness</i>	.038	.403						
<i>Creativity_x_CreativeImaginativeness</i>			.040	.438				
<i>Creativity_x_SocialImaginativeness</i>			-.129	-1.408				
<i>Creativity_x_PracticalImaginativeness</i>			-.079	-.895				
Model Summary	R2	F	ΔR2	ΔF	R2	F	ΔR2	ΔF
	.276	.879	.029	-.053	.305	.878	.029	-.001

* Correlation is significant at $p < .05$, two tailed

** Correlation is significant at $p < .01$, two tailed

Table 7. Hierarchical Regression Model, DV: *Causation*.

4.3 Effectuation as the Independent Variable

To assess the relationship of the predictors and the variable *Effectuation*, the same hierarchical regression analysis was subsequently conducted with *Effectuation* as the independent variable. Again, in the first model, the effect of the control variables was tested. The analysis revealed that the overall model is statistically significant ($F=1.857$, $p=.022$). In this case, the control variables account for 39.5% of the total variation in the variable *Effectuation*. Besides, the variables *DUMMY_NATIONALITY_not_german_not_european* ($\beta=.340$, $p<.05$), *DUMMY_EDUCATION_master* ($\beta=.004$, $p<.05$) and *DUMMY_EDUCATION_phd* ($\beta=.035$, $p<.05$) show statistically significant regression coefficients. Next to that, evidence was found that there is a significant effect of the control variable *DUMMY_EMLPLOYEES_3to5* ($\beta=-.414$, $p<.05$) on *Effectuation*. The other control variables did not show any significant effect on the independent variable, in consequence, the results can be found in Appendix C.

Similar to the first hierarchical regression, in the second step, the independent variables of the research were added to the regression. The analysis highlighted that *Creative Imaginativeness* ($\beta=.151$, $p>.05$), *Social Imaginativeness* ($\beta=.083$, $p>.05$) and *Practical Imaginativeness* ($\beta=.046$, $p>.05$) indicate no statistically significant coefficients. The same

applies to the independent variable *Creativity* ($\beta=.054$, $p>.05$). However, like Model 1, the overall Model 2 is significant ($F=1.907$, $p=.016$). The variables included in Model 2 thus account for 45,2% of the variation in the variable *Effectuation*.

In the last step, Model 3 includes the possible interaction terms for the moderation analysis. For all three interaction effects as seen in Table 8 no statistically significant coefficients can be found. Just like the previous two models, the overall model, in this case, is statistically significant ($F=1.955$, $p=.011$) and accounts for 49,4% of the variation in the independent variable.

Variable	Model 2		Model 3					
	β	T	β	T				
Constant	1.216	1.037	1.469	1.257				
<i>Creativity</i>	.054	.292						
<i>Creative Imaginativeness</i>	.151	.082						
<i>Social Imaginativeness</i>	.083	1.006						
<i>Practical Imaginativeness</i>	.046	.526						
<i>Creativity_x_CreativeImaginativeness</i>			-.129	-1.570				
<i>Creativity_x_SocialImaginativeness</i>			.147	1.770				
<i>Creativity_x_PracticalImaginativeness</i>			-.027	-.335				
Model Summary	R2	F	ΔR2	ΔF	R2	F	ΔR2	ΔF
	.452	1.907	.057	.05	.494	1.955	.042	.048

* Correlation is significant at $p < .05$, two tailed

** Correlation is significant at $p < .01$, two tailed

Table 8. Hierarchical Regression Model, DV: *Effectuation*

4.4 Hypothesis Testing

Apart from discussing the outcomes of the hierarchical regression analysis, it is highly relevant for the research to address the resulting implications of the hypotheses that were set up in Section 2.4 of the paper.

Hypothesis 1.A proposes that there is a statistically significant positive relationship between *Creativity* and using the *Effectuation* approach in entrepreneurial decision-making. Although Caton (2019) found out that creativity plays an important role in overcoming uncertainty, the research found that there is no statistically significant positive relationship between *Creativity* and *Effectuation* ($\beta=.054$, $p>.05$). For this reason, Hypothesis 1.A is not supported.

In connection to Hypothesis 1.A, Hypothesis 1.B revolves around the fact that there exists a significant negative relationship between the variables *Creativity* and *Causation*. Similar to Hypothesis 1.A, this cannot be confirmed by the study. Even though the coefficient is negative in this case, the results indicate no significant relationship between the two constructs ($\beta=-.24$, $p>.05$). Hypothesis 1.B is not supported.

Literature on entrepreneurial decision-making attributes a similar relevant role to imagination in the context of opportunity creation and combining resources (Chiles et al., 2013; Cornelissen & Clarke, 2010). In contrast to Hypothesis 2.A, which states that there is a

significant positive relationship between *Imagination* and *Effectuation*, the research has shown that there is no significant relationship between any of the three types of *Imagination* and *Effectuation* ($\beta=.151, p>.05$; $.083, p>.05$; $.046, p>.05$). As a consequence, we conclude that Hypothesis 2.A is not accepted.

In this context, Hypothesis 2.B proposes a significant negative relationship between *Imagination* and *Causation*. Also, Hypothesis 2.A cannot be supported, as the analysis reveals that each of the coefficients of *Creative Imaginativeness*, *Social Imaginativeness* and *Practical Imaginativeness* are not statistically significant ($\beta=.044, p>.05$; $.116, p>.05$; $.038, p>.05$).

As outlined in Section 1.4, few researchers have addressed the role of imagination in the landscape of entrepreneurial decision-making, as the concept is often seen as a tool for creativity (Garud et al., 2015). Therefore, hypotheses 3.A, 3.B and 3.B propose a moderating effect of the different types of *Imagination* on the relationship of *Creativity* and the use of *Causation* and *Effectuation*. The examination of the hypotheses, however, indicates that there is no moderating effect for both *Causation* ($\beta=.040, p>.05$; $-.129, p>.05$; $-.079, p>.05$). and *Effectuation* ($\beta=-.129, p>.05$; $.147, p>.05$; $-.027, p>.05$). Consequently, hypotheses 3.A, 3.B and 3.C are rejected.

Table 9 provides an overview of all hypotheses that were drawn up based on existing literature before the execution of the research.

Hypothesis	Independent Variable	Dependent Variable	Relationship	Result
H1.A	<i>Creativity</i>	<i>Effectuation</i>	Positive	Rejected
H1.B	<i>Creativity</i>	<i>Causation</i>	Negative	Rejected
H2.A	<i>Imaginativeness</i>	<i>Effectuation</i>	Positive	Rejected
H2.B	<i>Imaginativeness</i>	<i>Causation</i>	Negative	Rejected
H3.A	<i>Creativity/Creative Imaginativeness</i>	<i>Effectuation/Causation</i>	Moderated	Rejected
H3.B	<i>Creativity/Social Imaginativeness</i>	<i>Effectuation/Causation</i>	Moderated	Rejected
H3.C	<i>Creativity/Practical Imaginativeness</i>	<i>Effectuation/Causation</i>	Moderated	Rejected

Table 9. Overview of hypothesis testing.

