Corporate Effectuation

Effectual Strategy for Corporate Management

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Die Dissertation kann wie folgt zitiert werden:

Manchmal bin ich glücklich

– einfach so –

Und dann weiß ich, du bist wieder bei mir aus der geistigen Welt.

Und dann weiß ich, du gehst meine Wege und hälst meine Hand, dass ich nicht falle

Und gibst mir Kraft, weiter zu gehen.

Manchmal bin ich glücklich

– einfach so –

Und dann spüre ich, du bist mir wieder einmal ganz nah.

Gordian Johannes Garske

in loving memory of someone who taught me that life isn't about waiting for the storm to pass, it's about learning how to dance in the rain

AUTHOR'S NOTE

reaching the last paragraph, I would like to mention someone, who has ever been my brother. Gordian, I love you, and you will always follow my path, as your soul is connected to mine – and always will be. And most of all, I would like to thank Martin, for his endless support, his ceaseless faith in me, and for random content-discussions during the evenings. It was your spirit of adventure that let me sense the world's calling, for what I have closed this chapter of my life.

Essen, Juni 2017

Laura Mathiaszyk

EXECUTIVE SUMMARY

Managers, who chose strategies that allow employees to co-create, work positively with unforeseen events and/or follow new paths with means at hand, are crucial to successful companies and for innovative outcomes. These characteristics are essential for effectual decision-making that fits today's managerial challenges perfectly, especially since uncertainty and complexity increase steadily in the corporate world. Effectual decision-making, with its roots in the research of entrepreneurial expertise, is one possible path to deal with that context. This dissertation bridges the effectuation approach (Sarasvathy, 2001) originally linked to the new venture context, to the corporate world.

In three main parts, this work investigates how managers, think, decide and act. Specifically, this dissertation works out 1) what kind of outcomes could arise when utilizing the unique entrepreneurial heuristics of effectuation in a corporate setting, 2) how complexity perception affects managers' decision-making, and 3) how decision-making strategy varies over different cultures. All parts are built along one red line that strives to answer the central question of challenges and chances effectual decision making holds for managers in a corporate setting.

The dissertation starts with an introductory section that briefly summarizes the background of this research work, establishing the key concepts, and finally outlines the structure that underlies this work. First, the theory section introduces the topic of entrepreneurial cognition, in general, and effectual and causal decision-making strategy, in specific. It explains the role of the decision-making context and delineates how we bridge to corporate context. This part builds the starting point for the second section that goes into detail, and thus uncovers managers' cognition and behavior with complexity perception as moderating element. Having shown that effectual strategy is connected with some performance

measures, the third segment switches on meta-level and analyzes how managers' decision-making strategy is linked with cultural characteristics. Here, the author consults Hofstede's cultural dimensions (Hofstede, 2011) and shows differences in a country comparison. Finally, the dissertation closes with reviewing the whole process, and gives an outline of lessons learned.

PREFACE

Sustaining, persevering, striving, and paying with effort as we go, hanging on, and finally achieving our intention – this is action, this is effectuation
(William James, 2008, p. 84)

Entrepreneurship was the reason for my studying economics. But, it especially was the people who fascinated me. Later on, in the final stage of my studies Prof. Dr. Fallgatter brought the topic of effectuation to my attention. I had a phone call with Saras D. Sarasvathy soon after and met her at a summer school in Jena. Since then I was driven by the realization that it is all about creation. That we live in a world created by ourselves. With entrepreneurs in the family and several student projects, I found the effectuation approach in my daily routines and in that of others. It quickly bothered me that none of my textbooks where able to describe and picture how I naturally thought or started whatever. I knew that the effectuation approach pictures how expert entrepreneurs think and decide. Even so, I was struck by the idea that people naturally apply at least fractures of the principles described by Sarasvathy (2008), even when they work in a fundamentally different context. The question of how these people think, reason, and behave to create valuable outcomes or problem solutions, ignite the fire that enabled this research project and kept me going. I hope the findings from this dissertation provide meaning and inspiration for future research and project work in practice alike. However, not only researching but also addressing different audiences in talks and speeches, gaining experiences in student seminars and professional workshop sessions, initiating several own projects and supporting others to unfold their potential and working in this field for almost seven years now, this work is driven by passion and love for the topic, what I hope shines through.

OUTLINE

Today's research asks for scientific work which - to be acknowledged internationally – has to be presented in paper format. Accordingly, this dissertation is based on three research papers which each have been accepted and presented at international relevant conferences. Please find an overview of the papers below.

First Paper:

Effectuation and Mature Markets - Contradiction, Companionship or Contingency? (*Presented at Babson College Entrepreneurial Research Conference, June 8-11, 2011, Syracuse, New York, USA*)

Second Paper:

The Moderating Effect of Complexity on Causal and Effectual Heuristics and Outcome (*Presented at Babson College Entrepreneurial Research Conference, June 4-7, 2014, London, Ontario, Canada; Submitted to Strategic Entrepreneurship Journal – Special Issue 12/2016*)

Third Paper:

Is Managers Strategy Culture Bound? International Differences in Strategy Choice *(Presented at Academy of Management Conference, August 5 - 9, 2016, Anaheim, California, USA; Submitted to Journal of Enterprising Culture, 01/2017)*

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EMPIRICAL INVESTIGATION II
Is Managers Strategy Culture Bound? International Differences in Strategy Choice

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Please note that this work comprises three research papers with each of them including an introductory part into the topic. The figures and tables contain basic theory, like the principles or the dynamic effectual cycle, and thus might be reapplied.

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Part 1

EFFECTUAL STRATEGY IN CORPORATE MANAGEMENT – CHALLENGES AND CHANCES

</div>

1.1 Introduction

Entrepreneurial cognition and behavior is of high relevance for companies of all sizes (Barringer & Bluedorn, 1999). To initiate innovation, and therefore ensure long term profit and growth, companies make corporate entrepreneurship one of their major subjects (Ireland, Kurato, & Morris, 2006; Morris, Kurato, & Covin, 2011). In theory, entrepreneurship is closely linked with contextual issues like dynamism, change, and uncertainty. Dynamism often emerge from environmental shifts and changes, a context, where actor's more or less navigate the turbulence and create strategies that fit the varying conditions (Hmieleski & Baron, 2008). Simultaneously, uncertainty arises from the company system itself – a construct of different, interacting facets (Daft & Lewin, 1990). These contexts "give rise to heuristic-, effectuation-, selection mechanism-, and action-based conceptualizations" (Mitchell et al., 2007). Actually, effectual decision making has proved to be valuable in corporate research and development contexts (Brettel, Mauer, Engelen & Küpper, 2012). However, managers' entrepreneurial cognition and decision-making still holds open questions, and thus potential for future research. To fill that void, this work investigates *challenges and chances effectual decision-making has in a corporate setting*. In three main parts we work out how entrepreneurial cognition and corporate context fit together, how practice mirrors theory, and the role complexity plays in that context. Finally, we switch on meta-level and link managers' decision-making and Hofstede's' cultural characteristics.

A glance in today's news shows that companies are increasingly challenged through volatile markets, crisis, complexity and uncertainty (Davidsson, 2004; Morris, Kuratko, & Covin, 2010). Globalization, competition, fast growing new technologies, and communication tools (Bettis & Hitt, 1995) result in increasing competition; in addition, they make it elusive to gain competitive advantage. While companies have to deal with jumpy customers and the relentless demand for innovative technologies, new knowledge and strategy; people working within these companies are confronted with an increasing amount of complexity through performance requirements and a growing number of procedures, vertical layers, interface structures or coordination bodies (Morieux, 2011). As a result, managers and employees often miss relevant information, which could be helpful, to make thoughtful decisions (Busenitz & Barney, 2007). And, to make matters worse, changes in that context are most commonly not predictable or known a priori (McKelvie, Haynie & Gustavsson, 2011).

To meet the challenge of complexity and uncertainty as described above, taking alternative approaches and strategies that match surrounding conditions seriously, is increasingly important. Augier and Sarasvathy (2003) stated, that "in social environments, where individual and group-level behaviors matter most, we need strategies that do not fatally depend on predictive calculi" (p. 18). Furthermore, they add that "when we believe the future is not very predictable, we either (1) try to adapt to a changing environment […] or (2) effectuate a new environment – i.e., actively seek to influence, enact and even re-create our environment through stakeholder commitments" (p. 18).

Set goals - plan - act: That is the basic pattern of causal management approaches, as it is described in textbooks and boardrooms alike (Schendel & Hofer, 1979). On the other hand, managers frequently have to make decisions in environments, as described previously, which are hard to assess and where causal project management methods often do not work (White & Fortune, 2002). Those are situations in which the decision habits of experienced entrepreneurs known as "effectuation" might outperform causal management logic. Even if causal approaches are central in most MBA courses, they do "not prepare people to deal with unexpected [and complex] situations" (Thomas & Mengel, 2008, p. 307).

Effectuation, as a behavioral scientific answer on the question of how to handle the increasing amount of complexity and uncertainty, rapidly attract attention after the first paper "Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency" was published by Saras D. Sarasvathy in 2001. Conferences, like the Babson College Entrepreneurship Research Conference (BCERC) or the Academy of Management Conference (AOM) offered the first platform for discussing research that grows steadily around that topic. The topic evolved, and after nine years the first Effectuation Research and Teaching Conference was held in Liége, Belgium. Soon after the corporate world got attracted and first practitioner books entered the market, e.g., "Effectuation - Wie erfolgreiche Unternehmer denken, entscheiden und handeln" (Faschingbauer, 2010), "Effectuation – Unternehmergeist denkt anders" (Marcus Ambrosch, 2010), or "Corporate Effectuation: What managers should learn from entrepreneurs" (Blekman, 2011). The relevance of that approach for practitioners is even backed up by Davidsson (2005) who discussed the impact that result from a good match of

the decision making strategy and process with the characteristics of the idea, the environment, and the person involved.

When talking about entrepreneurial behavior and activity in a corporate context. the decision-making strategy perspective comes into play. In contrast to corporate venturing, what means the creation of new businesses, entrepreneurial strategy additionally involves opportunity and advantage seeking behavior (Ireland, Hitt & Sirmon, 2003). Morris, Kuratko, and Covin (2010) described corporate entrepreneurship as being manifested in companies either through corporate venturing or strategic entrepreneurship. We refer to Phan, Wright, Ucbasaran, and Tan (2009) who called for concentrating on cognition when unraveling the corporate entrepreneurship mystery. Accordingly, this work focuses on managers' entrepreneurial cognition and behavior.

1.2 Scope and Clarification of Key Concepts

Studying managers' entrepreneurial cognition and behavior includes focusing on the "thinking-doing" link in entrepreneurship (Mitchell et al., 2007). With this we walk right into the research stream of entrepreneurial cognition. In its core, entrepreneurial cognition can be defined as "the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation and venture creation and growth" (Mitchell, Smith, Morse, Seawright, Peredo & McKenzie 2002, p. 97). Recent work in entrepreneurial cognition research helps us to better understand the individual, as well as entrepreneurial behavior and action. Much has been written about entrepreneurial cognition. Thereby, key questions have been: how do entrepreneurs, or in the broader scope, how to people think? (Baron, 1998; Baron, 2004). Researchers tried to analyze how

individuals create valuable outcomes through opportunity identification or innovative problem solving. Well known are the papers by Shane (2000), Ardichvilli, Cardozo, and Ray (2003), or Corbett (2007) who concentrated on entrepreneurial opportunity identification and discovery. Ward (2004) took a step further by working on cognition, creativity, and entrepreneurship. Welpe, Spörrle, Grichnik, Michl and Audretsch (2012) analyzed antecedent of entrepreneurial exploitation. Hereby, they included the interplay of opportunity evaluation and emotions, like fear, joy, and anger. Grichnik, Dew, Mayer-Haug, Read, and Brinckmann, (2013) advanced theory on the action-interaction nexus by analyzing entrepreneurial cognition, boundary objects and the impact of extended mind mechanisms. Another work that is also worth mentioning is the paper by Dew, Grichnik, Mayer-Haug, Read, and Brinckmann, (2015) who addressed situated entrepreneurial cognition, thus providing insights into phenomena like co-creation and interaction that mainly gain attraction in a shared economy contexts based on new technologies. This is interesting as co-creation becomes apparent in the dynamic effectual process (Wiltbank, Dew, Read & Sarasvathy, 2006).

Research in entrepreneurial cognition includes different perspectives – one of them is the effectuation approach of decision-making and action (Sarasvathy, 2001). All arms have the same roots of bounded rationality and value creation driven by opportunity identification (Mitchell et al., 2007). Cognition research distinguishes between the use of heuristic-based logic (Baron, 1998; Busenitz & Barney, 1997; Simon, Houghton, & Aquino, 2000), perceptual processes, like entrepreneurial alertness (Gaglio & Katz, 2001; Kirzner, 1979, 1985), the entrepreneurial information processing-based expertise approach (Gustavsson, 2006; Mitchell, Smith, Seawright & Morse, 2000; Mitchell et al., 2002), and

the effectuation approach (Sarasvathy, 2001, 2002). The latter is at the core of this research project.

1.2.1 Strategic Management & Cognition Research

Managerial cognition has attracted little attention until Stubbart (1989) opened the discussion on cognition mechanisms in strategic management contexts. Most of the foundational work in strategic management (Andrews, 1980; Ansoff, 1965; Chandler, 1973; Porter, 1991; Schendel & Hofer, 1979) imply thinking aspects that require some form of cognition. However, Stubbart (1989) assumes that the "empirical findings in cognitive psychology, behavioral decision theory anthropology and organizational sciences all suggest that human cognitive patterns contrast markedly with the economists' ideal, rational agent" (p. 328).

The field of strategic management profits from cognition research due to managers bounded information processing and bounded rationality. Elementary work on these topics has been completed by March and Simon (1958) and Simon (1972) who advanced the idea of bounded rationality. For them, manager's cognitive abilities and patterns are limited in their capacity (Stubbart, 1989). They, for example, "face busy, immensely complicated, uncertain information environment, which always threatens to overload their information processing abilities" (p. 338). Thereby, they are often confronted with information overload, which can only be handled through "heuristics, or rules of thumb - that apply to a variety of problems" (p. 338). Nadkarni and Barr (2008) worked on environmental context, managerial cognition, and strategic action, where they highlight the relevance of the highly individual subjective perspectives when evaluating surrounding conditions.

Managers' experiences and sense context variables differently. Even De Carolis and Saparito (2006) find individual cognition as a relevant variable in understanding entrepreneurial activities and engagement. Due to the fact that entrepreneurial engagement is emergent and closely linked to cognitive processes, we focus on the individual perspective when researching managers' entrepreneurial cognition and behavior (Mitchell et al., 2002). Different researchers assume bounded rationality to be a remarkable factor when analyzing managers' environmental perception (Bogner & Barr, 2000; Daft & Weick 1984). Managers often cannot capture all environmental factors and context variables. Instead, they develop a representation of the environment that in itself is highly individual and subjective.

The literature review holds another important variable for understanding entrepreneurial behavior. While personal-, demographic, or psychological differences (Brockhaus 1980; McClelland 1961) between entrepreneurs and managers seem to be fractional, risk-taking propensity (Brockhaus 1980; Low & MacMillan, 1988), as individual psychological difference, appears to be an important variable for understanding entrepreneurial behavior (Ray 1994). In 1998, Sarasvathy came from the subjective perspective of the entrepreneur and found that context and correspondingly risk perception matters a lot when following entrepreneurial activities. The core question in one of her first papers was: Do bankers and entrepreneurs perceive and manage risk differently? She and her colleagues found "that entrepreneurs accept risk as given and focus on controlling outcomes at any given level of risk (…) [assuming] greater personal responsibility for influencing outcomes" (Sarasvathy, Simon & Lave, 1998, p. 11). Bankers, on the other hand, "target outcomes as reference points (…) avoiding situations where they risk higher

levels of personal responsibility" (p. 12). A main finding in the study was that the context and self-constructed problem spaces matter in how entrepreneurs perceive and manage risk. In another experiment, they found evidence for their proposition that the context plays a tremendous role in understanding how entrepreneurs think, decide, and act. Here, Sarasvathy asked 27, so called, expert entrepreneurs to think through a bunch of typical start up issues and challenges, while talking aloud, thus sharing their thoughts. In this venture experiment (Sarasvathy, 1998; Sarasvathy, 2008) the core question was: How do entrepreneurs (with high expertise in starting new ventures) think, decide, and act? When comparing the 'think aloud' protocols, Sarasvathy found that 63% of the entrepreneurs used similar heuristics more than 75% of the time. They refused to work with market research data and instead started with means at hand, e.g., experiences, knowledge, resources, and networks. Furthermore, she found that the entrepreneurs in her study made investments subject to what was affordable for them in case of loss. All entrepreneurs tried to leverage unexpected events as valuable inputs into the process. Transferring these findings to the original risk propensity question, she saw that these entrepreneurs tried to control, instead of attempting to predict, the unforeseen (Sarasvathy, 2001).

1.2.2 Entrepreneurial Expertise "Effectuation"

The term *effectuation* is a derivative of the definition "to bring about effect", i.e., shape, develop, initiate, and create something valuable. Thus, the focus lies on what "the entrepreneur does and how the situation effects the entrepreneur's thinking" (Mitchell et al., 2007, p.6). Sarasvathy (1998, 2008) found that the entrepreneurs in her study show several similarities, like starting with means, working with stakeholders in very early project state, and being aware of what is affordable for them in case of loss, while

leveraging contingencies. Doing this, the entrepreneurs develop startup ideas or businesses "along the lines of the means or expertise that are a part of [their] personal repertoire, a part of the way they think and make sense of an evolving situation" (Mitchell et al., 2007, p. 9). In the following, we briefly outline the core aspects of the effectuation approach, namely the effectuation principles, the dynamic cycle, and the effectual problem space.