5. Conclusion

The analysis of literature on entrepreneurial decision-making has revealed that previous research in this field has focused on several underlying variables and their influence on causation and effectuation. Although there may be a relationship between the constructs, previous work has failed to address the influence of creativity and imagination on entrepreneurial decision-making logic. Consequently, the core research aim of the study was to fill the gap by investigating the effect of creativity and imagination on causation and effectuation. Besides, the study aimed to investigate the extent to which the concept of imagination has a moderating effect on the relationship of creativity and causation/effectuation. To receive valuable insights into the mentioned relationships, the following central research question was formulated:

To what extent do creativity and imagination determine the application of effectuation and causation logic of German entrepreneurs?

In conclusion, the study has revealed that although creativity is considered to play a valuable role in achieving entrepreneurial activity and especially overcoming uncertainty, it does not affect the concepts of causation and effectuation significantly. Hence, it cannot be concluded, that creative entrepreneurs favour choosing effectuation logic over causation logic. In the opposite direction, it can also be concluded that entrepreneurs who are rather uncreative do not favour causation logic over effectuation logic.

Furthermore, the research has led to the conclusion that similar to creativity, the different types of imaginativeness are also not significant predictors of the causation or effectuation approach.

Besides, the results of the paper indicate that the interaction terms of creative, social and practical imaginativeness and creativity are not significant. Accordingly, the different types of imaginativeness do not moderate the relationship of creativity and the two decision-making approaches causation and effectuation.

6. Discussion

The paradigm of entrepreneurial decision-making highly contributes to entrepreneurship theory and embodies a relevant research area with a frequently underlined need for further research. Various approaches have been proposed to capture the underlying logic of these processes. The effectuation approach of Sarasvathy (2008) and the causation approach, which has been subject to decision-making literature for decades, are both central to this research and exemplify two opposite decision-making approaches. For particular in the field of effectuation, several researchers in this area call for further investigation of underlying factors (Fisher, 2012). Following Chandler et al. (2011) especially empirical relationships with other antecedents to the choice of decision-making logic like for instance cognitive processes should provide valuable insights into the topic of causation and effectuation.

Therefore, as stated in the Introduction, the research was conducted in order to investigate how the variables creativity and imagination, which are both referred to as cognitive processes (Frederiks, 2016; Woolley et al., 2020), fit into this context and to what extent they contribute to the existing theory on causation and effectuation. The results of the study indicate that neither creativity nor imagination has a significant influence on the use of the effectuation and the causation approach.

The variables creativity and causation/effectuation have been investigated various times, however as mentioned in the first part of the research, mostly only individually and not in relation to each other. One of the few empirical examples here is the work of Blauth et al. (2014), which underlined that the application of the effectuation decision-making logic fosters creativity in new product development. Despite the fact that various underlying variables have been analyzed for effectuation like for example uncertainty (Blauth et al., 2014) and entrepreneurial passion (Stroe et al., 2018), literature has so far failed to address how far creativity has an effect on the extent to which entrepreneurs decide for the effectuation approach. Firstly, contrary to prior hypotheses H1.A and H1.B, findings of the study reveal that more creative entrepreneurs do not favour either approach over the other. Remarkably,

although both being creative and using effectuation logic are attributed a valuable role in overcoming uncertainty (Caton, 2019; Sarasvathy, 2008), no significant relationship could be found in this research. Nevertheless, this finding is in line with the results of Sarasvathy and Dew (2005), which state that entrepreneurs might shift from causation to effectuation and vice versa and also might combine the two approaches. Apparently, it is not always possible to indicate which entrepreneur prefers which decision-making approach.

Secondly, similar to the concept of creativity, in H2.A and H2.B it was assumed that there is a significant relationship between imagination and the use of causation and effectuation. Here it is again important to note that literature revealed some interesting parallels between the use of effectuation logic and imagination. Both concepts refer to the Schumpeterian approach of entrepreneurship in which opportunities are rather created than discovered. In this context, effectuation decision-making logic helps entrepreneurs to take the given means and shape the future with those. On the other hand, it is indicated that imagination contributes to opportunity creation in entrepreneurial processes (Chiles et al., 2013; Cornelissen & Clarke, 2010; Foss et al., 2008; Witt, 1998). Even though some parallels and possible connections were found from a theoretical point of view, this could not be confirmed by the study, as no statistically significant relationship was found.

Thirdly, the investigation of the literature on the relationship between creativity and imagination has revealed that imagination mostly plays a subordinate role and is often seen as a contributor to creativity (Thompson, 2018). As stated in Section 1.4 there are several researchers who attribute a higher level of importance to the imagination in entrepreneurial processes, as it for instance serves as a starting point for relevant entrepreneurial activities (Garud et al., 2015). Based on the different opinions found in previous research, the moderating role of creative, social and practical imaginativeness was analyzed. It was found that none of the three types of imaginativeness significantly affect the relationship between creativity and causation/effectuation. Apparently, the study has concluded that imagination is not a moderator of this relationship.

Lastly, the research analyzed the influence several control variables on causation and effectuation. Notably, the research does not support previous research by Dew et al. (2009) stating that entrepreneurs with a Master's degree rather choose causation logic during new venture creation. In contrast with what was previously found out, the evidence from this study implies that entrepreneurs within the sample with a Master's or PHD degree rather choose the effectuation over causation.

6.1 Theoretical Implications

The research contributes to the literature on effectuation and causation, suggesting that creativity and imagination do not significantly influence the choice of decision-making approaches. As stated in the Discussion, this study provides insights into creativity and imagination as potential underlying variables of the theory of effectuation. Even though none of the variables was found to be an influential factor, this research adds to the overall picture of effectuation, which according to Arend et al. (2015) needs further development to become a solid theory. This is especially relevant for future research, as there are various variables that are tightly connected to creativity and imagination.

Besides, the findings add to the literature on the relationship between creativity and imagination. Again, the findings of Woolley et al. (2020) are supported, since also in this research, the two concepts are close to each other and do not reveal any major differences in an entrepreneurial decision-making context. Moreover, the research cannot emphasize a higher relevance of imagination and thus agrees with the work of Thompson (2018), which state that in most contexts imagination can be included under creativity. To conclude, in contrast with earlier findings of Silverman (2016), we cannot identify a more relevant role or delineation of imagination in this research environment.

6.2 Practical Implications

The results of the research result in various practical implications for several stakeholders. First, it can be stated that entrepreneurs can use the theory of this study to position themselves in this context and to reflect on their approach to decision-making concerning personal characteristics. Many of the survey participants were highly interested in the results of the research and could imagine that their lack of creativity can affect their decision-making processes. Accordingly, the research might refute their initial impression and clarify that under the circumstances of the research, creativity does not highly impact the use of decision-making logic.