The entrepreneurs in Sarasvathys' (1998) venture experiment started with what they had at hand – with their identity, knowledge, and people they know. They imagined things that could be accomplished with that set of means. Very early in the process, the entrepreneurs shared their ideas, thoughts, and talk with people. This might be potential stakeholders, like friends, family, or random people. Some of them become interested along the way and decide to bring in something – what in the beginning is not yet defined. All stakeholders bring in means and ideas and commit, in some way, to the construction process. Moreover, each stakeholder that comes on board invests only what he/she has at hand – their means and only what he/she can afford to lose in case of loss. Many talks, negotiations, and commitments evolves over two cycles. One in which the source of means grows, and another in which potential outcomes/effects evolve and get concrete along the way. At some point in the process, there is "no more room for negotiating and maneuvering the shape of what will be created" (Wiltbank et al., 2006, p. 992). As a result, the stakeholder commitments lead to some effects that can be new products, solutions, markets that in fact are a result of co-creation, as can be seen in figure 1 (next page).

Figure 1: Effectual Process—Dynamic and Interactive (Wiltbank et al., 2006)

```
         Expanding cycle of resources              New
                                                   means

  Means          Goals        Interact    Commitments
                                                           New
  Who I am    What can I do?   With people  Project        goals
  What I know               I know        partners
  Who I know                              Stakeholders

         Converging cycle of constraints on goals

                    Project outcomes
```
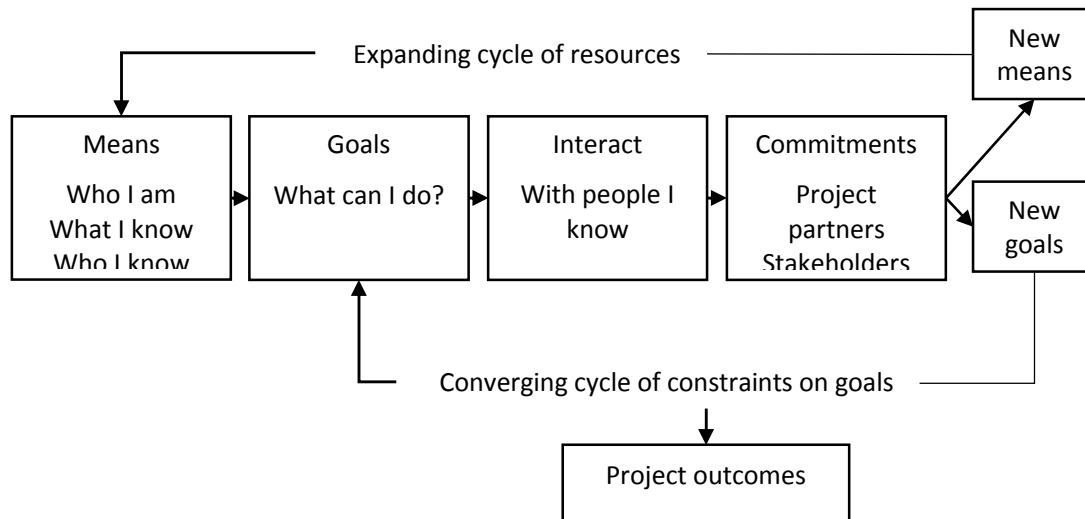
To build more theory, Dew, Read, Sarasvathy, and Wiltbank (2009a) replicated the original venture experiment (Sarasvathy, 1998) and compared the answers of 27 expert entrepreneurs with that of 37 students studying Masters of Business Administration. They found students working with heuristics typically known from traditional management classes, like applying market research data, setting goals early and trying to set up a team that perfectly match the project's challenges. Expert entrepreneurs instead "under-weighted, ignored and even explicitly argued against taking predictions seriously, working instead with things within their control" (Dew et al., 2009a, p. 288).

Differences in decision-making heuristics are probably based on the context – experience related, education-related, and context-environment-related (Krüger & Day, 2010). In the venture experiment, Sarasvathy (2008) observed the effectual problem space as being typical for the expert entrepreneurs in their venture founding- and start-up processes. This context is marked, first, by isotropy defined as not knowing which

information is relevant and which is not (Fodor, 1983), second, goal ambiguity implies not knowing if the goal set today will be of the same relevance a view days later (March & Simon 1958), and third, through the "Knightian Uncertainty", an environmental condition that makes prediction impossible (Knight, 1921). Entrepreneurs often know these environmental characteristics, because they deal with them, at least partly, when they bring their idea, project, or venture to life. Similar conditions are known by managers who face uncertainty and complexity when they initiate and run projects containing different actors, like customers, suppliers, employees, that interact dynamically and whose decisions and behavior cannot be fully predicted beforehand (McArthur & Nystrom, 1991).

After her first paper was published in the Academy of Management Review (2001) Sarasvathy's approach gained interest in different fields of research. "Entrepreneurship as a science of the artificial" (Sarasvathy, 2003) was published in Journal of Economic Psychology, while other articles have been placed in management (Augier & Sarasvathy, 2004), and economics (Dew, Sarasvathy & Venkataraman, 2004). Wiltbank, Read, Dew, and Sarasvathy (2009) published "Prediction and control under uncertainty: Outcomes in angel investing" which covers a more financial topic, in the Journal of Business Venturing. In the beginning, most of the studies were experimental. Sarasvathy and other researchers analyzed think aloud verbal protocols of entrepreneurs as they made decisions in a venture founding experiment (Dew et al., 2009a; Sarasvathy, Simon & Lave, 1998) or field studies analyzing qualitative data (Harmeling, 2005; Harting, 2004; Sarasvathy & Kotha, 2001; Sarasvathy & Dew, 2005b). In the evolutionary process of a research field, the urge to develop instruments for acquiring data quantitatively arise at some point in time (Edmondson & McManus, 2007). Wiltbank et al. (2009) delivered on that through

quantitatively measuring angel investors' use of predictive versus non-predictive control strategies. Chandler, DeTienne, McKelvie, and Mumford (2011) followed with measures of effectuation and causation in their validation study. However, their items did not cover all sub-dimensions that form the construct of effectuation. Another scale was developed by Brettel, Mauer, Engelen, and Küpper (2012) who also developed an instrument to measure effectual and causal decision making. They built their scale along the four principles (sub-dimensions) of effectuation (Sarasvathy, 2001; 2008) and therefore allow for modest hypothesis testing. Brettel et al. (2012) validated their scale in a corporate entrepreneurship research and development (R&D) context what predestinates this scale for this study.

1.3 Research Focus and Study Outline

Studies examining entrepreneurial cognition processes, indicate that the heuristics applied in new ventures differ from those of managers working in the corporate world, which most often can be linked with established industrial structures, customer segments, and historical data. We investigate how managers, working in a corporate context, think, decide, and act – specifically seeking to understand: 1) what kind of outcomes could arise when utilizing the unique entrepreneurial heuristics of effectuation in a corporate project management setting; 2) how complexity perception affects managers' decision making; and 3) how decision making strategy varies over different cultures. Thus, the core question this dissertation strives to answer can be verbalized as follows:

How do managers think, reason, and behave such that they create valuable project outcomes and problem solutions through the identification and implementation of their means and contingencies they face?

In this manner, they will apply effectual decision making strategies as well as alternative causal strategies and approaches. The major challenge – even recently recognized in effectual research – is to unravel the conditions under which effectual and alternative approaches are useful and, in turn, better understand how approaches can be mixed, matched, and adopted context dependent (Read, Sarasvathy, Dew & Wiltbank, 2016). Through a discussion of outcomes, in the first part, to unraveling the link between effectual decision making and complexity perception in the second, and taking a look at effectual decision making and culture, this dissertation hopes to offer inspiration in this particular field of research.

1.3.1 Current Theme

This dissertation belongs to the field of entrepreneurship in general and sheds light on entrepreneurial cognition and behavior in specific. It transfers the approach of effectuation (Sarasvathy, 2001), originally linked to the new venture context, to the corporate world, and thus enhances the field of corporate entrepreneurship and project management.

This work consists of three main chapters– a theoretical chapter that transfers the effectual approach to the corporate context and two empirical chapters. The first empirical investigation goes deep down and examines managers cognition and behavior in project management settings, sheds light on performance measures, and investigates which role complexity perception plays in that context. The latter goes on meta-level and reflects on managers' cognition and behavior in different cultural settings. All papers belong together as they have one starting point: the question of *challenges and chances effectual decision-making has in a corporate setting*.

The theory in the beginning introduces the topic of entrepreneurial cognition in general, and effectual and causal decision-making strategy in specific. It explains the role of the context and outlines how we bridge to corporate context and with that to project management and mature markets. With that, the chapter builds from this starting point into the empirical investigations. The second chapter uncovers managers' cognition and behavior in project management with complexity perception as the moderating element. Having shown that effectual decision making is connected with some performance measures, the third paper takes the meta-level and asks how managers chose strategy depending on cultural aspects. Here, the author consults Hofstede's cultural dimensions (Hofstede, 2011) and shows differences in a country comparison. Having laid this framework, this dissertation offers a promising starting point for future research. In the following, we describe, in brief, the aim of all three chapters and outline the research design.

1.3.2 Effectuation and Mature Markets – Contradiction, Companionship, or Contingency?

Effectuation is traditionally linked to uncertainty and new venture contexts (Sarasvathy, 2001). We transfer the effectual approach from entrepreneurship and new venture context to corporate entrepreneurship and with that to project management context. We think through theory based outcomes on the peoples-, product-, and innovation level. In doing this, we reveal valuable links to affiliated research fields as well as discuss future research questions.

Effectuation has its roots in entrepreneurship research. In her first study Sarasvathy (1998) analyzed the thoughts and decisions made by experienced entrepreneurs, which she defined as expert entrepreneurs. An expert entrepreneur in her sample, e.g., has gathered a lot experience (good and worse) in starting new ventures. Some of the companies succeeded and went public, while others failed (Sarasvathy, 1998; 2008). Many papers have been published after this first study – most of them discussing entrepreneurial expertise in light of founding processes and new venture context. Few papers have been published that face up to effectual decision making in corporate settings (Brettel et al., 2012).

My research interest raised through the statement by Busenitz and Barney in 1997 who pinpointed: "it is possible that the more extensive use of heuristics in strategic decision making may be a great advantage during the start-up years. However, it may also lead to the demise of a business as a firm matures" (Busenitz & Barney, 1997, p. 10). I got attached through that commentary, for personal experiences and observations let me suppose that managers in corporate context apply effectual heuristics as well. I got to know effectuation as decision making heuristic used by expert entrepreneurs, and, from this, I made the assumption that it might be interesting to apply to less experienced entrepreneurs as well as for corporate entrepreneurs, if they face similar context surroundings. Thus, the starting questions for my research were: what happens to young companies that may have grown through people whose decisions have at least partly been effectual in some cases; how do they continue to grow and mature? Do managers still apply effectual decision heuristics in their daily work? Low and MacMillan (1988) once stated that entrepreneurship is not solely for the new venture context, and Jennings and Lumpkin (1989) wrote about organizations that act entrepreneurially and apply entrepreneurial strategies. Wilbank et al. (2006) found

effectual decision making heuristics to be applied by business angels, especially in situations of high uncertainty. The papers, published by Berends, Jelinek, Reymen, and Stultiëns (2014) and another by Brettel, et al. (2012) show effectuation heuristics in a corporate context positively linked with performance measures. Based on this, I felt the urge to transfer effectual decision making to the corporate context and with that to a mature market and a project management setting. The possibility that effectuation may offer heuristics of interest for managers in a matured context has not been developed theoretically or tested empirically. To fill this gap, we transfer the effectual approach to the context of project management and mature markets. We think through theory based outcomes on the peoples-, product-, and innovation level, will thus reveal valuable links to affiliated research fields.

Therefore, the leading question of the first paper is: *do managers apply effectual decision making on project management level?* And in greater depth: *what outcomes emerge from effectual decision making in that context?* To think through these questions is of interest for researchers and practitioners alike. First, we transfer effectual decision making to a context where structures have grown over years and with this are mature in some way. Building this bridge between effectual- and causal decision-making and project management will remarkably widen the application domain for effectual research. Second, this paper focuses on outcomes that may rise when applying effectual decision making in project management.

Figure 2: Research Design – First Paper
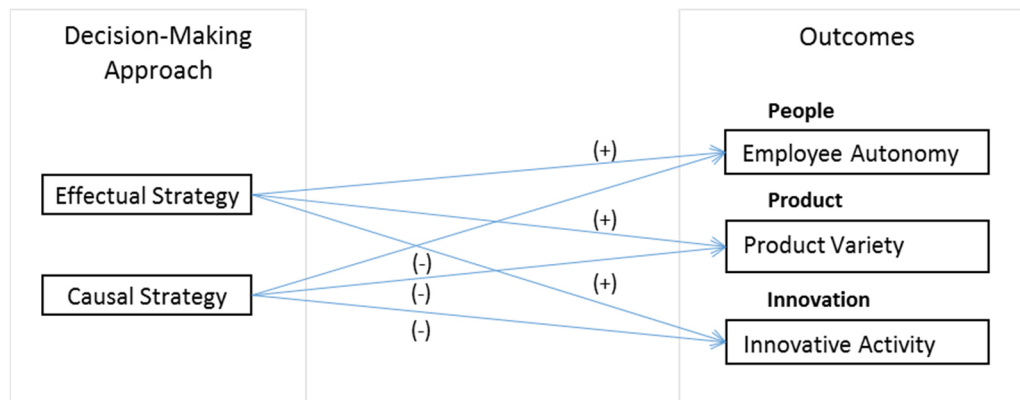
Beside the general positive performance consequences (Read, Song & Smit, 2009), this is an interesting field of research. The paper emphasizes three outcome-levels of value in that context. On the *peoples level* we work out employee autonomy as a relevant outcome variable. Managers with a leading function and/or the need to set up and coordinate a team, are looking for chances and tools to improve working power, commitment, and readiness for action, thus to empower employees. Frese (2009) states in his "Action Theory of Entrepreneurship" that an employee's mindset, which enables entrepreneurial initiatives, is self-starting, proactive, and persistent when facing challenges. Effectual decision making builds on proactive stakeholders who commit in some way to the already existing considerations of a project. Employees who apply effectual thinking are in some way self-starting, proactive, and persistent (Da Costa & Brettel, 2011). We therefore propose effectual decision making to be able to enhance employee autonomy that in turn builds the ground for high quality work and performance. On the *product level* we define product variety as valuable outcome. Customers are different in character and highly individual. In the past, individual product designs and setups increased distinctively (Hong, Dean, Yang,

Tu, & Xue, 2010). Effectuation encourages product co-creation through the dynamic effectual cycle (Sarasvathy, 2001) where even customers can attend as stakeholders in the process. In addition, we defined the *innovation-level* as relevant in the list of outcomes. Companies need to be innovative, create problem- and product solutions to compete successfully in the long run (Morris, Kurato & Covin, 2010). The dynamic effectual cycle is predestinated to form outcomes that have never existed before. The effectual process starts with a rough idea, or notion. Stakeholder commitments and co-creation leads to the development of something new that arises "between the heads". Thus, not one person alone could have created the final effect. It is a product of co-creation in iterative cycles, and might assume the shape of new products, markets, or problem solutions (Wiltbank et al., 2006).

In the theory part we first link the entrepreneurial cognition literature with project management and, secondly, reveal the basics of effectual decision making causal project management, its opportunities and limitations. Afterwards, we outline the effectual problem space and take the context of emerging and mature markets into account. We then describe the effectual project management process as well as its delineation from causation. Subsequently, we discuss potential outcomes of an effectual approach in a corporate project management setting. Doing this, we frame hypotheses that could be valuable in that context. The paper closes with a discussion on the value of effectuation in a corporate context.

1.3.3 The Moderating Effect of Complexity on Causal and Effectual Heuristics and Outcome

This empirical paper strives to take a closer look at managers' cognition and behavior in project management contexts. It includes the complexity perceived by the managers and analyzes the success outcomes of effectual/ causal decision making on project management level. The complexity perceived by the managers is included as moderator variable.

Expert entrepreneurs face difficult environmental conditions that are marked by uncertainty, dynamism and complexity. As introduced previously, Sarasvathy (2008) mentioned the effectual problem space that contains goal ambiguity, isotropy and Knight'ian uncertainty. However, the boundary conditions under which effectual logic operates have not been explored theoretically or empirically, leaving an important gap for researchers and practitioners who seek to understand whether effectuation is applied once startups grow into larger corporations. This paper deepens our understanding of effectual processes and behaviors by introducing the concept of complexity. Often discussed in the literature of project management, complexity is an important conceptual complement to the setting of uncertainty where effectuation is originally linked. While uncertainty provides a characteristic of the external environment, complexity describes more internal features of the project and/or organization and is perceived differently by the individuals involved (Müller, Geraldi, & Turner, 2012). Similarities in the characteristics of both concepts - uncertainty and complexity - let us assume that effectual decision-making might be predestinated for project management settings that are marked by complexity. Correspondingly, the second chapter is driven by the questions: *Do project managers apply effectual decision-making heuristics more intensively when they perceive their project*

environment as being complex? And what effects does the choice of effectual- or causal decision-making have on project success? In our study we differentiate between hard- and soft success measures for the following reason: Everyone knows the link between planning and success that is widely recognized in the management literature (Ansoff, 1980; Schendel & Hofer, 1979). Causal decision making strategies imply reaching a predefined goal in time (Collins & Baccarini, 2004) or bringing a product to market (Kotler & Levy, 1969). However, sometimes company settings lack the requirements of clear goals and therefore need an enhancement of the definition of success (Burgelman, 1991). Consequently, we gathered information about the extent of experiences and competency outcomes, a variable Brettel et al. (2012) have already applied in their study. Especially for companies that rely on strategy embodying innovative thinking and collaboration (Ragatz, Handfield, & Scannell, 1997), these so called "soft success measure[s]" implies learning and expertise enhancement, generation of new ideas, and widening of competencies and capabilities (Brettel et al., 2012) are fundamental. The research design is depicted in figure 3. Complexity, perceived by the managers, sits in the middle.