Moreover, the research provides useful insights of the choice of decision-making logic. Remarkably, it was observed that in accordance with previous findings, the causation approach was slightly more popular ($M=3.57$; $SD=.61$) than the effectuation approach ($M=3.18$; $SD=.65$) among the participants of this study. In this way, the majority of the entrepreneurs of this sample rather tend to careful planning instead of improvisation and flexibility. The similar favouritism of the two decision-making approaches confirms earlier findings of Fisher (2012) since there is no approach to decision-making that is always the right choice. The choice of entrepreneurial decision-making logic very often depends on the context and various variables such as for instance the external environment or individual preferences of the decision-maker.

As indicated by Chen et al. (2015) and Caton (2019), creativity is one of the most predominant and relevant characteristics of an entrepreneur. The results of the study are in line with these findings since the whole sample of entrepreneurs scores very high on the creativity scale ($M=4.05$; $SD=.449$). Accordingly, the surveyed entrepreneurs seem to be creative individuals that use their creativity in entrepreneurial contexts.

6.3 Limitations

In spite of the fact that the research aimed to produce unbiased and reliable results, the author acknowledges that there are a few limitations within the scope of the research. First, the study has a total sample size of $N= 97$, which can be considered limited. A small sample size may lower the level of generalizability of the results and therefore make the results less conclusive. In this context, a larger sample size would have resulted in a higher level of generalizability and could have provided more accurate mean values (Basu & Ho, 2006). There are several reasons for the small size of the sample. First, the scope of the research and the time frame result in limited time for collecting the data. The second point is that there needs

to be high levels of effort for reaching entrepreneurs that are willing to take part in questionnaires.

Another important limitation lies in the fact that the reliability analysis revealed that some of the scales have a poor Cronbach's Alpha and may not properly measure the same underlying construct. Consequently, the variables and their reliability are to be treated with considerable caution. For instance, Table 10 in Appendix B reveals that the inter-correlation within the variable *Practical Imaginativeness* is specifically low for the first question of the scale. This item seems to be not correlated with the other questions of the scale. As mentioned in Section 3.4.2 another reason for the low scores in this study is the number of items included in the scales. Due to the limited scope of the research, a comparatively low number of items for measuring the constructs was used. Thus, as pointed out before some items of the scales of Chandler et al. (2011), Kier and McMullen (2018) and Furtwengler (2021) needed to be excluded due to length of the questionnaire.

Despite the mentioned limitations, I believe that the work could be a starting point for research on the mentioned relationship and contributes to the existing literature on entrepreneurial decision-making.

6.4 Recommendations for Future Research

On the basis of the theoretical and the practical parts of the research, the research has raised several questions in need of further investigation. Consequently, several recommendations for future research can be drawn. As stated by Fisher (2012), in order for the effectuation approach to become a solid theory, future work should concentrate on addressing diverse underlying variables. Consequently, future research might investigate the influence of similar variables that are related to cognitive processes and the characteristics of an entrepreneur like for instance emotionality and intuition of an entrepreneur. Both are related to creativity and imagination and could therefore also affect the extent to which an entrepreneur decides between decision-making approaches. In this context, previous research already revealed that emotional intelligence significantly influences the use of effectuation logic among students (Malik et al., 2021). Additionally, recent research by Chen and Xu (2022) emphasizes the influence of emotional complexity of an entrepreneur on synergetic use of effectuation and causation. Here it could be valuable to tie in and relate this relationship especially to the individual use of effectuation and causation.

Besides, it can be recommended to examine cross-country differences and execute similar research in further countries. Especially due to the fact that the whole sample scored very high on the creativity scale ($M=4.05$; $SD=.449$), it might be valuable to investigate the same relationships in countries with a lower overall level of creativity. In this regard, it can also be recommended to have a larger sample and a broader scope of the research that also account for regional differences.

In accordance with in the Limitations Section, some of the scales used in this study show a low Cronbach's Alpha Score, which is mainly caused by the limited number of items included. Future research would benefit by taking this into consideration and using the complete scales for the variable's creativity, imagination, causation and effectuation. Especially for measuring

the complex construct of creativity, there are several alternative scales which measure the construct even more precisely and as a consequence might lead to relevant outcomes.

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Appendices

Appendix A: Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
CREATIVITY_total	97	3	5	4,05	,449
Q9_CREATIVITY1 Creative people add value to our organization.	97	3	5	4,60	,553
Q10_CREATIVITY2 Creative people are good at problem solving.	97	2	5	4,21	,763
Q11_CREATIVITY3 I prefer to be around people who are creative.	97	2	5	4,07	,794
Q12_CREATIVITY4 Creative people interrupt the workflow.	97	1	4	2,49	,914
Q13_CREATIVITY5 Creativity and innovation are necessary for a strong economy.	97	1	5	4,60	,672
Q14_CREATIVITY6 I would like to be more creative.	97	1	5	3,28	1,018
Q15_CREATIVITY7 Creative individuals are a threat to traditional values.	97	1	5	1,94	1,171
CREATIVE_IMAGINATIVENESS_total	97	2	7	5,58	,955
Q16_CREATIVE_IMAGINATIVENESS1 I consider myself to be inventive.	97	2	7	5,47	1,137
Q17_CREATIVE_IMAGINATIVENESS2 I demonstrate originality in my work.	97	2	7	5,71	,979
Q18_CREATIVE_IMAGINATIVENESS3 I like to create original work.	97	3	7	5,78	1,023
Q19_CREATIVE_IMAGINATIVENESS4 Being creative is a large part of who I am.	97	1	7	5,34	1,435
PRACTICAL_IMAGINATIVENESS_total	97	3	7	5,20	,847

Q24_PRACTICAL_IMAGINATIVENESS1 I tend to be good at project management.	97	2	7	5,20	1,320
Q25_PRACTICAL_IMAGINATIVENESS2 Before I face a new situation, I picture the issues I may encounter and plan accordingly.	97	1	7	4,69	1,673
Q26_PRACTICAL_IMAGINATIVENESS3 I see connections between seemingly unrelated pieces of information.	97	2	7	5,56	1,099
Q27_PRACTICAL_IMAGINATIVENESS4 I extrapolate existing methods to solve new problems. (Definition of 'extrapolate' according to the Cambridge Dictionary: to guess or think about what might happen using information that is already known.)	97	2	7	5,35	1,225
SOCIAL_IMAGINATIVENESS_total	97	3	7	5,57	,889
Q20_SOCIAL_IMAGINATIVENESS1 I always make an effort to see the world through other people's eyes.	97	2	7	5,73	1,075
Q21_SOCIAL_IMAGINATIVENESS2 It is easy for me to understand why people feel the way they do.	97	1	7	5,45	1,225
Q22_SOCIAL_IMAGINATIVENESS3 I have a good sense for what other people are feeling.	97	3	7	5,65	1,071
Q23_SOCIAL_IMAGINATIVENESS4 I am good at reading people.	97	2	7	5,45	1,071
CAUSATION_total	97	2	5	3,57	,610