Figure 3: Research Design – Second Paper
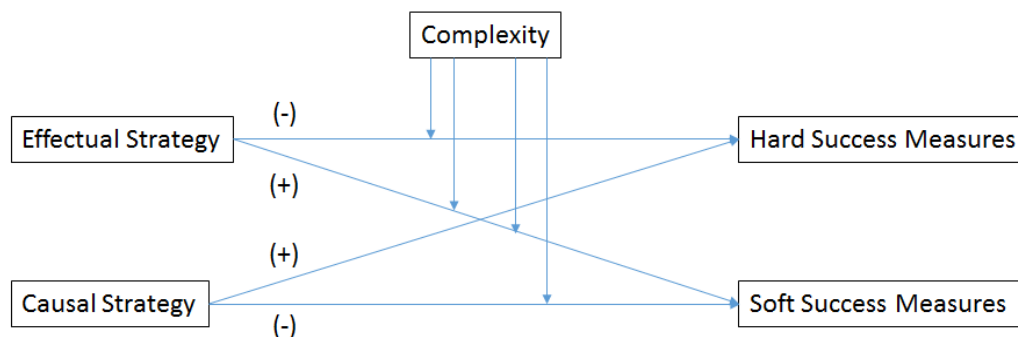
The third chapter is structured as follows. We build on the theoretical foundation of Brown and Eisenhardt (1998) where the firm is embedded in and changes its environment. We touch on decision-making theory a little and afterwards introduce the effectual and causal decision making approach (Sarasvathy, 2001). We outline the effectual problem space where effectuation has largely been examined, and describe how its characteristics are linked to complexity (Müller et al., 2012). To answer the central question: how complexity affects decision-making, we build a research model and hypotheses that link decision making strategy, complexity, and project outcomes. We test the expectations from our conceptual model using a large sample of projects in the corporate setting, serving to expand our understanding of effectuation in a novel context. After analyzing and presenting our key findings, we conclude the article by discussing its theoretical and practical implications.

The results show that managers' strategy choices are not simply based on rational and calculating aspects. Rather, these choices are based on their cognition, personal constitution, and how they perceive the decision-making context. When they perceive higher levels of complexity, they bring in their knowledge and methods from which they know will work well in that surrounding. Lower levels of perceived complexity let them think more outside the box, thus pushing them to more effectual decision-making heuristics. Consequently, the complexity perceived moderates the affinity for one or the other decision making approach.

1.3.4 Is Managers Strategy Culture Bound? International Differences in Strategy Choice

This empirical paper consults Hofstede's cultural dimensions and connects them with manager's cognition and behavior in project management settings. This investigation is theoretically and practically important in understanding the impact of cultural dimensions on managers' decision making. Though effectual decision making, in its structure, supports relevant paradigms like collaboration and shared responsibility in the companies' world, its interdependency with culture is still unclear.

Culture context and influence on strategy and business practice has always been of interest for the research as well as the corporate world. Researchers, such as Cox (2001), Hofstede (2001), Schneider, and Barsoux (2003) or Trompenaars and Hampden-Turner (1998) wondered if companies in different parts of the world have their own management approaches and found that even the term *manager* varies in its meaning. Papadakis, Lioukas and Chambers (1998) discussed the role of management and context in strategic decision making processes and Bhaskaran and Sukumaran (2007) analyzed how culture influences the values, orientations, and practices of organizations. Building on culture research and what we have learned through our research (see Chapter 4), we assume managers will apply strategy approaches in distinctive ways based on their cultural and regional contexts. Therefore, the third paper is driven by the following questions: *Do cultural characteristics and differences have an effect on managers' decision making strategy? Is it possible to explain strategy choice by applying cultural dimensions?* We incorporate theory from effectuation, corporate entrepreneurship, as well as culture research, and test our expectations using an international sample of 400 projects. We apply the scale by Brettel

et al. (2012), which differentiates between traditional planning-based, causal decision making, and control-based, effectual decision making. For cultural differentiation in this study, we build on national income differences and distinguish between triad and non-triad countries, as this differentiation is typical for the economic context and goes in line with Hofstede's high and low developed countries. To reflect on and discuss the variances between managers' decision making choice, this study builds on three of Hofstede's dimensions. We have chosen power distance, uncertainty avoidance, and individualism, because these dimensions are distinct in high developed and less developed countries.

The first dimension, *power distance*, can be either high or low, based on national- and organizational culture. Power distance describes the unequal distribution of power between individuals in an institution. Team members are either invited to work autonomously and as partners on a specific problem or expect to be supported and consulted through team leaders and/or superiors (Hofstede, 2011). This attitude is suitable to an effectual decision making approach that encourages team members and other stakeholders to contribute to the project idea and invite them to shape the process. Causal decision making, on the other hand, suits a higher level of team leader support. The next dimension, *uncertainty avoidance*, can be either strong or weak. Uncertainty avoidance describes society's tolerance of ambiguous situations. Team members feel either uncomfortable in unstructured situations (Hofstede, 2011) or leverage that ambiguity and unfold creative potential. While the effectual approach is one of control instead of prediction (Sarasvathy, 2001), it guides teams to work with control, and with this, is particularly linked to Hofstede's dimension.

The third dimension, *individualism/collectivism* refers to the degree of group cohesiveness and -integration in an institutional context. Either team partners expect each other's opinion and vote or speak one's mind to be classified as, so called, in-group. Self-selected stakeholders, which are inherent in the effectual approach, negotiate ideas and procedures, and with this, need a certain degree of individualism. The discussion of the three dimensions of Hofestedes' (2011) work, in the light of the decision-making approaches by Sarasvathy (2001), let us assume a tendency for effectual decision-making in higher developed countries, and a tendency for causal decision-making in less developed ones.

Figure 4: Research Design – Third Paper
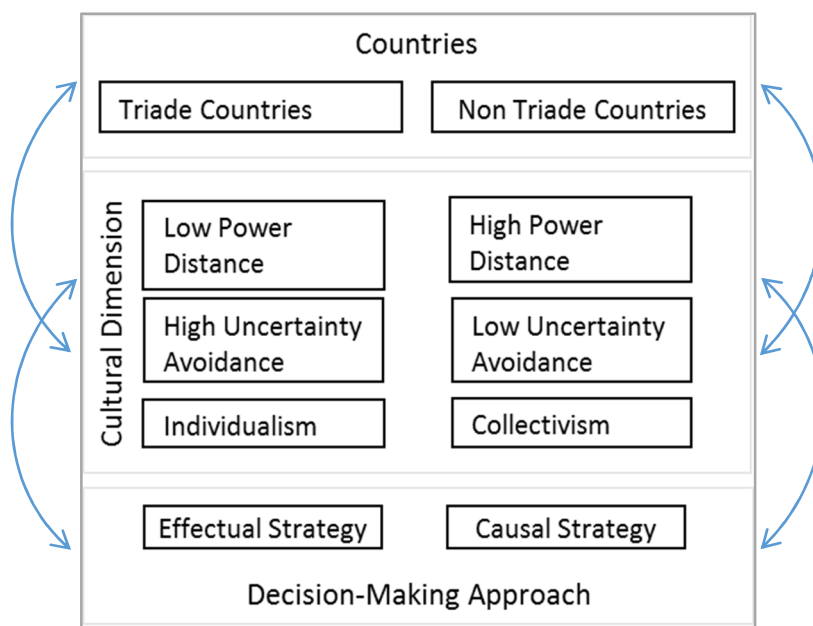
The chapter is structured as follows. In the first part, we link entrepreneurial strategy and decision making with project management, and describe how it is applied in this context. We then outline our regional and cultural differentiation by building on Hofstede

(2011), the most recognized approach in the literature on culture. In this context we work out our hypotheses. The section on methods is reserved for testing our expectations. Afterwards, we discuss the results in relation to our theory. We finally conclude with our contribution, limitations of the study, and future research questions.

Part 2

THEORETICAL FRAMEWORK

Effectuation and Mature Markets - Contradiction, Companionship or Contingency?

2.1 Introduction

Empirical evidence suggests that effectuation – a strategy of "non-predictive-control" – is particularly useful in the uncertain (Knight, 1921) environments of new ventures (Read, Song & Smit, 2009a; Sarasvathy, 2001). But then, what happens? Ultimately, some new firms that have ventured into uncertainty create products, firms, and markets, which become successful and mature. Arguments from the literature suggest that planning is beneficial in mature markets, as it is rooted in the predictability of the environment (Sarasvathy & Dew, 2005). Information about what happened in the past should lead to good decisions in the future, given a sufficiently predictable future. Though there is empirical support for the connection between planning and success in mature markets (Ansoff, 1979; Porter, 1980; Schendel & Hofer, 1979), the possibility that effectuation may offer a heuristic of interest for managers in a mature market context has not been developed theoretically. To fill this gap, we transfer effectual decision-making to the context of mature markets and outline outcomes on three levels that are theoretically linked with an effectual approach. With this, the chapter offers insights into the relationship between effectual strategy, where "the project 'emerges' rather than being fully preplanned" (Williams, 2005, p. 497) to the widely known causal strategy, which is prediction based and run by a set of tools and techniques. The latter is defined, for example, in the "Bodies of Knowledge" of

the Project Management Institute (PMI) or International Project Management Association (Project Management Institute, 2008).

This chapter brings the entrepreneurial cognition literature together with existing differing research perspectives found in project management literature. Specifically, the corporate management perspective which deals with project management and its contribution to value-creation in the company (Crawford, Hoobs, & Turner, 2006; Thomas & Mullaly, 2007), calls for a broader view on project management. Here, an enhancement of project management literature can be easily done through the integration of enriching insights of other disciplines (Hanisch & Wald, 2011; Shenhar & Dvir, 2007b; Söderlund, 2004). Of particular theoretical interest to our investigation are specific propositions derived directly from the management literature on the growth of firms. Companies are obliged to run projects and look for activities in order to create value (Narayanan, Yang, & Zahra, 2009). "Project strategy, then, simply becomes the specific way in which the project is going to create or ad new value" (Patanakul & Shenar, 2012, p. 7). This can likely be pursued causally and/or effectually, and may accordingly lead to meaningful different outcomes. With this perspective, the study makes a substantial contribution to the literature of project management.

Simultaneously, our study contributes in three ways to the theory building in entrepreneurial cognition literature. First, we transfer the logic of effectual strategy, originally developed in entrepreneurship research (Sarasvathy, 2001), to the empirical setting of project management. We describe projects along the four key principles of effectuation (means orientation, affordable loss, leverage contingencies, and partnerships).

These principles are clearly distinguished from causal strategy, which is often connected with conventional planning approaches in traditional project management. Examples for that can be lean project management or *kaizen,* defined as the steady improvement of processes (Besner & Hobbs, 2008; Kapsali, 2013). Initially, we show that effectuation can offer an important conceptual basis for describing and analyzing the decision-making strategy of managers. Subsequently, we theoretically outline the potential effects of effectual-and causal decision-making strategies on outcomes. These are divided into three levels: 1) *people* with employee autonomy (Makadok & Coff, 2009), 2) the *organization* with product variety (Al-Zu'bi & Tsinopoulos, 2012), and 3) *innovative activity* (Kleinschmidt & Cooper, 1991) of the company. In addition, we transfer the effectuation-, causation approach, recently rediscovered in the R&D context of large corporations (Brettel, Mauer, Engelen & Küpper, 2012), to the context of mature markets and project management in general.

The chapter begins with the theoretical background, which provides an overview of entrepreneurial cognition, detailing the distinctive features of causation and effectuation strategy and clarifies the applicability to the project management context in specific and mature markets in general. In doing this, we set of our hypotheses that links managers' decision-making strategy and outcomes, and subsequently conclude the chapter by discussing our theory and practical implications.

2.2 Entrepreneurial Cognition & Project Management

Existing management literature on the growth of firms has established a connection between planning and success in mature markets (Ansoff, 1979; Schendel & Hofer, 1979).

A conventional planning approach implies clear targets, predefined milestones or formal reviews and other factors that are often cited in the literature. In contrast, effectual strategy suggests a lever of control that can be seen as an extra toolkit for interacting with the environment. While target setting and prediction are known as one of the most important elements in the existing management literature (Porter, 1980), the core of an effectual project is to start with means, negotiate targets with self-selected stakeholders, and apply an affirmative attitude toward unexpected influences (Sarasvathy, 2001).

Induced from the study of management and entrepreneurial expertise (Sarasvathy, 2001), effectuation was first introduced in the entrepreneurial context. It quickly gathered momentum in different disciplines including management (Augier & Sarasvathy, 2004), economics (Dew, Sarasvathy, & Venkataraman, 2004), psychology (Sarasvathy, 2003), and finance (Wiltbank, Read, Dew, & Sarasvathy, 2009). As existing work has considered effectuation predominantly in the entrepreneurial context of new venture creation, this study seeks to understand effectual decision-making in an environment where typical signs of a mature market and company structure exist. Within that context, information from the past has traditionally been used to make decisions for the future. In contrast with this, we intend to investigate heuristics and outcomes related to an effectual approach. In the view of Dewar and Dutton (1986), who considered project management as an essentially diverse decision-making problem, effectuation logic may offer an alternative or additional tool kit. Especially in mature markets, where competition exists and companies have to reinvent themselves regularly to stimulate innovation demand, control through future creation can be a valuable approach. That is, as Sarasvathy (2008) puts it, effectuation focusing on human action as the "predominant factor shaping the future" (p. 91) can be a useful

consideration. The opportunity to negotiate future development with stakeholders and shape the level of the playing field is critical for companies in mature markets as well as emerging ones. Therefore, effectual logic, which values the heuristics of control over the heuristics of prediction "to the extent we can control the future we do not need to predict it" (Sarasvathy, 2003, p. 208), can be an inspiring approach in any organizational context where sustainable growth and continuous development is necessary for long existence and maintenance of value (Patanakul & Shenar, 2012).

2.2.1 Esteem Causal Project Management and know its Opportunities and Limitations

The topic of project management involves researchers and practitioners alike. For more than 50 years, both are looking for better ways to manage projects. Following the modern perspective of project management, a project can be defined as "a temporary endeavor undertaken to create a unique product and service […] designed to serve progress" (Gauthier & Ika, 2012, p. 12). The literature about project management is broad and multifaceted. One of the latest publications by Gauthier and Ika (2012) points out that if we talk about projects, we need to consider the different perspectives of the modern, postmodern, and hypermodern periods of project and project management. Considering the complexity of projects, we choose an integrated perspective characterized by duality and define project management "as an ever-changing construction of the human spirit due to constant negotiation with oneself and others" (Gauthier & Ika, 2012, p. 18). Therefore, a project can be "renegotiated and transformed at any time" (Gauthie & Ika, 2012, p. 18). Other researchers focus on project management tools and techniques (Murphy & Ledwith, 2007; Pisani, Hayes, Kumar, & Lepisto, 2009), when they discuss this topic or address

different project types and contexts that differ in their project management demand (Hanisch & Wald, 2011). According to the Project Management Institute (PMI), the world's leading professional association for project management, project management is the application of knowledge, skills, and techniques to execute projects effectively and efficiently (PMI, 2008). Patanakul and Shenar (2012) note, that project management in the practitioners' world has become almost synonymous with project management tools and techniques like Program Evaluation and Review Technique, known as PERT-charts, defined by the Project Management Institute in the "Bodies on Knowledge" (Williams, 2005). Even project management literature and training "have traditionally focused on project planning, scheduling, and resources management" (Patanakul & Shenar, 2012, p. 5).

Patanakul, Iewwongcharoen and Milosevic (2010) describe, in their empirical study, nine knowledge areas in management (Integration Management, Scope Management, Cost Management, Quality Management, Time Management, Risk Management, Human Resource Management, Communications Management, Procurement Management) and illustrate the corresponding project management tools and techniques, which are taught in business schools but are hardly known by the interviewed practitioners in their study. Yet managers have a central role in implementing project management tools and techniques, which is shown in the work by Moosa and Sajid (2010). They differentiate between Total Quality Management (TQM) assessment models and TQM implementation models, which are common in the project management field. The former includes checklists that expose what TQM means. Widely known are the DMAIC Methodology of Six Sigma (Define, Measure, Analyze, Improvement, and Control) or the PDCA model of ISO 900

(Management, Responsibility, Resource Management, Product Realization, and Measurement, Analyses and Improvement). The latter describes six types of TQM implementation or, as Lascelles and Dale (1991) define them, six levels of adaption of TQM. Of capital importance for the successful organizational utilization of project management tools and techniques, or TQM, are the managers' statistical qualifications (Cleland & King, 1967) and his ability to master and successfully adapt the methods and techniques to various management contexts and environments. This context is challenging in that "much of the existing material is far too technical for the […] project leader and team. Following each and every step in the process may seem tedious and the benefits may not appear to justify the investment of time and energy" (Longman & Mullins, 2004, p. 55). Following traditional project management tools and techniques, each project starts with data acquisition and analyses, what requires enormous time and extensive expenditures before the first step within project execution (Longman & Mullins, 2004). Nonetheless, the question arises, is the quality "only as good as the information and data behind it" (Moosa & Sajid, 2010, p. 750)? Most of the cases of successful implementation mention big companies like General Electrics or Motorola (Guitérrez, Bustinza, & Molina, 2012), where sophisticated programs for manager qualification and structures that facilitates information procurement and processing exists. Small and medium-sized enterprises (SMEs) often lack necessary requirements for effectively incorporating data acquisition and analyses (Kumar, Antony, & Douglas, 2009; Kumar, Antony, & Tiwari, 2011).

Because most project management tools and techniques are based on systematic data analyses (Moosa & Sajid, 2010), it is difficult to use them for projects in rapidly changing or emerging markets where "volatility, reinvention and fundamental changes pose

unprecedented challenges" (Cravens, Piercy, & Baldauf, 2009, p. 32). Nor is it easy to transfer project management tools and techniques on ill-defined projects. "The traditional project management toolbox does not seem to contain tools that are especially well adapted to the needs of managers of this type of project" (Besner & Hobbs, 2008, 27). This fact can be underlined by a "positive correlation between the level of project definition and the use of project management practices" (Besner & Hobbs, 2012a, p. 242). A well-defined project can be suitably managed with project management tools and techniques, however, with rising complexity or uncertainty in a project these tools will not work well. The Project Management Body of Knowledge (PMBOK®) Guide i.e., assumes no real involvement of project management in front-end definition, including strategy formulation (Morris, 2005).

A key role is also attributed to the strategy that underlies the project management. Following Minzberg (1994), strategy is closely linked with action. Transferred to the project management context, it is about how the management is planning to create value. In addition, the *how* differs depending on context (Wiltbank, Dew, Read, & Sarasvathy, 2006) and the higher enterprise goal or vision (Patanakul & Shenhar, 2012).

2.2.2 Effectual Problem Space & Project Management Context

Positioning Strategies vs. Construction Strategies

As described earlier, companies need renewal and growth to withstand market competitiveness and write business history for themselves. Particularly in management, the question: "What to do next?" affects millions of managers. In their article: "What to do next – the case for non-predictive strategy" Wiltbank et al. (2006) reviewed the planning versus learning literature and found that strategic decisions, in particular, and strategy, in

general, often deal with the term of prediction. Because of this, they defined a framework of prediction and control where decision makers chose between positioning strategies in a given environment and construction strategies where markets are made by human activity (Wiltbank et al., 2006).

Figure 5: Framework of Prediction and Control (Wiltbank, Dew, Read, & Sarasvathy, 2006)

	low Emphasis on Control **high**

Emphasis on Prediction		
high	**Planning** *Try harder to predict and position more accurately*	**Visionary** *Persistently build your clear vision of a valuable future*
low	**Adaptive** *More faster to adapt to a rapidly changing environment*	**Transformative** *Transform current means into co-created goals with others who commit of building a possible future*

Strategy, according to Witbank et al. (2006), depends on how the managers see and understand their environment. They choose planning strategies if they understand the environment as being under their control (Ansoff, 1979; Porter, 1980; McGrath, 1999). Market research, forecasts, and planning works well for them if nothing unforeseen crosses their plans. Adaption strategies are well suited to managers who think that the environment is unpredictable. Therefore, they shorten their plans and answer to context changes (Eisenhardt, 1989; Minzberg, 1994; Quinn, 1980; Teece, Pisano, & Shuen, 1997). Managers who change the environment successfully reach their goals. They rather tend to work with visionary strategies (Courtney, Kirkland & Viguerie, 1997; Hamel & Prahalad,

1991; Rindova & Fombrun, 1999; Tellis & Golder, 2002), which are first on the construction site. Transformative strategies go one-step further. Here, managers seek to co-create environmental factors with stakeholders, people who bring in means and negotiate potential goals. Everyone, putting *skin into the game* has an interest in controlling one's inputs, which makes the control aspect high, while the prediction aspect in this case is low (Wiltbank et al., 2006).

Effectuation as Construction Strategy – linked to the Effectual Problem Space

Besides strategies like the "value curve creation" (Kim & Maubourgne, 1997) and "backing into the future" (Hayes, 1985) where predicted success factors are left completely out of the process, the effectuation strategy (Sarasvathy, 2001) fits perfectly into this field. As a construction strategy with a focus on high control and low prediction in the process, effectuation refers to a specific context, known in the literature as the effectual problem space (Sarasvathy, 2008). Here, goals are unclear (March, 1982), isotropy is high (Fodor, 1983), and knightian uncertainty (Knight, 1921) makes predicting outcomes impossible. After a review of the uncertainty literature across disciplines (Afifi & Burgoon, 2000; Knight, 1921; March, 1978; Marris, 1993; Mazursky & Ofir, 1990; Pitz & Sachs, 1984; Taleb, 2007; Wilson, Centerbar, Kermer & Gilbert, 2005), we briefly outline uncertainty in line with Knight (1921), as this is necessary to understand where effectuation originally accrues.

Knight (1921) differentiates three environmental conditions: The first consists of a predictable future where outcome scenarios are known ex ante and decision-making involves calculation and planning. This brings to mind Wiltbank et al.'s (2006) model,

indicating that planning strategies seem reasonable. The second environmental condition consists of a future where outcome distribution can be analyzed through repeated trials. In project management, managers facing this situation often successfully apply project management tools and techniques (e.g., market and competitor analyses) to choose matching strategies or adapt faster to the environment (Wiltbank et al., 2006). The third condition is known as knightian uncertainty or true uncertainty, which "consists of a future that is not only unknown, but also unknowable – with unclassifiable instances and a non-existent distribution" (Sarasvathy, Dew, & Velamuri, 2002, p. 6). In project management, managers face such situations when they cross undeveloped waters, are exposed to unforeseeable events (e.g., environmental changes), or face environmental reactions (e.g. through customers) which they could not anticipate beforehand. As risk management is made for foreseeable quantifiable events, like Besner and Hobbs (2012b) describe it, other tools or approaches to deal with this third type of uncertainty are needed.

Besides knightian uncertainty, the effectual problem space is characterized by goal ambiguity (March, 1982) and isotropy (Fodor, 1983). Both are in some way linked to knightian uncertainty. A context with unclassifiable instances, as Sarasvathy (2008) notes, makes setting goals impossible. There is no way to define in advance what goal will be valuable and worthwhile. In this context, it is even hard to classify information as valuable and useful or uninteresting, what is mentioned when talking about isotropy, because "actors cannot know what to attend to and what to ignore" (Fodor, 1983, cited by Sarasvathy 2008, p. 70). Project managers know these occurrences either partly or in sum (Kapsali, 2013). As universities mostly teach project management tools and techniques that work good under conditions that resemble the first and second environmental uncertainty, described

by Knight (1921), no techniques are taught that fit a project context that models the effectual problem space, which often challenges managers. Particularly "in the case of innovation projects that regularly involve fuzzy missions and goals, with objectives that are not clearly rooted in a fixed reality, and were solutions need time to emerge […] [project management tools and techniques] have been found lacking" (Lenfle, 2008; Lenfle & Loch, 2010 cited by Kapsali, 2013, p. 2). For this context Meyer, Loch, and Rich (2002) propose tools that build "less toward planning and more toward flexibility and learning" (p. 61), while Florice and Miller (2001) add that uncertainty can moreover be managed with cohesiveness and creativity. Project management tools and techniques that are agile (Conforto & Amaral, 2010) and lean methods (Ballard & Howell, 2003) are a step in this direction. For years, researchers struggled to find a behavioral mode to deal with the third type of uncertainty described by Knight (1921). Sarasvathy (2001) firstly examined patterns used by expert entrepreneurs to deal with unknowable context conditions.

Transferred to market perspective, emerging markets often have high levels of environmental uncertainty, because they have no past containing useful historic data, and markets are ill-defined and undeveloped (Teplensky, Kimberly, Hillman & Schwartz, 1993). In contrast, uncertainty is low in many mature markets, "because past industry trends, successful operating practices, customer preferences, etc. are generally known throughout the industry" (Castrogiovanni, 1996, p. 813). A characteristic of market maturity is, therefore, low economic growth and entry rates, as "successful entry is often possible only by taking market share from an existing competitor" (Lumpkin & Dess, 2001, p. 438). Furthermore, market and technology structure shift is low and market barriers are high.

In the context of project management, actors naturally face different levels of uncertainty depending on environmental circumstances, e.g., the market in which the company is active in (or to which it belongs), and the kind of project someone is running. Within research and development projects, strategic renewal activities or new revenue stream generation, the level of uncertainty may likely approach the third condition described by Knight (1921), where the manager can not anticipate beforehand what kind of situations will arise. In contrast, however, projects like product-launch or recurring customer projects come along with lower levels of uncertainty and can be conducted according to best practice or traditional project management tools and techniques. Nevertheless, "[e]ven predictable markets can change abruptly as a result of disruptive invention, regulatory actions, and events outside the control of even the best" (Read, Dew, Sarasvathy, Song, & Wiltbank, 2009a, p. 15) managers. In this situation, when we have an effectual problem space and causal project management tools and techniques fail "[e]ffectual rationality opens up a traversable path […] by inverting the problem, solution process, decision principles and the overall logic of causal rationality" (Sarasvathy & Kotha, 2001, p. 6, 7). Therefore, we assume several niches in project management where effectual strategy might offer an additional toolkit – even if the company markets already reached a certain level of maturity.

2.2.3 Effectual Project Management & Delineation from Causation

Read et al. (2009a) state that effectuation can be seen as relational (Arndt 1979; Dwyer, Schurr, & Sejo, 1987; Macneil, 1980; Morgan & Shelby 1994), network-oriented (Achrol & Kotler, 1999), equity driven (Rust, Lemon, & Zeithaml 2004), and co-creational

(Jaworski & Kohli, 2006). It consists of four principles and a dynamic process. A summary of the four principles is described in table 1.

Table 1: Effectuation and Causation Principles

Principle	Causation	Effectuation
Starting point	***Goal orientation*** Goals define the required resources for a particular project	***Means orientation*** Means/ resources/ contacts define potential goals
Risk perception	***Focus on respected returns*** Project should maximize return on invest/ outcome	***Focus on affordable loss*** Project should not risk more resources than can be afforded to be lost
Attitude toward outsiders	***Potential competitors*** Protection of ideas is important, as a project is positioned in competitive environment	***Potential partners*** Partnerships emerge as stakeholders commit resources to the common project while influencing its development
Attitude toward contingency	***Avoidance*** Planning and focus on goals help to avoid contingencies	***Leverage*** Contingencies provide opportunities that can be used to own advantage
View of the future	***Forecast*** Future environment is externally given, forecast help to adopt to it	***Create*** Prediction is not possible, since future environment depends on own actions

From the start, effectual processes are means oriented, suggesting that projects can be initiated only with a loose notion of goals, while in contrast, causal approaches depend on predefined goals and the acquisition of relevant resources. Thus, the effectual project team works with all resources they have readily available, including skills, competencies, and their contacts and social networks. There is no clear sense of which resources will be more valuable than others to the ultimate project. "Effectual logic seeks to […] explicitly

assum[e] any and all means at hand – irrespective of whether they turn out to be valuable ex post or not – as possible inputs into the process" (Read et al., 2009a, p. 13). Effectual strategy tries to involve only self-selected people as team members into the project. Each of them brings means, ideas, and commit in some way or another to the already existing considerations. Involving the self-commitment perspective, the resource value partly comes from the financial and psychological ownership, which rises in the co-creation processes of all stakeholders in the project (Read et al., 2009a).

Following effectual strategy, commitments of the project team members are made according to the affordable loss principle – how much they are willing to put at risk and "what they are willing to lose in order to follow a particular" (Dew, Read, Sarasvathy, & Wiltbank, 2009b, p. 110) project goal. "A preference for the cheapest if not free, options and for quickly realized small successes and small failures tends to [dominate]" (Read et al., 2009a, p. 7). This is helpful on all levels of analyses, the individual-, project-, and firm level (Dew et al., 2009). Davidsson (2005) puts it as follows: "It is more important to limit the damage if unsuccessful, than to get the highest possible return if successful" (p. 12). Causal project management approaches, in contrast, encourage the assessment of risk according to expected project returns, and use that assessment as a basis for resource acquisition.

Instead of expensive market and competitor analyses in the causal strategy approach, effectual strategy build on strategic alliances and ask: "With whom do I have to ally in order to be able to take the […] [project] one step further?" (Davidsson, 2005, p. 12). To answer that question effectual strategy involves social networks, forming partnerships, and

obtaining commitments from potential customers or suppliers. In the end of the process, the project team may have the structure of a quilt, as Sarasvathy (2001) describes it. All commitments advance the cycle of resource transformation and converge the cycle toward constraints on project outcomes.

Throughout the process, effectual managers are "sensitive to what comes up along the road, and prepared to turn these contingencies into business strengths" (Davidsson, 2005, p. 12). Sarasvathy (2008) illustrates this form of leveraging contingencies with "the well-known expression 'when life gives you lemons make lemonade'" (Ucbasaran, 2008, p. 226). In contrast, causal project management would try to identify and avoid contingencies, e.g. by elaborate market and competitor analyses.

Overall, effectual strategy is characterized by the principles described previously. Whilst causal approaches are central in today's project management literature, the effectual approach can be seen as an alternative or additional toolbox for project management and not solely in the effectual problem space. While linear causal approaches try to predict potential project outcomes, effectuation is based on the underlying assumption that the project team will create the outcome, i.e., the stakeholders within the project, thus reducing the need for prediction and opens up the chance for innovative, unforeseen new and valuable outcomes.

2.3 Effectual Decision-Making and Outcomes

This section details the expected results of effectual and causal strategy in project management. We worked though the literature to find outcomes on people, organization,

and innovation levels that might differ according to the strategic approach applied in context of project management. The first step in doing so is to establish what *outcomes* mean in this context. All outcomes are meaningful and cover relevant topics in company context.

On the peoples-level, we are interested in the employee autonomy (Makadok & Coff, 2009) inherent in the company. The second level, organization, asks for product variety (Al-Zu'bi & Tsinopoulos, 2012), and, finally, we are interested in the innovative activity of a company (Kleinschmidt & Cooper, 1991). The research model is depicted in figure 6.

Figure 6: Research Model – Decision-Making Approach and Outcomes
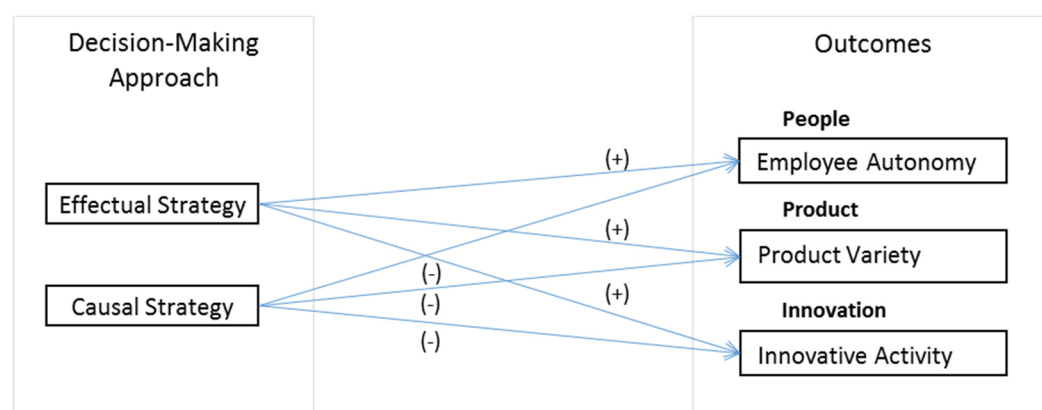
2.3.1 Employee Autonomy through Stakeholder Self-Selection

Effectual strategy needs stakeholders who commit to a project by contributing their individual resources. Practically speaking, employees self-select into projects based on their knowledge, interests, and networks. This can only work if the company offers structures which allow these processes to proceed. Normally, in hierarchic organized companies, this will not work at all. However, long researchers and practitioners deal with approaches that try to bring "the market inside the firm" (Baker, Gibbons, & Murphy, 2001,

p. 212) and concepts like empowerment and intrapreneurship goes is that direction. A work by Makadok and Coff (2009) sheds light on hybrid governance forms that can be found in today's companies. They found three dimensions: authority, ownership, and incentives that differ extremely in market like structures and hierarchy like structures. Companies who mainly promote market like structures "involves asset ownership by the agent, job autonomy, and high-powered rewards tied to output" (Makadok & Coff , 2009, p. 299). Pure hierarchy structures "involves asset ownership by the principal, low-powered productivity incentives, and strong authority for the principal to determine the type, methods, and timing of the agent's work and other activities" (Makadok & Coff , 2009, p. 299). These dimensions are set as key differences between companies' governance forms, which is also supported by, e.g., Bradach & Eccles, 1989; Holmstrom & Milgrom, 1994; Williamson, 1991. That approach let us propose that effectual decision-making is more likely emerging in companies that promote a more market like governance structure in which employee's self-determination and autonomous decision-making is part of the game. Here, employees work with self-reliance and autonomously, what qualifies them to self-select into different projects, a central element of effectual decision-making. Therefore, we propose the following:

Hypothesis 1: Managers who apply effectual strategy in project management will more
    likely select company structures that allow employees autonomy than managers who
    apply a causal strategy approach.