Q28_CAUSATION1 We analyzed long run opportunities and selected what we thought would provide the best returns.	97	1	5	2,93	1,184
Q29_CAUSATION2 We developed a strategy to best take advantage of resources and capabilities.	97	1	5	3,70	,937
Q30_CAUSATION3 We researched and selected target markets and did meaningful competitive analysis.	97	1	5	3,67	1,179
Q31_CAUSATION4 We designed and planned business strategies.	97	2	5	4,00	,764
Q32_CAUSATION5 The ultimate product/service that I used to launch this business was quite similar to my original conception.	97	1	5	3,57	1,009
EFFECTUATION_total	97	1,60	4,60	3,1758	,64675
Q33_EFFECTUATION1 The ultimate product/service that I used to launch this business was quite different from my original conception.	97	1	5	2,41	1,170
Q34_EFFECTUATION2 It was impossible to see from the beginning where we wanted to end.	97	1	5	3,25	1,291
Q35_EFFECTUATION3 We have allowed the business to evolve as opportunities have emerged.	97	3	5	4,30	,580
Q36_EFFECTUATION4 We used a substantial number of agreements with customers, suppliers and other organizations and people to reduce the amount of uncertainty.	97	1	5	2,87	1,115

Q37_EFFECTUATION5 Our decision making has been largely driven by how much we could afford to lose.	97	1	5	3,07	1,073
Valid N (listwise)	97				

Figure 4. Minimum, Maximum, Mean and Standard Deviation of the variables.

Appendix B: Hierarchical Linear Regression Assumptions

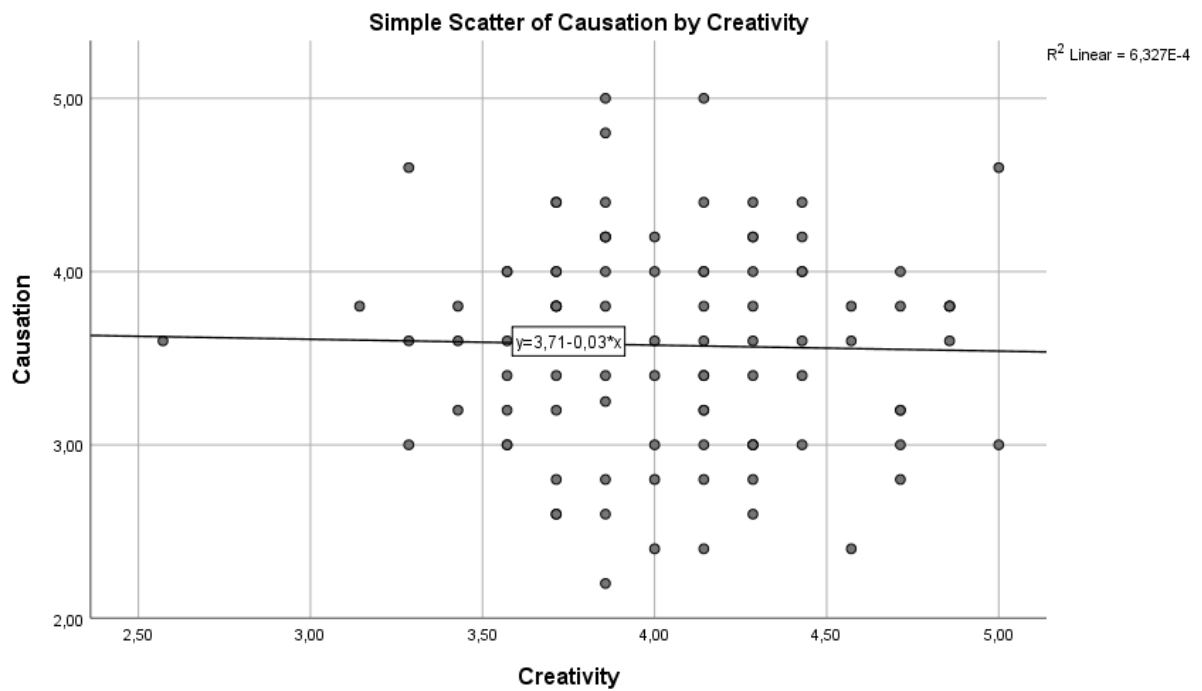


Figure 5. Linearity of the phenomenon, DV: Causation.

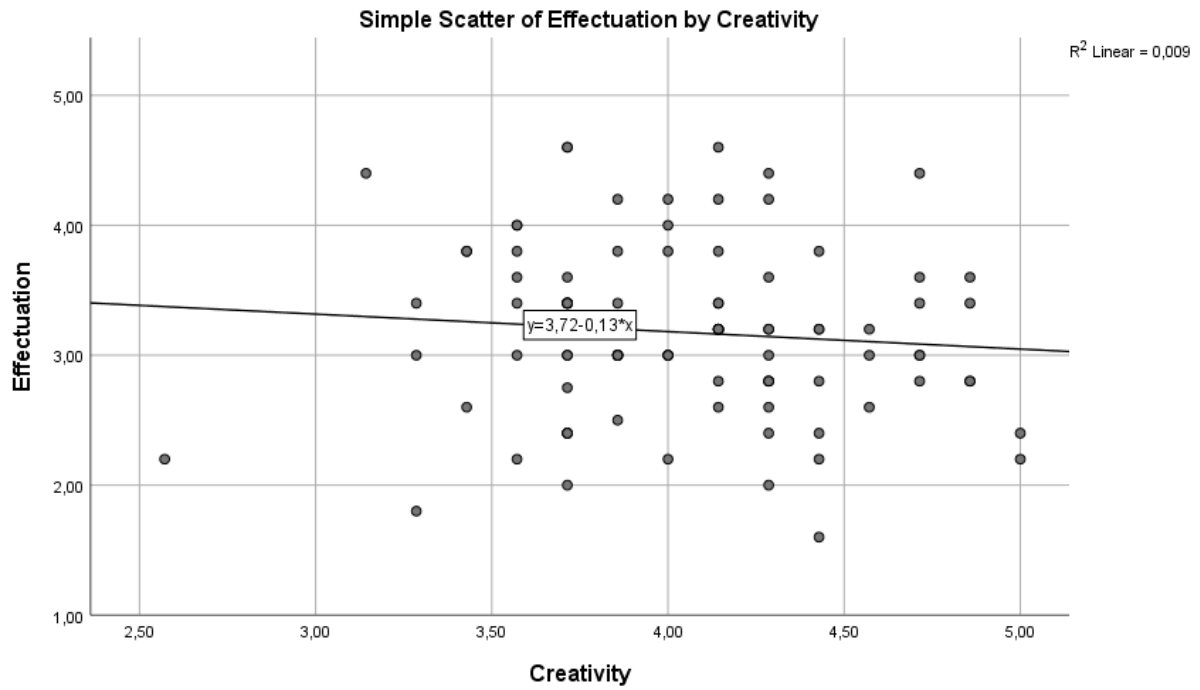


Figure 6. Linearity of the phenomenon, DV: *Effectuation*.

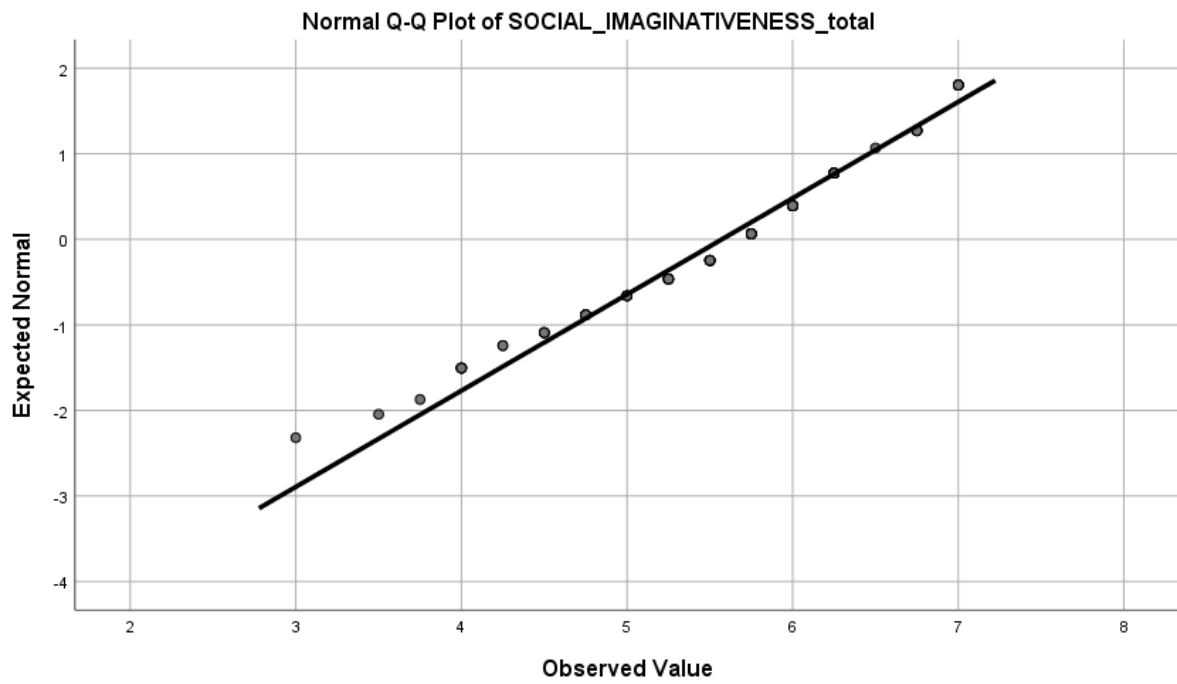


Figure 7. Q-Q Plot for *Social Imaginiveness*.

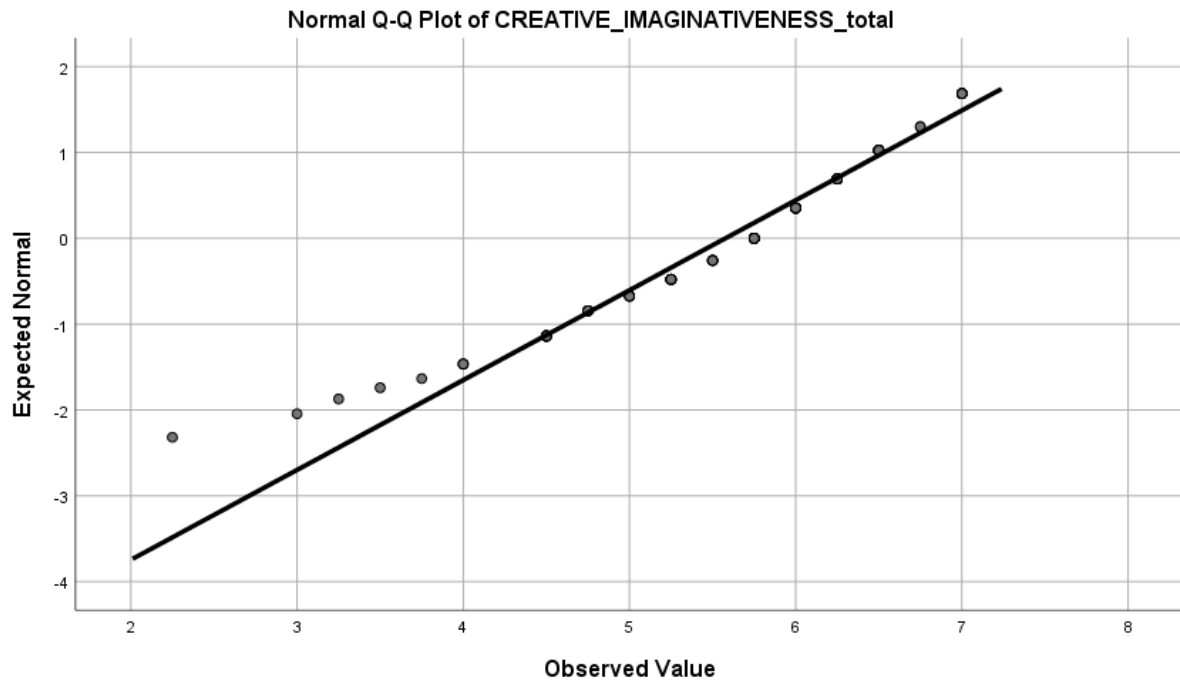


Figure 8. Q-Q Plot for *Creative Imaginiveness*.