2.3.2 Product Variety through Stakeholder Co-Creation

Throughout the last decades, managers notice a paradigm shift in consumer and buyer behavior. Customers are getting more and more interested in obtaining high quality

products/services that perfectly fit their demands for low rates. Companies partially answer with innovative production technologies and new sales and operations planning. Highly segmented markets are the result and Porters strategies of differentiation or cost leadership become insufficient in that context (Piller & Ihl, 2002). Alternative perspectives that have a focus on product variability and customer-orientation are getting more and more relevant (Pine, 1994). Researchers are talking about market responsiveness that is mostly characterized by a variety of products produced with a diversity of inputs into the production process, that itself has flexible processes (Williams, D'Souza, Rosenfeldt, & Kassaee, 1995). We follow the definition of Williams (1995) and define product variety as the ability of the firm to provide a broad range of products measured against company size.

A key aspect of effectual strategy is that it "involves negotiating with any and all stakeholders who are willing to make actual commitments to the project, without worrying about opportunity costs, or carrying out elaborate competitive analyses" (Sarasvathy, Block & Lutz, 2015, p. 17). Within that process, stakeholders bring in their personality (who I am), resources, ideas, and concepts they have, or competencies and project management experience (what I know), as well as skilled employees and experts in the considered project field (who I know). Moreover, effectual strategy contains stakeholder co-creation. Thus, results and effects emerge through repeated trials and negotiation within the dynamic effectual cycle (Sarasvathy & Dew, 2005). Compared with traditional marketing, effectual strategy involves not only suppliers, but also customers in the co-creation process (Read et al., 2009a). They act as bringers of ideas, testers, and investors or indeed as (first) customers. Hence, we assume that companies using an effectual strategic approach will end up having a wider product range than those applying causal strategy in their projects, thus

increasing the number of different variants of products and services a company offers to its customers. This dimension was partly applied in earlier studies (Williams et al., 1995). Because of this, we assume those companies to have a higher product variety if managers show a manifestation for effectual strategy in project management. Therefore, we frame the second hypothesis as follows:

Hypothesis 2: Managers who apply effectual strategy in project management will generate broader variation in product range and/or services than those who apply a causal strategy approach.

2.3.3 Innovative Activity through Leveraging Contingencies

Innovative activity is eminent in the corporate world. Geroski and Machin (2013) revisited the discussion about innovating and non-innovating firms, and showed that innovative activity goes along with a transformation of internal capabilities "in a way which affects how they generate profits and grows" (Geroski & Machin, 2013, p. 85). They also state that innovating firms are "more perceptive, more flexible and more adaptable" (Geroski & Machin, 2013, p. 86), which is inherent in the effectual approach. Managers who utilize effectual strategy try to integrate unforeseen circumstances as information and/or valuable inputs into their projects. Effectual strategy often begins with only a very loose notion of goals (Sarasvathy, 2008) that increase the possibility for something new or unknown to arise. Stakeholders come on board and bring unforeseen information, experiences and/or network contacts. The effect or outcome of the effectual process then "depends on which stakeholders come on board and the contingencies that occur along the way" (Read et al., 2009a, p. 3). Concerning this, innovative outcomes might be anticipated. We therefore refer innovative activity as the third outcome dimension. Following the

affordable loss principle, project stakeholders commit only what they can afford to lose rather than investing in calculations about expected returns (Sarasvathy, 2008), which allows innovative activity to be less-risky and arise more thoroughly.

Hypothesis 3: Managers who apply effectual strategy in project management will end up having a higher innovative activity than those who apply a causal strategy approach.

2.4 Discussion

As established previously, the primary aim of this study is to discuss effectual strategy in the context of project management in mature markets and reflect about possible effects that might be associated with an effectual strategy approach in that context. We proceed as follows: first, we outline the effectual strategy approach in entrepreneurial cognition literature and then examine the theory of project management and strategy. We discuss challenges in project management and highlight points where project management tools, often causal in nature, hit the wall. Thereafter, we introduce the effectual problem space and link its characteristics to the environment of project management. We discuss the niches and sites where an effectual approach might outperform causal management approaches, even if the project takes place in a mature company context. Afterwards, we describe an effectual project management approach and contrast it with a causal one. In the next section, we deduce outcomes on three levels, namely the peoples-, the product-, and the innovation level. All outcomes are directly linked to an effectual approach in a corporate context, and have been derived from the literature of firm growth. Beside these outcomes, there are side effects that can be associated with an effectual approach in a corporate context, and which profit from further discussion and consideration.

2.4.1 Implementation of Knowledge and People

An effectual approach might help to answer relevant questions in company contexts. One relates to the topic of *knowledge implementation*. Firms normally reach *tipping points*, meaning problems faced by the firm that effect or impede its growth. Phelps, Adams, and Bessant (2007, p. 8) represent in their work the states framework when talking about company growth. Here, "growth is (…) complex, path dependent and unique to each firm". Thereby, new knowledge mostly comes in through encounters, what constitutes a so called *tipping point* challenge. To resolve the challenges of tipping points, a firm "must have the capability to find new knowledge (…) and the ability to implement this knowledge" (Phelps et al., 2007, p. 8). Here, effectual strategy, with the element to leverage contingencies and to work with what is available, can offer a valuable new perspective. Additionally, effectuation might help in the context of *team building and integration* of new employees and team members. Phelps et al. (2007, p. 9) stated "in the context of growing and developing businesses (…) little is known about the various issues involved in integrating people". In the effectual approach, stakeholders self-select into a project or a team by bringing in ideas and/or means, like knowledge, skills etc. Here the team grows naturally and members become integrated through the co-creation approach. Of course, there are still gaps to close, like the question of what might be key enablers of co-creation relationships, or how psychological and emotional ownership of resources can be handled. Nevertheless, consulting the effectuation approach concerning these questions might be a valuable step.

2.4.2 Raising Complexity in Project Management

The corporate management perspective which deals with project management and its contribution to value-creation in the company (Crawford, Hoobs & Turner, 2006; Thomas

& Mullaly, 2007) calls for a broader view on project management. Here, an enhancement of project management literature can be easily done through the integration of enriching insights of other disciplines (Hanisch & Wald, 2011; Shenhar & Dvir, 2007; Söderlund, 2004).

New challenges in project management through environmental influence, changing customer needs, or competing offers, call for reframing strategic management approaches. Bridging effectual heuristics to project management settings can be a step in that direction. We outline here, theoretically, how effectual strategy can lead to valuable outcomes/effects on different levels, all playing a particular role in corporate management. Little research has be done concerning where the effectual approach can enrich traditional management approaches and how effectual and causal approaches can intertwine. Still, one of the central papers that transfer effectuation to a corporate context is that of Brettel et al. (2012). They analyze effectual decision-making in the context of R&D projects in a corporate setting and found both – causal and effectual decision making – being applied by R&D managers. Reymen, Andries, Berends, Mauer, Stephan, and Burg (2015) recently published a process study of effectuation and causation to unfold the dynamics of strategic decision making in venture creation. They suggest a hybrid perspective on strategic decision-making and described shifts in decision-making logic depending on changes in uncertainty, resource position, and stakeholder pressure. Both papers answer relevant questions when incorporating effectual decision-making. Nevertheless, more research is needed to enlighten this research area. There are still relevant questions unanswered and open gaps to close (Read, Sarasvathy, Dew & Wiltbank, 2016). However, when tracing back to the project management context, we should also consider the effects new research has for

practice. Thereto, Patanakul and Shenhar (2012) state that "the traditional thinking must also incorporate the new, strategic perspective, which will inevitably make project management more complex and more demanding than it was before" (p. 5). In the end, it is up to the individual project manager to incorporate new perspectives. Managers are free to choose their perspective and decide which strategy they bring to bear (Delmar, Davidsson, & Gartner, 2003).

2.4.3 Contribution to Theory and Practice

With this study, we extend the research field of effectuation and causation through bridging to a project management and mature market context. This helps to broaden the scope of effectuation and, thus, gives it a more general meaning. In its core, the chapter contributes to cognition research, as it discusses manager's decision-making strategies in project management tasks and challenges. On an organizational level, this study explores how project managers think and act, thereby navigating their projects, and achieving project outcomes.

The results also have some managerial implications, as they bring in a new perspective that is at least partly contrary to what is generally known concerning decision making in project management. This study shows that effectual strategy can be seen as a valuable theoretical framework for project management in companies facing advanced market structures. While Brettel et al. (2012) demonstrated the value of effectual behavior in innovative R&D projects, we discuss effectual decision-making in the project management behavior of managers whose companies are located in an environment showing typical signs of maturity. In view of the fact, that Sarasvathy, Dew, Read, and Wiltbank (2008) described effectuation as an "internally consistent set of ideas that forms a clear basis for

action upon the world" (p. 345), the concept of effectuation can amplify approaches in project management. Specifically this view differentiates the effectuation approach from the current project management literature, which often follows causal strategy.

2.5 Conclusion

Driven by the statement by Busenitz and Barney in 1997 who pinpointed the use of heuristics in strategic decision-making as being advantageous for start-ups, and hazardous for businesses as the companies mature, we asked for challenges and chances when applying effectuation in a mature company context. Our theoretical investigation successfully links Sarasvathys' (2001) approach of effectual and causal decision-making with a mature market context and emphasizes three outcome-levels. We therefore discuss employee's autonomy on the people's level, product variety on the product level, and finally inventions/innovations on the innovation-level. With that, the chapter shows that effectual decision-making can be seen as an interesting theoretical framework for project management in companies, even when they face advanced market structures.

After having built a bridge between the effectual/- and causal decision-making approach and the corporate project management world, the next part of the dissertation goes further into understanding these concepts empirically. We thus analyze to what extent managers apply effectual- /or causal decision-making heuristics that originally comes from the venture building area in entrepreneurship research. Doing this, we discuss a context factor that might influence how managers think, decide, and act. Central to our investigation is complexity. Literature shows that complexity can be objectively measured, i.e., number of team members, number of time zones, number of tasks, and topics in a

project context. Moreover, it is perceived subjectively and therefore individuals could classify the same situation as high or low in complexity. The next part discusses how complexity is linked to managers' decision-making strategy and performance outcomes.

Part 3

EMPIRICAL INVESTIGATION I

The Moderating Effect of Complexity on Causal and Effectual Heuristics and Outcome

3.1 Introduction

The entrepreneurship literature on effectual and causal decision-making (Sarasvathy, 2001) provides a promising framework to expand our understanding of decision-making strategy. Effectual decision-making has been observed in the behavior of entrepreneurs who have reached an expert level in building new ventures (Sarasvathy, 2001). However, the boundary conditions under which effectual logic operates have not been explored theoretically or empirically, leaving an important gap for researchers and practitioners who seek to understand whether effectuation functions once those successful startups grow into larger corporations.

This paper deepens our understanding of effectual processes and behaviors by introducing the concept of complexity. Complexity is an important conceptual complement to the setting of uncertainty where effectuation is often studied, because while uncertainty provides a characteristic of the external environment, complexity describes more internal features of the project and/or organization (Richard, 1992). With various interacting systems, organizations are extremely complex (Daft & Lewin, 1990) and its behavior is hard to predict due to nonlinearity (Casti, 1994). Here, manipulation of certain elements might influence the whole system. In their study, Garret and Holland (2015) approach the context of corporate entrepreneurs through the definition of turbulent systems, which are

described as being uncertain, i.e., highly irregular, and complex for containing "many different elements that interact with each other in unpredictable ways" (p. 372). Thus, the characteristics of complex systems seem to mirror the environment where effectual decision-making has been observed originally. With developing a conceptual understanding of how uncertainty and complexity interact, we contribute to the current body of knowledge. With this paper, we construct the theoretical connections between the combination of uncertainty and complexity and decision-making heuristics of effectuation and causation. Finally, we test the expectations we develop from our conceptual model using a large sample of projects in the corporate setting, serving to expand our understanding of effectuation in a novel context. With that, we initiate the discussion of boundary conditions for effectuation and causation.

3.2 Theoretical Background

3.2.1 Decision-Making

As long as humans exist, they are making decisions. In this paper, we are interested in the cognitive part of decision-making that focuses on decision-making as a process. Here, the decision-maker interacts with its surrounding, as mentioned by Simon (1955). Accordingly, the environment plays an important part in the decision-making process. Davidson and Bar-Yam (2006) showed that environmental complexity influences cognitive function. "Much of the decision making in the real world takes place in an environment in which the goals, the constraints and the consequences of possible actions are not known precisely" (Bellmann & Zadeh, 1970, p. 141).

The special thing with fuzzy, complex tasks and settings is that prediction and planning does not work well (Knight, 1921). Too murky are the goals, consequences of actions, and players involved (March, 1982). Here, effectual decision-making that builds on control instead of prediction might be valuable. The entrepreneurship literature found effectuation and causation as two strategic decision-making approaches that can be used to describe the continuum between non-predictive decision-making and prediction-based decision-making. Both are used in various contexts, depending on what kind of action a project or situation needs, or what preference someone has. Decision makers utilize both approaches and rarely distinguishe when they jump between the two (Sarasvathy, 2008). They are looking for the most effective tool for the context or situation.

3.2.2 Decision-Making Context

For decades, researchers try to describe and understand complexity, because of its influence it has on decision-making when working in teams and doing business. In 2011, Geraldi, Maylor, and Williams offered a comprehensive review of the complexity literature and found different classifications of complexity, whereby the latest articles at the core have five complexities, namely socio-political, pace, dynamic, uncertainty, and structural complexity. Müller et al. (2012) put these elements of complexity together in the patterns of complexity. In our study, we build on Müllers et al., (2012) approach, as their three dimensions successfully mirror the fuzzy context decision-makers are often situated in.

The first dimension complexity of face includes situations of high uncertainty. Here, tasks are not solvable through known procedures or approaches. Means–ends connections are unknown and one does not have enough information to decide on adequate options

(Campbell, 1988). The second dimension complexity of fact refers to structural complexity, and therefore describes a bunch of strongly dependent information. Sources of information and their interdependencies remain unknown, which makes the definition of tasks and subtasks even harder (March & Simon, 1958). The third dimension complexity of interaction includes interfaces between humans and locations. Here, several ideas might lead up to conflicts resembling Campbell's (1988) uncertain links and conflicts. These patterns consider most of the characteristics of complexity published so far and offer a multidimensional framework of complexity for our study (Simon, 1962; Williams, 2002).

With lots of uncertainty in entrepreneurial settings, entrepreneurship research offers great insights into the elements of complexity that worries people in larger organizations across the world (Alvarez & Barney, 2005; McMullen & Shepherd, 2006; Packard, Clark, & Klein, 2014; Zahra & Dess, 2001). Effectuation has mostly been researched as a heuristic in contexts where goals are unclear (March, 1982) and isotropy is high, while knightian uncertainty (Knight, 1921) makes outcome prediction impossible (Sarasvathy, 2008). Such spheres of activity often come with high dynamic settings, where uncertainty also originates from the players on the court. Here, goal setting is a different story. Attractive outcomes and goals are hard to define. Even if a decision-maker sets a goal that is desirable, the changing environment can switch it immediately into an unattractive one (March, 1994). Fast changing and highly dynamic contexts require flexible goals that can be adapted to be of value over time. Isotropy mostly comes from "confusion inherent in the information available" (Sarasvathy, 2008, p. 69). Decision-makers face a bunch of possibilities and miss clear criteria that helps to decide which information is worth paying attention to (Fodor, 1983) and which action to choose (Sarasvathy, 2008). Weick (1979) argues, isotropy in the

environment also arises from human action. Little is known about drivers and motivators of the actors on the court, and decisions can be either rational or irrational, wherefore possible actions are merely foreseeable (Crawford & Kreiser, 2015). Since the publication of Knight's (1921) book "Risk, Uncertainty, and Profit," a certain type of uncertainty has gained currency. Called "true uncertainty" or "Knightian uncertainty," this type of uncertainty is characterized by absolutely no chance of prediction.

These are characteristics of the effectual problem space that merge into the approach of the patterns of complexity which will be described in detail later in that paper. Unknown means-ends connections, like in complexity of face, leads to situations that let decision-makers struggle with goal definition. Actors do not have enough information to decide on adequate options, what makes the characterization of tasks and subtasks even harder. Highly divers' information, various people involved, uncertain links, sources of information and unknown interdependencies challenge decision-makers that struggle with complexity of fact. Here, the actors are challenged by isotropy – they do not know, which information is relevant and which is not.

Furthermore, the patterns of complexity add elements typical for decision-makers in business context, such as interfaces between actors and locations, and therefore complement the description of the decision-making context. While uncertainty is perceived individually—"different individuals […] experience different doubts in identical situations" (Lipshitz & Strauss, 1997, p. 150), complexity too is perceived individually (Jaafari, 2003; Tversky & Kahneman, 1981). This approach has its roots in psychology (Duncan, Featherman & Duncan, 1972; Smithson, 1999). Consequently, actors' reactions

to and judgments of action depend on the individually perceived complexity, and therefore influence their decision-making approach.

3.3 Decision-Making and Complexity

The strategies of effectual and causal decision-making described in the theory section are "integral parts of human reasoning" (Sarasvathy, 2008, p. 75) and can be applicable to decision-making settings at different points in time. Actually, the decision maker applies that approach that helps him to get the best outcome of a situation. Accordingly, both approaches, prediction based and control based decision-making, are used to achieve different goals. As particularized in the following, causal decision-making strategy is designed to choose, and therefore is successfully applied in contexts where "the future is predictable, goals are clear and the environment is independent of our action" (Sarasvathy, 2008, 73). Here, processes are straightforward and decision-makers can work on reaching success measures efficiently (Doran, 1981). Effectual decision-making strategy is designed to develop "effects" (Sarasvathy, 2001), such as increasing stakeholder networks or resources in contexts where prediction is not promising. Other than causal decision-making, effectual decision-making is an approach of design. Here, the environment is mainly created through human action, like in stakeholder networks.