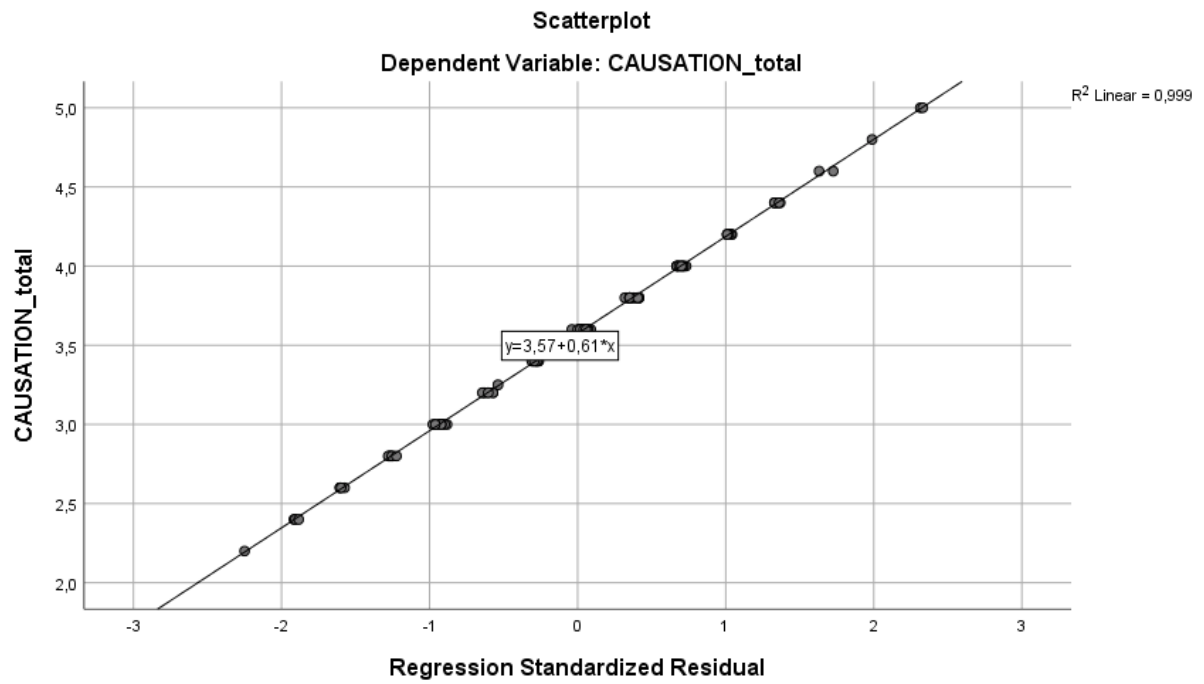


Figure 9. Homoscedasticity, DV: Causation, IV: *Creativity*.

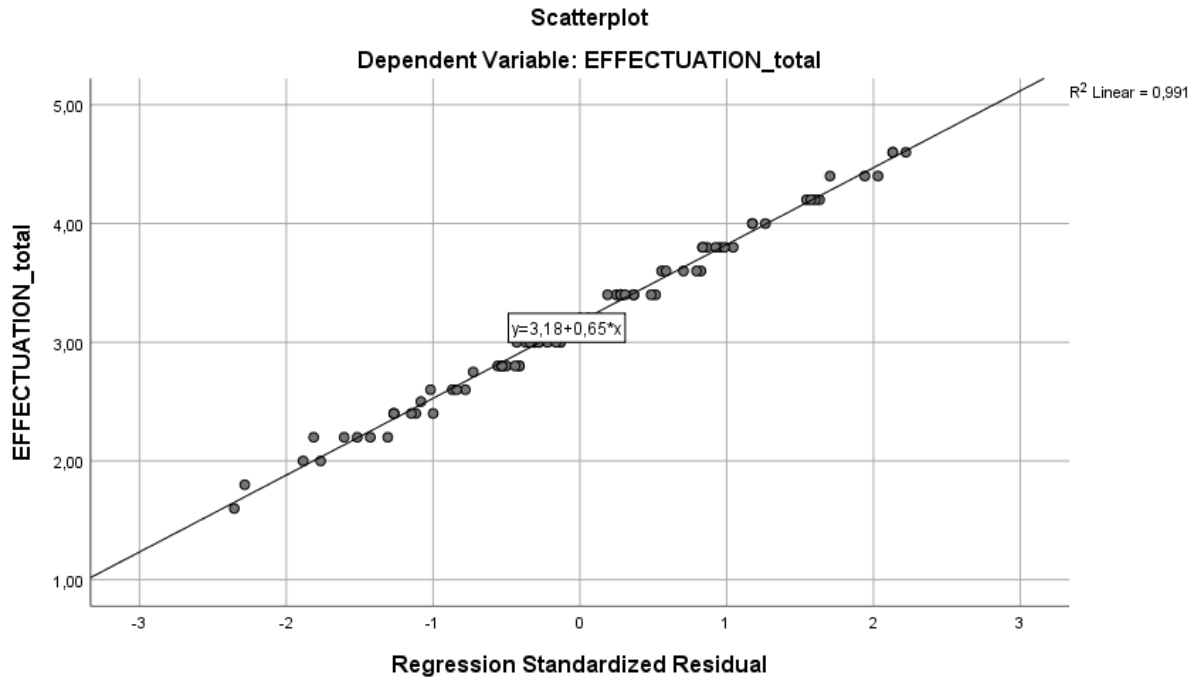


Figure 10. Homoscedasticity, DV: *Effectuation*, IV: *Creativity*.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q24_PRACTICAL_IMAGI NATIVENESS1 I tend to be good at project management.	15,60	8,764	,124	,557
Q25_PRACTICAL_IMAGI NATIVENESS2 Before I face a new situation, I picture the issues I may encounter and plan accordingly.	16,10	5,531	,400	,293
Q26_PRACTICAL_IMAGI NATIVENESS3 I see connections between seemingly unrelated pieces of information.	15,24	8,016	,362	,369
Q27_PRACTICAL_IMAGI NATIVENESS4 I extrapolate existing methods to solve new problems. (Definition of 'extrapolate' according to the Cambridge Dictionary: to guess or think about what might happen using information that is already known.	15,44	7,895	,302	,408

Table 10. Inter Item Consistency for Practical Imaginativeness.

Appendix C: Hierarchical Linear Regression Results

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2,235	,734		3,047	,003
	DUMMY_AGE_26to35	,236	,212	,188	1,117	,268
	DUMMY_AGE_36to45	,441	,257	,299	1,712	,091
	DUMMY_AGE_above45	,200	,447	,138	,447	,656
	DUMMY_NATIONALITY_not_german_european	-,011	,325	-,004	-,034	,973
	DUMMY_NATIONALITY_not_german_not_european	,288	,447	,082	,645	,521
	DUMMY_GENDER_female	-,156	,174	-,116	-,897	,373

	DUMMY_EDUCATION_bachelor	,138	,183	,098	,755	,453
	DUMMY_EDUCATION_master	,236	,184	,166	1,284	,203
	DUMMY_EDUCATION_phd	,230	,418	,075	,551	,584
	DUMMY_EXPERIENCE1_2to5years	-,210	,194	-,149	-1,080	,284
	DUMMY_EXPERIENCE1_6to10years	,024	,251	,013	,094	,925
	DUMMY_EXPERIENCE1_11to20years	,024	,439	,009	,055	,957
	DUMMY_EXPERIENCE1_more_than_20years	,016	,427	,011	,038	,970
	DUMMY_EXPERIENCE2_2to3	,038	,163	,031	,234	,816
	DUMMY_EXPERIENCE2_4to5	,441	,551	,103	,801	,426
	DUMMY_EXPERIENCE2_more_than_5	,218	,472	,062	,463	,645
	DUMMY_EMPLOYEES_2	-,039	,218	-,025	-,181	,857
	DUMMY_EMPLOYEES_3to5	,254	,206	,173	1,236	,220
	DUMMY_EMPLOYEES_6to10	,142	,231	,077	,615	,540
	DUMMY_EMPLOYEES_11to49	,065	,253	,034	,258	,797
	DUMMY_EMPLOYEES_50to249	-,403	,361	-,132	-1,114	,269
	DUMMY_EMPLOYEES_250_or_more	-1,116	,694	-,186	-1,609	,112
	DUMMY_BUSINESSSECTOR_secondary	,904	,709	,453	1,275	,206
	DUMMY_BUSINESSSECTOR_tertiary	1,127	,689	,919	1,636	,106
	DUMMY_BUSINESSSECTOR_quaternary	,957	,694	,785	1,379	,172
2	(Constant)	1,059	1,272		,833	,408
	DUMMY_AGE_26to35	,251	,223	,200	1,127	,264
	DUMMY_AGE_36to45	,489	,263	,332	1,860	,067
	DUMMY_AGE_above45	,287	,471	,198	,609	,545
	DUMMY_NATIONALITY_not_german_european	-,054	,331	-,019	-,162	,872

DUMMY_NATIONALITY_not_german_not_european	,281	,467	,080	,602	,549
DUMMY_GENDER_female	-,231	,189	-,173	-1,225	,225
DUMMY_EDUCATION_bachelor	,111	,199	,079	,555	,580
DUMMY_EDUCATION_master	,295	,205	,207	1,438	,155
DUMMY_EDUCATION_phd	,084	,443	,028	,190	,850
DUMMY_EXPERIENCE1_2to5years	-,203	,201	-,144	-1,007	,318
DUMMY_EXPERIENCE1_6to10years	-,014	,266	-,008	-,052	,959
DUMMY_EXPERIENCE1_11to20years	,095	,454	,035	,210	,835
DUMMY_EXPERIENCE1_more_than_20years	,065	,466	,044	,140	,889
DUMMY_EXPERIENCE2_2to3	,036	,175	,029	,208	,836
DUMMY_EXPERIENCE2_4to5	,457	,604	,107	,756	,452
DUMMY_EXPERIENCE2_more_than_5	,187	,505	,053	,370	,712
DUMMY_EMPLOYEES_2	-,032	,226	-,020	-,140	,889
DUMMY_EMPLOYEES_3to5	,243	,210	,165	1,159	,251
DUMMY_EMPLOYEES_6to10	,160	,237	,087	,673	,503
DUMMY_EMPLOYEES_11to49	,036	,262	,019	,137	,891
DUMMY_EMPLOYEES_50to249	-,488	,370	-,160	-1,319	,192
DUMMY_EMPLOYEES_250_or_more	-1,334	,757	-,222	-1,762	,083
DUMMY_BUSINESSSECTOR_secondary	1,100	,731	,551	1,504	,137
DUMMY_BUSINESSSECTOR_tertiary	1,296	,706	1,058	1,836	,071
DUMMY_BUSINESSSECTOR_quaternary	1,121	,711	,919	1,577	,120
CREATIVITY_total	-,025	,202	-,018	-,123	,902
CREATIVE_IMAGINATIVENESS_total	,044	,089	,069	,500	,618

	SOCIAL_IMAGINATIVENESS_total	,116	,090	,169	1,296	,199
	PRACTICAL_IMAGINATIVENESS_total	,038	,095	,053	,403	,689
3	(Constant)	,715	1,293		,553	,583
	DUMMY_AGE_26to35	,274	,224	,218	1,222	,226
	DUMMY_AGE_36to45	,530	,268	,359	1,976	,052
	DUMMY_AGE_above45	,489	,495	,337	,987	,327
	DUMMY_NATIONALITY_not_german_european	-,072	,335	-,026	-,216	,830
	DUMMY_NATIONALITY_not_german_not_european	,230	,478	,066	,481	,632
	DUMMY_GENDER_female	-,206	,191	-,153	-1,074	,287
	DUMMY_EDUCATION_bachelor	,190	,206	,135	,922	,360
	DUMMY_EDUCATION_master	,280	,208	,196	1,345	,183
	DUMMY_EDUCATION_phd	,150	,448	,049	,334	,739
	DUMMY_EXPERIENCE1_2to5years	-,216	,205	-,153	-1,052	,297
	DUMMY_EXPERIENCE1_6to10years	-,066	,270	-,037	-,244	,808
	DUMMY_EXPERIENCE1_11to20years	-,189	,492	-,069	-,383	,703
	DUMMY_EXPERIENCE1_more_than_20years	-,081	,480	-,054	-,169	,867
	DUMMY_EXPERIENCE2_2to3	,109	,181	,088	,604	,548
	DUMMY_EXPERIENCE2_4to5	,453	,611	,106	,742	,461
	DUMMY_EXPERIENCE2_more_than_5	,613	,584	,175	1,049	,298
	DUMMY_EMPLOYEES_2	,006	,234	,004	,024	,981
	DUMMY_EMPLOYEES_3to5	,253	,217	,172	1,168	,247
	DUMMY_EMPLOYEES_6to10	,218	,245	,118	,888	,378
	DUMMY_EMPLOYEES_11to49	,128	,270	,067	,474	,637
	DUMMY_EMPLOYEES_50to249	-,485	,372	-,159	-1,302	,197

DUMMY_EMPLOYEES_250 _or_more	-1,389	,760	-.231	-1,827	,072
DUMMY_BUSINESSECTO R_secondary	1,271	,740	,636	1,716	,091
DUMMY_BUSINESSECTO R_tertiary	1,411	,711	1,151	1,984	,052
DUMMY_BUSINESSECTO R_quaternary	1,205	,715	,988	1,687	,096
CREATIVITY_total	,005	,206	,004	,024	,981
CREATIVE_IMAGINATIVEN ESS_total	,033	,093	,052	,360	,720
SOCIAL_IMAGINATIVENES S_total	,109	,094	,159	1,162	,250
PRACTICAL_IMAGINATIVE NESS_total	,065	,097	,089	,662	,510
MODERATOR1_ZCREATIVI TYxZCREATIVEIMAGINATI VENESS	,040	,091	,057	,438	,663
MODERATOR2_ZCREATIVI TYxZSOCIALMAGINATIVEN ESS	-.129	,092	-.195	-1,408	,164
MODERATOR3_ZCREATIVI TYxZPRACTICALIMAGINAT IVENESS	-.079	,088	-.120	-.895	,374

a. Dependent Variable: CAUSATION_total

Table 11. Complete Hierarchical Regression Model, DV: Causation.

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	3,265	,696		4,688	,000
	DUMMY_AGE_26to35	-.097	,201	-.073	-.483	,631
	DUMMY_AGE_36to45	-.350	,244	-.224	-1,433	,156
	DUMMY_AGE_above45	-.626	,425	-.407	-1,473	,145
	DUMMY_NATIONALITY_not _german_european	,201	,309	,069	,650	,518
	DUMMY_NATIONALITY_not _german_not_european	1,340	,424	,360	3,159	,002
	DUMMY_GENDER_female	-.072	,165	-.051	-.436	,664