Decisions in business contexts often go hand in hand with the intention to reach certain goals, like finding a solution for a problem or bringing a product to market (Kotler, P. & Levy, 1969). However, sometimes company settings lack the requirements of clear goals and therefore need an enhancement of the definition of success (Burgelman, 1991). We expected our decision-makers to face such challenges too. Consequently, we gathered

information about the extent of experiences and competency outcomes, a variable Brettel et al. (2012) already applied in their study. For Kerzner (2002), continuous learning is one of the central elements in project management maturity. Furthermore, the measure of experiences and competency outcomes is highly relevant for companies that rely on strategy embodying innovative thinking and collaboration (Ragatz, Handfield, & Scannell, 1997). Therefore, we establish experience and competency outcomes as so called "soft success measures" that implies learning and expertise enhancement, generation of new ideas, and widening of competencies and capabilities (Brettel, Mauer, Engelen, & Küpper, 2012). Success and competitive strength in today's companies are instantly influenced by individuals (Lechler, 1998), who think, decide, and act whole heartedly, based on a considerable treasure of experience (Sarasvathy, 2008). Cooke-Davis (2002) maintained, "it is the people who ultimately determine the adequacy" (p. 189) of project outcomes. Consequently, the broadening of experience and competency of the decision-maker is a relevant variable for companies, especially to endure entrepreneurial in the long run (Ketchen, Ireland & Snow, 2007).

Managers who apply effectual decision-making strategy work with resources that are available, and co-create project outcomes with partners and stakeholders, what has been found to be valuable in dynamic projects (Ring & Van de Ven, 1994). They integrate unexpected changes, and thus leverage contingencies (Sarasvathy, 2001). They focus on what is doable and do not trust predictions and plans. Following the effectual decision-making strategy, managers need to have an eye on what comes up along the road, talk with everyone who might become a potential stakeholder, or take part in the project idea (Sarasvathy & Dew, 2005). Lots of questions, talks, and negotiations in iterative cycles

(Wiltbank, Dew, Read, & Sarasvathy, 2006) help managers to experience diverse situations and therefore gain comprehensive competence.

H1a: Managers are more likely to use effectual than causal decision-making when they aim for soft success measures.

As mentioned in the theory section, causal decision-making strategy is the basic concept of most strategic tools and techniques that are traditionally used in corporate settings. Therefore, managers who apply causal decision-making draw on well-known, inhabited techniques and decision-making patterns. They focus on the accomplishment of each step determined by carefully selected tools or techniques (Besner & Hobbs, 2012). Unexpected influences are impeded through risk management and environmental observations (Sarasvathy, 2001). However, once managers have reached a specific level of competence and practical experience, the boundaries of most tools and techniques do not leave much room to gain further incremental, wide-ranging experiences and competencies. Therefore, we propose the following:

H1b: Causal decision-making strategy has less impact on soft success measures than effectual decision-making.

Large organizations often focus on tools and techniques needed to handle a task or reach a specific development phase, for example within a project (Covin & Slevin, 1991). Most of these are causal approaches that build on prognoses and forecasts, have a detailed agenda and clear targets (Porter, 1980). The instruments work well to reach an outcome in a timely manner or satisfy stakeholder expectations. This link between planning and success is widely recognized in the literature (Ansoff, 1980; Schendel & Hofer, 1979). Following

causal decision-making strategy, success implies reaching a predefined goal in terms of time, cost, and quality (Collins & Baccarini, 2004). Therefore, we suppose the following:

H2a: Managers are more likely using causal than effectual decision-making when they aim for hard success measures.

Effectual decision-making strategy is useful where goals are nebulous and project achievements unclear (Sarasvathy, 2001). The effectual process is not designed to fit traditionally applied hard success measures like goal achievement or customer satisfaction. When managers apply effectual decision-making strategy to different corporate entrepreneurship settings, goals and outcomes emerge throughout the effectual process. They are negotiated by stakeholders and team members, and finally grow through stakeholder perceptions, resources, and expectations (Sarasvathy & Dew, 2005). Goals are developed, altered, and manifested in iterative cycles throughout the dynamic process (Wiltbank et al., 2006). This example indicates that effectual strategy does not help to achieve preset goals. Building on this, we assume the following:

H2b: Effectual decision-making strategy has less impact on hard success measures than causal decision-making.

Furthermore, we anticipate that managers discern complexity, because some projects evolve, grow rapidly, or change unexpectedly. In this case, complexity perception might influence the relationship between managers' decision-making strategy and success outcomes. Therefore, we expect complexity to function as a moderator (Wood, Mento, & Locke, 1987). Building on the theory that shows the contradiction of effectual decision-making strategy and goal-centered success measures (Sarasvathy, 2001) we focus on the potential connection of effectual decision-making strategy with soft success measures and

assume it to be moderated by complexity. In this case, complexity can either intensify the relationship, because effectual decision-making in its characteristics seems quite optimal to gain soft success factors, or diminish its connection. The latter is substantiated through the organization context. Here we hypotheses the following:

H3a: Complexity positively moderates the relationship between effectual decision-making and soft success measures.

H3b: Complexity negatively moderates the relationship between effectual decision-making and hard success measures.

Furthermore, we expect a moderating effect of complexity on the relation of causal decision-making strategy on hard success measures.

H4a: Complexity positively moderates the relationship between causal decision-making and hard success measures.

H4b: Complexity negatively moderates the relationship between causal decision-making and soft success measures.

The research model is provided in figure 7.

Figure 7: Research Model - Moderating Effect of Complexity on Heuristics and Outcome
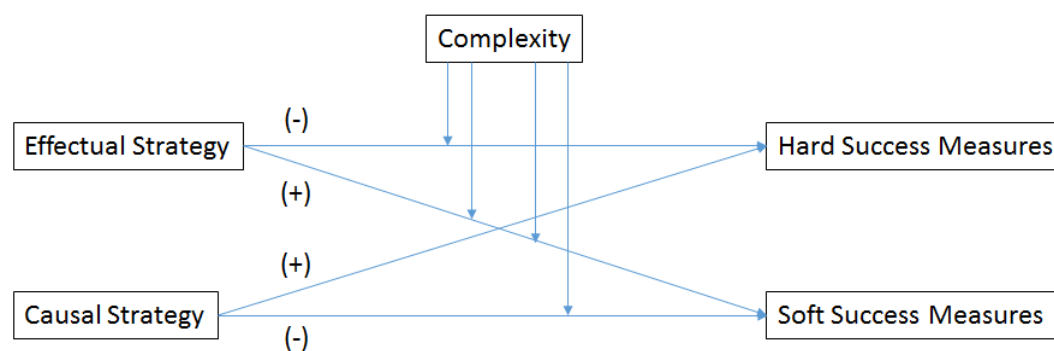
3.4 Setting, Measures and Method

3.4.1 Complex Project Strategy Setting

Managers face typical entrepreneurial situations when they cross undeveloped waters in strategic decision-making (Kapsali, 2013). Thus, project work is often marked by complexity determined by the uniqueness of the project, the amount of information that has to be processed, or the interdependency of technology, people, and organizations (Geraldi, Maylor, & Williams, 2011). In a project context, people interact and work with resources to ensure project benefits within a specific period. Some projects are routine: They have clear goals, are short with respect to their turnaround time, and can be run in stable settings and environments. According to Casson & Wadeson (2007), others miss well-defined project goals. Here, project requirements change constantly and causal techniques have to struggle with high dynamic and complex project settings. Therefore, additional decision-making strategies are needed to achieve project objectives (Shenhar & Dvir, 2007). Entrepreneurial strategies, such as effectual decision-making, work well in dynamic startup settings, since they do not attempt to predict but centralize the controllable aspects in a project context, such as accessible resources and networks (Sarasvathy, 2001). In a nutshell, this approach takes advantage of the unexpected, which is why the context of complex project strategies is eminently suited for testing our hypotheses.

3.4.2 Complexity Measure

For measuring complexity, we apply the approach of complexity of projects. It has the advantage of measuring complexity as it is perceived by managers in practice (Geraldi & Albrecht, 2007; Jaafari, 2003; Maylor et al., 2008; Shenar & Dvir, 2007; Williams,

2005). In the following, we explain the pattern of complexity in project settings and address our measurement.

Patterns of Complexity in Project Contexts

Complexity of faith accrues when problems need to be solved, or solutions have to be found. This type of complexity applies to projects such as R&D, whereby the term "faith represents the extreme situation characterizing this type of complexity" (Geraldi & Albrecht, 2007, p. 35). The high uncertainty refers to the Knightian uncertainty that "consists of a future that is not only unknown, but also unknowable—with unclassifiable instances and a non-existent distribution" (Sarasvathy, Dew, & Velamuri, 2002, p. 6). Managers face such situations when they are exposed to unforeseeable events (e.g., environmental changes), or face environmental reactions (e.g., through customers) they are unable to predict. Complexity of fact is a well-known concept in production, procurement, and logistic projects (Geraldi & Albrecht, 2007). Since it contains a high amount of information, it cannot be observed in minute detail. This type of complexity consists of goal ambiguity (March, 1982) and isotropy (Fodor, 1983). There is no way to tell in advance which goal will be valuable and worthwhile, and it is even harder to classify information into categories like valuable, useful, or irrelevant—"actors cannot know what to attend to and what to ignore" (Fodor, 1983, cited by Sarasvathy, 2008, p. 70). In some cases, best practice, even including tools and techniques, can help to reduce this type of complexity. However, both may also result in errors, thereby adding to irritation and isotropy. Complexity of interaction arises between project members like partners, clients, the organizational structure of companies, or actors from the environment. Therefore, it can

emerge within a project team or in different business areas (Geraldi & Albrecht, 2007). In order to get an objective picture of the complexity of projects in our study, we enquired about the number of project members, languages, time zones, budget size, and the time horizon for project execution.

The pattern of complexity offers a holistic view that "is built up on an interrelated and dynamic set of characteristics of complexity" (Geraldi & Albrecht, 2007, p. 33). It gives a precise description of the complexity managers face (Geraldi, Maylor, & Williams, 2011) and "in itself has the potential to be a good indicator […] of complexity in a project" (Geraldi & Albrecht, 2007, p. 42). As a broad construct, complexity is perceived individually and in a situation-dependent manner (Jaafari, 2003), whereas we consider this perceived complexity in this study.

Scale for Complexity

For measuring project complexity, we used the concept of the pattern of complexity, originally developed by Geraldi and Albrecht (2007), comprising 12 questions validated in 47 interviews with six plant engineering companies (Geraldi, 2006; Geraldi and Albrecht, 2007). We used a five-point Likert scale ranging from "very low" to "very high" to operationalize complexity. For this study, we deployed complexity as one construct and integrated all three dimensions. Explanatory factor analyses showed all 12 items loading high on the first factor explaining 50 percent variance. Using a Cronbach's Alpha of 0.68, we documented a moderate degree of consistency between the patterns of complexity.

3.4.3 Causation and Effectuation Measure

To provide a good idea of how effectual and causal decision-making work in the context of project strategy, we walk the reader through the principles following the effectual and causal process (c.f. figure 1).

Effectual Decision-Making Strategy in Project Contexts

In the effectual process, the starting point is the accessible means. The project team following effectual decision-making strategy works with all resources at their disposal, including skills, competencies, and contacts as well as social networks. There is no clear sense of which resources will be more valuable than others to the ultimate project outcome. "Effectual logic seeks to […] explicitly assum[e] any and all means at hand—irrespective of whether they turn out to be valuable ex post or not—as possible inputs into the process" (Read, Song, & Smith, 2009a p. 13). Effectual strategy involves preferential self-selected team members in the project. The members each bring means and ideas, while also committing to the already existing considerations. With regard to the self-commitment aspect, the resource value partly comes from the financial and psychological ownership that increases during the co-creation processes of all the stakeholders in the project (Read, Dew, Sarasvathy, Song, & Wiltbank, 2009b). The project output, therefore, arises from the interaction between the individuals and the team members (Sarasvathy, 2001).

Commitments of the project team members following effectual strategy are based on the affordable loss principle—how much they are willing to put at risk and "what they are willing to lose in order to follow a particular" (Dew, Read, Sarasvathy, and Wiltbank, 2009, p. 110) project goal. At the same time, they prefer the cheapest alternative to realize small

successes and face only small failures when they are unsuccessful (Read et al., 2009a). This course of action is helpful at all levels, namely the individual, project, and firm levels (Dew et al., 2009b). Davidsson (2005) puts it as follows: "It is more important to limit the damage if unsuccessful than to get the highest possible return if successful" (p. 12).

Effectual strategy builds on strategic alliances and asks: "With whom do I have to ally, in order to be able to take the [...] [project] one step further?" (Davidsson, 2005, p. 12). To answer this question, effectual strategy involves social networking, forming partnerships, and obtaining commitments from potential customers or suppliers. At the end of the effectual process, the project team may have the structure of a quilt, as Sarasvathy (2001) describes it. All commitments advance the cycle of resource transformation and converge the cycle toward constraints on project outcomes, as can be seen in figure 1.

Throughout the process, effectual strategy is "sensitive to what comes up along the road, and prepare[s] to turn these contingencies into business strengths" (Davidsson, 2005, p. 12). Sarasvathy (2008) describes this form of leveraging contingencies with the proverbial phrase "When life gives you lemons, make lemonade" (Ucbasaran, 2008, p. 226).

Causal Decision-Making Strategy in Project Contexts

The starting points of a project typically involve project goals. Following the strategy of "Management by Objectives," which is applicable for achieving goals with teams in larger organizations, goals should ideally be specific, measurable, assignable, realistic, and time-dependent (Doran, 1981). Goals lay out the basis for first steps in research and analyses. Market research and competitor analyses are central aspects of most project processes

(Deshpande & Zaltman, 1982). Even the acquisition of resources that are considered relevant is based on those goals.

In the following steps of causal strategy, project managers determine the project investment, which is oriented to the expected project return (De Meza & Webb, 1987). Thus, projects that promise high profits are well financed, quite in contrast to projects that promise fewer profits. Basically, the project should reach the expected return.

Causal strategy involves managers having a clear vision of which resources are needed to reach the project goal efficiently and on time. Therefore, managers advertise vacancies with clear descriptions of skills and professional abilities. Sarasvathy (2001) describes this search of partners as looking for pieces that complete the picture of a jigsaw puzzle.

The attitude toward outsiders is characterized by a view of competition. Therefore, protection of ideas is important, as the project team needs to position itself within a competitive environment. Forecasts, planning, and focus on project goals help to avoid contingencies. Causal strategy involves risk management, whereby the dimensions are often dependent on the investment and expected project return. Therefore, these projects necessitate significant investment of time and money in market and competitor analyses (Sarasvathy, 2001).

Scale for Effectual and Causal Decision-Making

We measured strategy by using the effectuation/causation scale originally developed by Brettel et al. (2012). Though Brettel et al. (2012) analyzed the strategy behavior of R&D projects, some of the questions had to be adjusted so that they fit a more general project

context. The scale was characterized by forced-choice items, indicating the degree of difference between effectual and causal project strategy (Bradley, Wiklund, & Shepherd, 2010). An example of an item could be: New project findings influenced the project target vs. new project findings did not influence the project target. We validated the scale and finally integrated all 23 items (Cronbach's Alpha of 0.74).

3.4.4 Dependent Variables

Hard Project Success Factors: General project success was measured using the model of Müller and Turner (2006) which consists of nine success dimensions. The operationalization was done using a five-point Likert scale ranging from "very low" to "very high." In order to get the dependent variable of project success, we took the mean of all dimensions and finally integrated nine items into an unweighted additive score. Using a Cronbach's Alpha of 0.78, we documented a high degree of internal consistency.

Soft Project Success Factors: The extent of managers' experiences and competencies was measured using a scale validated by Brettel et al. (2012). The items asked if the project met its expectations in terms of the (1) learning and expertise that can be leveraged in other projects, (2) generation of new ideas as a starting point of potential future projects, and (3) enhancement of competencies and capabilities. We integrated the three items with Cronbach's Alpha of 0.68.

3.4.5 Control Variables: Project Variables, Job Tenure, and Professional Experience

We controlled for potentially confounding factors that did not have any direct theoretical importance. Therefore, we collected information about job tenure and professional experience. Moreover, at the project level we included variables that might

affect the managers' decision-making strategy, such as team size, the number of time zones, and project duration. These measures were also used to verify the results of perceived complexity. Here, none of the variables became significant in the analyses, thus adding no explanatory power. We also controlled for project type. Even here, we could not find any significant influence, which is why we decided not to include this control in our final analyses. Moreover, we gathered secondary data such as branch or size (turnover in million USD).

3.4.6 Sample

Our sample was drawn from the "Factiva" database that offers global data from companies across the world. We took a sample of almost 400 public companies in over 42 countries. The companies each have a turnover of USD 50 million, have more than 500 employees, are on average 45 years old, and belong to different sectors like manufacturing, trade, and service activities. The survey addressed business owners, first- and second-level management (in sum 43.7 percent), as well as middle management (56.3 percent). With regard to the levels of management, the gender distribution with 70.8 percent males and 29.3 percent females can be considered good. All managers who could be interviewed in our study were on average 40 years old, had 14 years of professional experience, and on average worked for nine years in that company.

3.4.7 Procedure

We constructed an online survey based on our theory and carefully selected scales. The questions were ordered in a pleasing manner, starting with easy and interesting questions that try to reflect the purpose of the questionnaire (Dillman, Smyth, & Christan, 2009).

Sensitive questions were set at the end of the questionnaire. The survey was structured in different parts geared to each other. The interview-administered mode of data collection allowed us to ask the questions within a specific part in random order. We provided a pre-notice letter and information brochure to give information about the study background and the usage of the survey results (Groves, Cialdini, & Couper, 1992).

3.5 Results

In order to test the hypothesized model, we examined linear relationships between decision-making strategy and project outcome, moderated by complexity. The methodical implementation was realized with regression analysis using SPSS Statistics.

Table 2: Descriptive Data on Decision-Making Strategy

		Causal strategy	Effectual strategy
N	valid	396	396
	missing	4	4
Median		3,43	2,78
Standard deviation		0.51	0.69
Variance		0.26	0.47
Minimum		2	1
Maximum		5	4

In the first step, we checked the descriptive results of our study. Out of about 400 participants, 396 answered the questions concerning decision-making strategy in our survey (see table 2). They used the whole latitude of the scale (causal strategy: min. 2, max.

5; effectual strategy: min. 1, max. 4)[1]. Median and standard deviations were slightly different: causal strategy (median 3.43; standard deviation 0.51) and effectual strategy (median 2.78; standard deviation 0.69). In our model, we assumed that managers apply both decision-making approaches situation dependent. The descriptive results underline that proposition and show that managers use both decision-making strategies in equal shares. The correlations are shown in table 3.

Table 3: Correlations between Constructs and Descriptive Statistics

	1	2	3	4	5
1. Effectual strategy					
2. Causal strategy	-0.72**				
3. Project complexity	-0.17**	0.18**			
4. Project success	-0.25**	0.29**	0.43**		
5. Experiences and competencies	0.12*	-0.17**	-0.24**	-0.29**	
Statistics					
Mean	2,64	3,43	3,30	3,85	1,92
Standard deviation	0.69	0.51	0.51	0.54	0.72

n = 396
*Correlations are significant at alpha = 0.1
**Correlations are significant at alpha = 0.05

To test the relationship between effectual and causal decision-making strategy in terms of project success, we used hierarchical regression analysis, by entering control variables in Model 1, independent variables in Models 2 and 3, and interactions in Model 4, and

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[1] We initially analyzed decision-making strategy in a single model but then separated effectual and causal measures to manage the covariance between the two independent variables.

tracing the change in the multiple squared correlation coefficient.[2] We included team size, the number of time zones, and project duration as control variables at the project level, and job tenure as well as professional experience at the individual level. The results are summarized in table 4.

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[2] We conducted Haman's single factor test and partial correlation procedure to control for common method bias in the analyses. The results indicate no difficulty through common method bias in the model (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Table 4: Results of Hierarchical Regression Analysis: Effects of Strategy and Complexity

| Variable | Project success | | | | | | | | Experiences and competencies | | | | | | | |
| | Effectual strategy | | | | Causal strategy | | | | Effectual strategy | | | | Causal strategy | | | |
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CV_PD1_team size	0.17**	0.17**	0.16**	0.16***	0.16**	0.17***	0.15***	0.16***	0.09*	0.09*	0.1*	0.09**	0.09*	.073	0.08	.081
CV_PD2_time zones	-0.12**	-0.12**	-0.13**	-0.12**	0.1**	-0.1**	-0.12**	-0.11**	-0.01	-0.01	0.00	-0.01	-0.01	-.021	-0.01	-.017
CV_PD3_project durat.	0.09	0.09*	0.01	0.02	0.09*	0.07	-0.01	0.00	-0.21***	-0.20***	-0.16*	-0.16**	-0.21***	-0.19***	-0.15**	-0.16**
CV_PM1_job tenure	-0.08	-0.07	-0.02	-0.03	-0.07	-0.04	0.01	-0.01	0.00	-0.01	-0.04	-0.03	0.00	.026	0.00	.003
CV_PM2_prof. exp.	0.10	0.08	0.06	0.06	0.10	0.07	0.06	0.05	0.04	0.05	0.06	0.05	0.04	.038	0.05	.050
Causal strategy						0.26***	0.2***	0.17***						-0.13**	-0.10*	-.070
Effectual strategy		-0.24***	-0.17***	-0.15**						0.12**	0.09*	0.08*				
Complexity			0.39***	0.37***			0.37***	0.34***			-0.21***	-0.19***			-0.20***	-0.17**
Causal strat. X compl.								0.14**								-0.10*
Effectual strat. X compl.				-0.11**								0.07				
R²	0.07***	0.12***	0.26***	0.27***	0.07***	0.13***	0.27***	0.26***	0.04***	0.05***	0.09***	0.1***	0.04**	0.06**	0.09***	0.10***
ΔR²			0.14	0.01		0.06	0.14	-0.01		0.01	0.03	0.01		0.02	0.03	0.01
ΔF	4.48***	7.37***	16.19***	14.09***	4.48***	7.96***	16.61***	17.52***	2.77**	3.02**	4.64***	5.32***	2.77**	3.29**	4.8***	4.65***

n = 396

p<0.1*; p< 0.05 **; p< 0.001***

The results show that managers are more likely using effectual decision-making when they aim for soft success factors (b=0.12, p<0.05). Causal decision-making therefore, has less impact on soft success measures in the project than effectual decision-making (b=-0.20, p<0.001). Hence, both H1a and H1b can be supported. Furthermore, the results in table 4 (Model 2) show that managers are more likely using causal decision-making when they aim for reaching hard success measures (b=0.26, p<0.001). Effectual decision-making strategy and hard success measures are negative related. Thus, H2a and H2b can be supported.

Finally, we tested the moderated regression analyses of (1) complexity and effectual decision-making strategy for soft project success measures, and (2) complexity and causal decision-making strategy for hard project success measures. The results, as in table 4 (Model 3), show that when we add complexity to the model of effectual decision-making strategy, and soft success measures the explained variance increases from 0.05 to 0.09 (p<0.001). Here, complexity has a negative effect (b=-0.21, p<0.001) in the model. When managers perceive lower complexity, effectual strategy leads to a sharper increase in soft success measures. Rising complexity seems to mitigate this effect. The interaction effect of effectual decision-making strategy and project complexity is not significant, and its implementation does not explain much additional variance. By implication, complexity does not moderate the connection between effectual decision-making strategy and success in the project.

In the model with causal strategy and project success, the implementation of complexity leads to a change in the multiple squared correlation coefficient from about 0.14 (p<0.001).

The result of the moderated regression analyses indicates a significant direct effect between complexity and causal strategy with project success as dependent variable (Table 4, causal strategy, project success, Model 4). Consequently, H3, where we proposed that complexity moderates the relationship between heuristic and outcome, can only be supported for causal strategy and project success.

3.6 Discussion

As stated throughout, the objective of this study was to understand whether effectuation, used by expert entrepreneurs, functions once successful startups grow into larger corporations. We used the underlying mechanisms of effectuation and causation to explain how decision-makers in company contexts apply strategic decision-making when they master projects under complexity. Our findings indicate a connection between managers' strategy and complexity. With higher complexity, i.e., goal ambiguity, isotropy, and uncertainty, managers tend to apply more causal decision-making strategy. This result is surprising, as research has shown that expert entrepreneurs apply effectual decision-making particularly in contexts of high uncertainty (Read et al., 2009b). However, companies postulate and train the use of causal tools and techniques (Frame, 2002). As a result, causal tools have a high reputation in large companies (Staw & Epstein, 2000), they might urge managers to apply causal strategy, even when higher uncertainty arises.

We could affirm our hypotheses on decision-making and success. Causal decision-making strategy helps to reach success factors that are goal focused, while effectual decision-making works for reaching soft success measures. The positive relationship between effectual strategy and soft success measures, like the extent of managers' experiences and competencies, lies at the core of the effectual approach (Sarasvathy, 2001).

The development of human resources, such as employee experiences, skills, and capacities, is of high relevance for companies with a long-term vision and for sustainable entrepreneurship (Wright, Dunford, & Snell, 2001).

Surprisingly, there is a non-significant interaction effect of complexity and effectual decision-making strategy on soft success measures. The model shows, when managers apply effectual decision-making strategy, complexity has a negative effect on learning, grows of experience, and enhancement of skills. An attempted explanation comes from research on (workplace) psychology that shows managers with self-confidence and psychological resilience find it easier to apply their skills and competencies (Lester, Garofalo, & Kroll, 1989). Applying one's skills and competencies is the starting point in the dynamic effectuation process, and therefore deeply inherent in the effectual decision-making approach (Sarasvathy, 2001). Perceived complexity may lead to higher stress and a decrease in that capacity, thus reducing the use of effectual decision-making strategy. Accordingly, managers who perceive lower complexity gather more experiences and competency outcomes than those who perceive higher complexity. At this point, future research is highly recommended. Little is known about the effects and impact perceived complexity has on stress levels and consequently on human cognition and decision-making.

Even, the result of the moderated regression with causal strategy and project success is surprising and needs further consideration. Here, success is positively correlated with project complexity and causal decision-making. An explanation of this could be that managers who perceive higher complexity tend to focus more on their preset goals, which causes them to act according to schedule. As mentioned, tools and techniques impact a company with high reputation; these tools are causal most of the time. With higher

complexity, decision-makers focus more intensively on their pre-set goals. Projects that are carried out in clearly structured contexts may not attract the same intensity and consequently lose managers' focus. Moreover, the latter offers a broader perspective, which may encourage decision-makers to adapt goals, if necessary.

3.7 Contributions

By introducing complexity into the conversation around effectuation, we first enable a dramatic expansion of the contexts in which effectuation has been considered and thus our understanding of the concept. We empirically adopt the model of Brettel et al. (2012) to show that effectual and causal decision-making strategies are well used in larger organizations where decision-makers commit to activities characterized by greater levels of complexity. Our concept of complexity is multidimensional and combines most of the characteristics of complexity (Müller et al., 2012). Thus, decision-makers do not only face elements known from the effectuation context, such as knightian uncertainty, goal ambiguity, and isotropy (Sarasvathy, 2008), but also dynamics that are characteristic of large company contexts, like interrelations between humans and business departments, which might be challenging (Anderson, 1999).

Furthermore, our paper adds some further insights and answers to questions raised in the field of effectuation research. For instance, Read et al. (2009b) analyzed elements of effectual and causal strategy in connection with venture building and performance. In that context, they called for performance consequences of applying one or the other decision-making strategy. At the project level, the present study can offer an answer to what is

valuable for different purposes in corporate entrepreneurship, and could inspire other researchers to adapt and replicate our work to get results at the company level.

Second, the specific set of hypotheses based on the underlying mechanisms of effectuation and causation help to explain why outcomes under complexity differ from outcomes under uncertainty. As described herein, the context of complexity in larger organizations is more comprehensive than the problem space expert entrepreneurs face when applying effectual decision-making. Nevertheless, decision-makers using effectual strategy grow in terms of experience and competency outcomes. Similar results were delivered by Brettel et al. (2012) who analyzed the strategy of R&D managers working under uncertainty. However, we gain different results for effectual strategy and success under typical startup uncertainty situations on the one hand, and complex project settings on the other. Read at al. (2009b) showed remarkable connections between effectuation and new venture performance. In our study, managers in large organizations, perceiving high complexity in project contexts, switched to causal decision-making to meet hard project success measures.

Third, we test our expectations using a large panel sample of projects in corporate contexts, bringing new data and findings to the effectuation, decision-making, corporate entrepreneurship, and strategy conversations. To reveal the secret of these types of companies that succeed in remaining entrepreneurial over decades, we take the context of project strategy and analyze managers' decision-making. These insights help to deepen our understanding of the utilization of effectual and causal decision-making in larger, matured companies, thereby making a substantial contribution to the research on effectuation and

decision-making. We thus enrich the corporate entrepreneurship and strategy discussion by illustrating how managers utilize effectual and causal decision-making strategy in project contexts, and show how complexity impacts managers' decision-making strategy. In conclusion, we offer effectual and causal decision-making as an action strategy for companies to remain innovative and entrepreneurial in order to create wealth in the long run (Ireland, Hitt, Camp, & Sexton, 2001).

3.8 Limitations and Future Research

This study is not without limitations. To begin with, our international sample of 400 managers is extremely diverse, e.g., with regard to the field of action and project type. We tried to control for that heterogeneity through a bunch of control variables. We finally included only those variables which had an impact on the research model. Nevertheless, a broadening of the sample would have provided scope for project differentiation, enriched results, and an increase in the predictive power of the model. Secondly, we captured project outcomes (dependent variables) and decision-making strategy (independent variables) in a project by a single informant, an approach that might cause bias. Even though we conducted Haman's single-factor test and partial correlation procedure to control for common method bias in the analyses (Podsakoff, et al., 2003), triangulating valuation objective performance measures at the project level could strengthen our results. Thirdly, the strong negative correlation between complexity and effectual strategy could be grounded in our sample that is limited to corporate managers.

Apart from these suggestions, future research should build on our study. Theory work could deepen the understanding of antecedents like context and personal factors, e.g., locus

of control or company, as well as cultural aspects that influence people's choice of strategy (Zheng, Yang, & McLean, 2010). Moreover, education and team dynamism (Priem, 1990) could actually influence strategy that calls for multi-level analyses, examining how different groups choose strategy, and how their choice might be biased both individually and depending on project types.

3.9 Conclusion

The findings of this study have practical implications as they contribute to the discussion on how decision-makers behave, if their companies mature, their decision-contexts become structured and more complex. Companies stay innovative, creative, and entrepreneurial if they act cautiously and apply effectual and causal decision-making strategy context dependent. Central to our study is the finding that managers across the world apply effectual mindset and decision-making even in corporate context, and that the use of effectual decision-making strategy is directly related to learning and expertise enhancement, generation of new ideas, and widening of competencies and capabilities. Complexity has a moderating function: the higher the perceived complexity, the more managers apply causal decision-making strategy. Lower perceived complexity leads managers to apply effectual decision-making strategy more frequently. Managers thus widen their experiences and competency outcomes, and foster the source of innovative thinking and wealth creation. In addition, the empirical insights provide surprising results such as the increase in project success under high complexity and causal strategy. The results discussed may inspire other researchers to further develop this line of research.

Part 4

EMPIRICAL INVESTIGATION II

Is Managers Strategy Culture Bound? International Differences in Strategy Choice

4.1 Introduction

4.1.1 What we know

Today's institutions need bodies that encourage managers to think, decide, and act entrepreneurially. Especially entrepreneurial decision-making to take action (Hayton, 2005; Monsen, Patzelt & Saxton, 2010) appears to constitute a promising framework for corporate entrepreneurship. Here, effectual decision-making (Sarasvathy, 2001) provides a unique opportunity to widen causal project organizations to make them more effective for today's challenges of being innovative and sustainable. However, the impact of cultural characteristics and differences (Hofstede, 2011) on managers' decision-making strategy has not been explored theoretically and empirically, leaving an important gap for researchers and practitioners who try to understand how companies foster innovative action.

4.1.2 What we don't know

Building on entrepreneurship and culture research, we assume international differences in strategy choice, as well as differences in cultural and regional contexts. Taking this into account and setting up an international view, we formulate the following questions: Is it

the case, that cultural characteristics and differences have an effect on managers' decision-making strategy? Is it possible to explain strategy choice by applying cultural dimensions by Hofstede (2011)? Providing an answer to these questions is pertinent to researchers who stand to gain a deeper understanding of the connection between decision-making strategy and culture for company contexts. This is particularly important, as current research explores the multifacetedness of entrepreneurial wealth creating behavior (Hitt, Ireland, Camp, & Sexton, 2001) but still lack answers at this crossroads.

4.1.3 Approach: Transfer Effectual and Causal Strategy to Project Contexts and Interpret Results in Light of Hofstede's Cultural Dimensions.

We incorporate theory from effectuation, corporate entrepreneurship, as well as cultural research and test our expectations using an international sample of 400 projects. We apply the scale by Brettel, Mauer, Engelen, & Küpper (2012), which differentiates between traditional planning-based, causal strategy and control-based, effectual strategy. For cultural differentiation in this study, we build on national income differences and distinguish between triad and non-triad countries, as this differentiation is typical for the economic context. The results are discussed and interpreted in light of Hofstede's cultural dimensions.

4.1.4 Why we should care

With our study, we make four contributions to the body of knowledge. First, we introduce culture into the conversation around effectuation and causation (Sarasvathy, 2001). This widens the horizon of effectuation research, thus helping researchers to better understand the concept. Second, we build on our theory and develop hypotheses that

connect characteristics inherent in each decision-making approach with three of Hofstede's (2011) cultural dimensions, namely power distance, uncertainty avoidance, and individualism. Third, we test our expectations using an international sample of projects, providing empirical data and insights into the discussion on decision-making, and culture. Finally, we discuss our results in the context of corporate entrepreneurship and shed light on chances and challenges this approach offers for decision-making in management.

The chapter is structured as follows: In the first part, we link entrepreneurial strategy to project management and describe how it is applied in this context. We then outline our regional and cultural differentiation by building on the most recognized approach in the literature on culture. In this context, we work out our hypotheses. The section on methods is reserved for testing our expectations. Afterwards, we discuss the results in relation to our theory. We finally conclude with our contribution, limitations of the study, and future research questions.

4.2 Theoretical Foundation and Hypotheses

4.2.1 Principles of Effectual Decision-Making for Company Contexts

Collaborative work and problem solving is valuable in most institutional contexts (Sundaramurthy & Lewis, 2003). Following Read, Dew, Sarasvathy, Song, & Wiltbank, (2009) who state that effectual decision-making is relational (Arndt, 1979; Macneil, 1980; Dwyer, Schurr, & Sejo, 1987; Morgan & Shelby, 1994), network-oriented (Achrol & Kotler, 1999), and co-creational (Jaworski & Kohli, 2006), it seems to embody the idea of seeking external input. Effectual strategy consists of four principles and a dynamic process. A summary of the four principles is described in table 1.