	DUMMY_EDUCATION_bachelor	,090	,174	,060	,516	,608
	DUMMY_EDUCATION_master	,516	,175	,341	2,951	,004
	DUMMY_EDUCATION_phd	,854	,397	,264	2,154	,035
	DUMMY_EXPERIENCE1_2to5years	-,103	,184	-,069	-,559	,578
	DUMMY_EXPERIENCE1_6to10years	,155	,238	,082	,649	,518
	DUMMY_EXPERIENCE1_11to20years	,049	,417	,017	,118	,907
	DUMMY_EXPERIENCE1_more_than_20years	,603	,406	,379	1,487	,141
	DUMMY_EXPERIENCE2_2to3	-,097	,155	-,074	-,626	,533
	DUMMY_EXPERIENCE2_4to5	-,957	,523	-,211	-1,831	,071
	DUMMY_EXPERIENCE2_more_than_5	-,179	,448	-,048	-,400	,690
	DUMMY_EMPLOYEES_2	,189	,207	,112	,915	,363
	DUMMY_EMPLOYEES_3to5	,414	,195	,265	2,117	,038
	DUMMY_EMPLOYEES_6to10	,629	,219	,322	2,865	,005
	DUMMY_EMPLOYEES_11to49	,237	,240	,117	,990	,325
	DUMMY_EMPLOYEES_50to249	,148	,343	,046	,431	,668
	DUMMY_EMPLOYEES_250_or_more	,253	,658	,040	,384	,702
	DUMMY_BUSINESSSECTOR_secondary	-,572	,673	-,270	-,850	,398
	DUMMY_BUSINESSSECTOR_tertiary	-,385	,654	-,297	-,589	,558
	DUMMY_BUSINESSSECTOR_quaternary	-,251	,659	-,194	-,381	,704
2	(Constant)	1,216	1,172		1,037	,303
	DUMMY_AGE_26to35	-,019	,205	-,014	-,094	,926
	DUMMY_AGE_36to45	-,313	,242	-,200	-1,291	,201
	DUMMY_AGE_above45	-,619	,434	-,403	-1,424	,159
	DUMMY_NATIONALITY_not_german_european	,190	,305	,065	,621	,536

DUMMY_NATIONALITY_not_german_not_european	1,313	,430	,353	3,054	,003
DUMMY_GENDER_female	-,199	,174	-,140	-1,143	,257
DUMMY_EDUCATION_bachelor	-,002	,183	-,001	-,011	,991
DUMMY_EDUCATION_master	,650	,189	,430	3,438	,001
DUMMY_EDUCATION_phd	,667	,409	,206	1,632	,107
DUMMY_EXPERIENCE1_2to5years	-,087	,186	-,058	-,467	,642
DUMMY_EXPERIENCE1_6to10years	,123	,245	,065	,503	,616
DUMMY_EXPERIENCE1_11to20years	,192	,418	,066	,460	,647
DUMMY_EXPERIENCE1_more_than_20years	,822	,429	,517	1,917	,060
DUMMY_EXPERIENCE2_2to3	-,099	,162	-,076	-,616	,540
DUMMY_EXPERIENCE2_4to5	-1,086	,557	-,240	-1,950	,055
DUMMY_EXPERIENCE2_more_than_5	-,356	,465	-,096	-,766	,446
DUMMY_EMPLOYEES_2	,127	,208	,075	,610	,544
DUMMY_EMPLOYEES_3to5	,377	,193	,241	1,949	,056
DUMMY_EMPLOYEES_6to10	,677	,219	,347	3,097	,003
DUMMY_EMPLOYEES_11to49	,143	,242	,071	,593	,555
DUMMY_EMPLOYEES_50to249	,043	,341	,013	,125	,901
DUMMY_EMPLOYEES_250_or_more	,093	,697	,015	,134	,894
DUMMY_BUSINESSSECTOR_secondary	-,350	,674	-,165	-,519	,605
DUMMY_BUSINESSSECTOR_tertiary	-,120	,650	-,092	-,184	,855
DUMMY_BUSINESSSECTOR_quaternary	,030	,655	,024	,047	,963
CREATIVITY_total	,054	,186	,038	,292	,771
CREATIVE_IMAGINATIVENESS_total	,151	,082	,223	1,854	,068

	SOCIAL_IMAGINATIVENESS_total	,083	,083	,114	1,006	,318
	PRACTICAL_IMAGINATIVENESS_total	,046	,088	,060	,526	,601
3	(Constant)	1,469	1,169		1,257	,213
	DUMMY_AGE_26to35	-,028	,203	-,021	-,140	,889
	DUMMY_AGE_36to45	-,336	,242	-,215	-1,387	,170
	DUMMY_AGE_above45	-,800	,447	-,521	-1,788	,078
	DUMMY_NATIONALITY_not_german_european	,181	,302	,062	,597	,553
	DUMMY_NATIONALITY_not_german_not_european	1,403	,432	,377	3,245	,002
	DUMMY_GENDER_female	-,218	,173	-,154	-1,261	,212
	DUMMY_EDUCATION_bachelor	-,023	,186	-,016	-,124	,901
	DUMMY_EDUCATION_master	,639	,188	,422	3,402	,001
	DUMMY_EDUCATION_phd	,562	,405	,174	1,387	,170
	DUMMY_EXPERIENCE1_2to5years	-,037	,185	-,025	-,198	,844
	DUMMY_EXPERIENCE1_6to10years	,162	,244	,086	,665	,508
	DUMMY_EXPERIENCE1_11to20years	,468	,445	,161	1,052	,297
	DUMMY_EXPERIENCE1_more_than_20years	1,021	,434	,642	2,353	,022
	DUMMY_EXPERIENCE2_2to3	-,161	,164	-,123	-,985	,328
	DUMMY_EXPERIENCE2_4to5	-1,177	,552	-,260	-2,133	,037
	DUMMY_EXPERIENCE2_more_than_5	-,845	,528	-,227	-1,601	,114
	DUMMY_EMPLOYEES_2	,179	,212	,106	,846	,401
	DUMMY_EMPLOYEES_3to5	,365	,196	,234	1,863	,067
	DUMMY_EMPLOYEES_6to10	,722	,222	,369	3,257	,002
	DUMMY_EMPLOYEES_11to49	,115	,244	,057	,473	,638
	DUMMY_EMPLOYEES_50to249	-,018	,337	-,005	-,052	,959

DUMMY_EMPLOYEES_250 _or_more	,086	,687	,013	,125	,901
DUMMY_BUSINESSECTO R_secondary	-,472	,669	-,223	-,706	,483
DUMMY_BUSINESSECTO R_tertiary	-,185	,643	-,143	-,288	,774
DUMMY_BUSINESSECTO R_quaternary	-,020	,646	-,015	-,031	,976
CREATIVITY_total	,009	,186	,006	,048	,962
CREATIVE_IMAGINATIVEN ESS_total	,127	,084	,187	1,516	,134
SOCIAL_IMAGINATIVENES S_total	,127	,085	,175	1,502	,138
PRACTICAL_IMAGINATIVE NESS_total	,032	,088	,042	,362	,718
MODERATOR1_ZCREATIVI TYxZCREATIVEIMAGINATI VENESS	-,129	,082	-,175	-1,570	,121
MODERATOR2_ZCREATIVI TYxZSOCIALMAGINATIVEN ESS	,147	,083	,209	1,770	,081
MODERATOR3_ZCREATIVI TYxZPRACTICALIMAGINAT IVENESS	-,027	,079	-,038	-,335	,739

a. Dependent Variable: EFFECTUATION_total

Table 12. Complete Hierarchical Regression Model, DV: *Effectuation*.