Effectual decision-making builds on the means that are accessible and "at hand". On the contrary, causal decision-making builds on goal definition as starting point for action. People who follow effectual decision-making work with all resources they have readily available, including their skills, competencies, and contacts as well as social networks. Through the networks, external competencies are implemented in the process from the very beginning. Consequently, the chances for co-created outcomes arise – often with effects an individual alone could have never intended. Thereby, the value of resources, first comes from the financial and psychological ownership, and second evolves throughout the effectual process (Read et al., 2009).

Commitments of the team members, following effectual decision-making strategy, are made according to the affordable loss principle – how much they are willing to put at risk and "what they are willing to lose in order to follow a particular" goal (Dew, Read, Sarasvathy, & Wiltbank, 2009, p. 110). Thereby, team members focus on the cheapest option to limit the damage if the project is not successful (Davidsson, 2005). Causal decision-making techniques, which are mostly applied in institutional projects, rely on prediction based risk management, which is dimensioned along the expected return of a project.

While causal decision-making builds on forecasts and planning, it goes hand in hand with high investment of time and funds for market and competitor analyses. Effectual decision-making, on the other hand, builds on partnerships and strategic alliances. Here, stakeholders come on board, and bring the project idea a step further (Davidsson, 2005). Thereby stakeholders get in from social networks, partnerships, potential customers, suppliers and even competitors. At the end of the process, the project team may have the

structure of a quilt, as Sarasvathy (2001) characterizes it. All stakeholders' commit to the project idea, therefore sharing responsibility, and expand resources. Simultaneously, converge perceptions on project outcomes as can be seen in figure 1.

Throughout the process, effectual decision-making is sensitive to surprises, good or bad, and incorporate these contingencies into the process (Davidsson, 2005). As known from "the well-known expression 'when life gives you lemons make lemonade'" (Ucbasaran, 2008, p. 226) the effectual project manager tries leverage contingencies as inputs into the process.

Causal strategy, on the contrary, attempts to identify and avoid contingencies, e.g., by elaborating market and competitor analyses. Overall, effectual decision-making combines the basic principles described here. It can be seen as "a cohesive pattern of managerial behavior" (Stevenson, 1983, p. 12) and therefore function as a decision-making approach that widens the traditional prediction-based view typical for causal strategy approaches.

4.2.2 Culture and Decision-Making Strategy

Years ago, researchers wondered if management decision-making approaches, of which a lot have been developed in the US, could be applied in other parts of the world (Cox, 2001; Harris & Moran, 1996; Hofstede 2001; Schneider & Barsoux, 2003; Trompenaars & Hampden-Turner, 2004). They found that there were regional differences, even remarkable variations in the meaning of the term "manager". Frederick W. Taylor, who wrote "*The Principles of Scientific Management*" in 1911, originally introduced management as a science. In the US, managers played a central role in group coordination and motivation, what is rooted in the society of immigrants. In Germany, there has never been this

heterogeneity. Workers have mostly been highly educated and experienced, so there has never been great need for managers (Hofstede, 1993). There is another picture in France, where social group systems are historically central, as well as in Holland, where consensus among all parties impinge on the role of the manager (Hofstede, 1993).

There are several dimensions researchers use to differentiate between cultures and context. Historically well-known are the cultural dimensions by Hofstede (1984, 1998, & 2011). In his last work, culture is subdivided into six dimensions, namely power distance, individualism-collectivism, uncertainty avoidance, masculinity-femininity, long-term/short-term orientation, and indulgence-restraint. Based on these dimensions, he comes to distinguish parts of the world from one another. In this study, we expect managers in different parts of the world to be influenced by their cultural background and the company with which they work.

Culture Differentiation along Clusters

When differentiating cultures, research often distinguishes between countries based on their national income. The most popular approach in economics is to differentiate between triad and non-triad countries. Triad is a cluster of countries, which account for over 50 percent of the world's gross domestic product (GDP), while only accounting for 8 percent of the world's population. The gross national income (GNI) of the triad countries is about 48 percent of the world's GNI. The triad countries typically include Canada, Mexico, and the US (NAFTA), the European Union, and the industrialized Eastern Asia. In our study, we included the NAFTA, 16 countries from the EU, and nine countries from Eastern Asia. On the other hand, we have 14 non-triad countries in our study. The final distribution is provided in table 5.

Table 5: Countries Integrated in the Study

NAFTA	Canada, Mexico, USA
European Union	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Luxembourg, Poland, Portugal, Slovenia, Spain, Sweden, Great Britain
Eastern Asia	China, Taiwan, Hong Kong, Japan, Vietnam, South Korea, Philippines, Malaysia, Indonesia
Others	Turkey, Switzerland, Sri Lanka, Russia, Pakistan, New Zealand, Norway, Peru, Macedonia, India, Brazil, Bahrain, Australia, Argentina

Triad countries are comparable in terms of their economic system, law environment, and political stability. Here, an economic and political history has helped to form a mainly stable political environment and law system. Companies located in non-triad countries often work in a context with less stable systems that implicates less predictability. Here, systems are less developed and companies have a higher chance of being challenged by external influences, like corruption. The differentiation based on national income fits the approach of Hofstede (2011) who mention significant differentiations between highly developed and less developed countries. For example, the Individualism Index score by Hofstede, Hofstede, & Minkov (2010) show high individualism in developed countries and high collectivism in less developed countries.

To reflect on and discuss the differences between managers' decision-making choice, this study builds on three of Hofstede's dimensions. We have chosen power distance, uncertainty avoidance, and individualism, because these dimensions are distinct in highly developed and less developed countries, and thus serves our research interests.

Cultural Dimensions by Hofstede

The first dimension, *power distance*, can be either high or low, based on national- and organizational culture. Power distance describes the unequal distribution of power between

individuals in an institution. In cultures with high power distance, power is a basic fact that antedates what is good or bad. Legitimacy in this context is almost irrelevant. Teams in such cultures are expected to be told what to do. On the contrary, cultures with low power distance link power strongly with legitimacy. Legitimacy in this context is subject to criteria of good and bad. Team members are invited to work autonomously and as partners on a specific problem or challenge. Other than in cultures with high power distance, they expect to be supported and consulted through team leaders and/or superiors (Hofstede, 2011). This attitude is suitable to an effectual decision-making approach that encourages team members and other stakeholders to contribute to the project idea and invite them to shape the process. Even partnership is more likely in a context of low power distance, which is a key element in the effectual decision-making approach. On the other hand, the causal decision-making strategy fits the culture of high power distance, as it needs team members who follow a specific goal and accomplish clear tasks. Based on this, we expect managers in cultures with low power distance to use effectual decision-making strategy more intensively.

H1a: Managers in cultures with low power distance apply effectual decision making more preferably than causal strategy.

H1b: Managers in cultures with high power distance apply causal strategy more preferably than effectual strategy.

The second dimension, *uncertainty avoidance*, can be either strong or weak. Uncertainty avoidance describes society's tolerance of ambiguous situations. In cultures with strong uncertainty avoidance, team members feel uncomfortable in unstructured situations (Hofstede, 2011). Therefore, they have a high need for control to structure situations and perform well. The effectual approach is one of control instead of prediction (Sarasvathy,

2001). However, control can be achieved causally and/or effectually depending on experiences, personal disposition, and situation. Managers who apply tools and methods that build on data and forecasts mainly make use of a causal decision making approach (Sarasvathy, 2001). Here, goals rely on (hopefully) solid information, investment decisions depend on the expected return, and risk management has to defend from unexpected influences that could affect the plan (Dew et al., 2009). Market research that provides extensive knowledge about context and influencing factors, as well as intensive competitor analysis helps to conceptualize and control for unimpeded planning and project roll out (Read et al., 2009).

Managers applying effectual decision-making strategy work with resources they have already available, and with stakeholders, who commit to the project idea, thus are involved through resources and/or creative input (Brettel et al., 2012). The goal emerges through an interactive process in which commitments by the stakeholders – on the one hand, leads to some kind of effects, i.e., goals, and on the other, hand helps to reduce uncertainty. All investments in the project are based on the affordable loss principle which then again reduces uncertainty and helps to control the wager and effort. The effectual decision making approach leverages contingencies, which thus works with the unexpected and tries to implement changes in the project surrounding--as well as good luck and bad luck--into the process. All influences are able to somehow change the project outcome or problem solution. Managers in cultures with high uncertainty avoidance can apply both approaches to reduce uncertainty and gain control. However, a higher degree of tolerance for ambitious situations combined with low uncertainty avoidance might enhance the chance of building partnerships with stakeholders that self-select into the process. Moreover, it allows for a

faster implementation of unexpected events. Building on this, we expect managers from cultures with low uncertainty avoidance to apply effectual decision-making strategy more intensively than managers from cultures with high uncertainty avoidance.

H2a: Managers in cultures with low uncertainty avoidance apply effectual decision making more preferably than causal decision making.

H2b: Managers in cultures with high uncertainty avoidance apply causal decision making more preferably than effectual decision-making.

The third dimension, *individualism/collectivism*, refers to the degree of group cohesiveness and -integration in an institutional context. In cultures that are individualistic, people expect each other's opinion and vote. It is healthy to speak one's mind and people classify each other as individuals. Transferred to the project context, team members contribute as individuals to the idea and process. In collectivistic cultures, the picture is very different. Here, people are classified as either in-group or out-group. Opinions and votes are predetermined in-group, by the organization or team. Central to effectual decision-making are self-selected stakeholders who negotiate ideas and procedures based on their individual affordable loss. Therefore, we suppose that managers in individualistic countries use effectual decision-making strategy more intensively, than causal decision-making strategy.

H3a: Managers in cultures with individualism apply effectual strategy more preferably than causal strategy.

H3b: Managers in cultures with collectivism apply causal strategy more preferably than effectual strategy.

The discussion of the three dimensions of Hofestedes' (2011) work, in the light of the decision-making approaches by Sarasvathy (2001), let us assume a tendency for effectual decision-making in higher developed countries, and a tendency for causal decision-making

in less developed ones. This finding can be reflected in light of the economic and political context. Hofstede's work (1993, 2011) expect non-triad countries to have higher levels of uncertainty and dynamism on national and governmental level than triad countries. It might be the case that the stable political situations, national rules, and organizational frameworks allow managers in triad countries to involve external knowledge more easily and work collaborative with related institutions, thus applying effectual decision-making strategy more intensively. On the other hand, management that miss these stable conditions due to corruption, unstable political situations, or weak judicial authority might stick to causal decision-making. In this context, we frame our last hypotheses:

H4a: Managers in triad countries tend to use effectual strategy more intensively than managers in non-triad countries

H4b: Managers in non-triad countries tend to use causal strategy more intensively than managers in triad countries

4.3 Method

4.3.1 Sample

Our sample was drawn from the "Factiva" database that offers global data from companies across the world. From a database of 7.455 companies (Asia - 4,681; Australia and Oceania - 65; Europe - 1,299; Latin and South America - 128; and North America - 1,282), we took a sample of almost 400 public companies in over 42 countries. The companies each have a turnover of over 50 million USD, have more than 500 employees (on average 8 employees), are on average 45 years old, and belong to different sectors like manufacturing, trade, and service activities. The survey addressed business owners, first- and second-level management (in sum 43.7%), as well as middle management (56.3%).

With regard to the levels of management, the gender distribution with 70.8 percent males and 29.3 percent females can be considered good. All managers who could be interviewed in our study were on average 40 years old, had 14 years of professional experience, and worked on average nine years in that company. All participants had to be responsible for one or more projects, have project management experience, and the ability to provide detailed project strategy information.

4.3.2 Strategy

We measured decision making strategy by using the effectuation/causation scale originally developed by Brettel et al. (2012). Though Brettel et al. (2012) analyzed the strategy behavior of R&D projects; some of the questions had to be adjusted so that they fitted a more general project context. The measures are provided in table 6.

Table 6: Scale for effectual- and causal decision-making (Brettel et al., 2012 adapted)

Means/ends
How concrete was your project before you started and how was it specified?

Our project was specified on the basis of given means/resources	Our project was specified on the basis of given project targets
The target of our project was vaguely defined in the beginning	The target of our project was clearly defined in the beginning
Given means/resources have been the starting point for the project	Given project targets have been the starting point
The process converged towards a project target on the basis of given means/resources	Required means/resources have been determined on the basis of given project targets
Rather given means than concisely given project targets have been the starting point for our project	A concisely given project target has been the starting point for our project
The project specification was predominantly based on given resources	The project specification was predominantly based on given targets
Given means have significantly impacted on the framework of our project	Given project targets have significantly impacted on the framework of our project

Affordable loss/expected return

Please assess how different project options have been compared based on possible losses (eg. costs) or future profits

Considerations about potential losses were decisive for the selection of the project option	Considerations about potential returns were decisive for the selection of the project option
Project budgets were approved on the basis of considerations about acceptable losses	Project budgets were approved based on calculations of expected returns (e.g., ROI)
The selection of the project-option was mostly based on a minimization of risks and costs	The selection of the project-option was mostly based on analyses of future returns
We mainly considered the potential risk of the project	We mainly considered the potential odds of the project
Decisions on capital expenditures were primarily based on potential risks of losses	Decisions on capital expenditures were primarily based on potential returns

Partnerships/competitive analysis

Please explain how you deal with uncertainty relating to other market players

We tried to reduce risks of the project through internal or external partnerships and agreements	We tried to identify risks of the project through thorough market and competitor analyses
We jointly decided with our partners/stakeholders on the basis of our competences	We have taken our decisions on the basis of systematic market analyses
Our focus was rather on the reduction of risks by approaching potential partners and customers	Our focus was rather on the early identification of risks through market analyses in order to be able to adopt our approach
In order to reduce risks, we started partnerships and received pre-commitments	In order to identify risks, we focused on market analyses and forecasts

Leveraging/evading contingencies

Please comment how surprising events and unexpected changes are handled

We always tried to integrate surprising results and findings during the process - even though this was not necessarily in line with the original project target	We only integrated surprising results and findings when the original project target was at risk
Our process was flexible enough to be adjusted to new findings	Our process focused on reaching the project target without any delay
New project findings influenced the project target	New project findings did not influence the project target
The project planning was carried out in small steps during the project implementation	The project planning was basically carried out at the beginning of the project
Despite of potential delays in project execution we were flexible and took advantage of opportunities as they arose	We first of all took care of reaching our initially defined project targets without delays
We allowed the project to evolve as opportunities emerged - even though the opportunities have not been in line with the original project target	We have always paid attention to reach the initial project target

Potential setbacks or external threats were used as advantageous as possible	By the use of upfront market analyses we tried to avoid setbacks or external threats

Forced-choice items, indicating the degree of difference between effectual and causal project strategy (Bradley, Wiklund, & Shepherd, 2010), characterized the scale. We did not dismantle the two dimensions of effectuation and causation as done by other studies. Taking the independence of both dimensions into account, we argue that people surely use effectual and causal strategy in the same project, but they cannot use both strategies at the same moment of decision. Besides, we were interested in a manifestation of one of the two decision approaches where the scale by Brettel et al. (2012) worked well. We validated the scale and finally integrated all 23 items (Cronbach's Alpha of 0.74).

4.4 Results

We ran the independent samples through a *t*-test to check the means of two groups against each other. This was to investigate evidence that the population means are statistically distinct. For this parametric test, we used SPSS.

First, we separated the data set into distinct groups — one that contains triad countries (79 percent) and the other with non-triad countries (21 percent). We took the strategy scale by Brettel et al. (2012) and divided it into two mutually exclusive parts—effectual decision-making strategy and causal decision-making strategy.[3] To test H1-H3, we analyzed the frequency and distribution of strategy choice over the separated data set and matched it

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[3] We initially analyzed decision-making strategy in a single model but then separated effectual and causal measures to manage the covariance between the two independent variables.

with the results of the Power Distance, Uncertainty Avoidance, and Individualism Index by Hofstede et al. (2010). Our results suggest that in the triad countries, managers use effectual decision-making strategy (57.6 percent) more intensively than causal decision-making strategy (42.4 percent).

Correspondingly, the results of the Power Distance Index by Hofstede et al. (2010) reveal that the German, and English-speaking western countries have low Power Distance scores. Based on this, we can support H1a. Our results further suggest that managers of non-triad countries apply causal strategy more intensively. However, Hofstede's Power Distance Index accents less developed countries to have a high power distance score. Thereby, H1b can also be supported.

In our next hypotheses, we provide the following picture. We expected countries showing low uncertainty avoidance to use effectual decision-making strategy preferably (H2a). However, the Uncertainty Avoidance Index by Hofstede et al. (2010) demonstrates strong uncertainty avoidance in EU countries and middle uncertainty avoidance in countries of the USA. In sum, we found strong uncertainty avoidance to be connected with effectual decision-making strategy, what runs against our hypotheses. Therefore, H2a and H2b cannot be supported.

Concerning H3a and H3b, the results make it rather easy to be linked to the Individualism Index. Here, we have effectual decision-making strategy coming along with more individual cultures in highly developed countries (Hofstede 2010). Less developed countries score higher on collectivism, which supports both hypotheses.

Finally, we conducted two *t*-test analyses with each strategy type. The results indicated that managers in triad countries use control-based effectual strategy more intensively than managers in non-triad countries (t[365]= 3.51***). The effects for non-triad countries are the other way around. They use causal planning-based strategies more often. Table 7 shows that the differences in the mean scores are significant, whereby we can support the hypotheses H4a and H4b.

Table 7: Results of the T-Test for Hypotheses H4a, H4b

	Triad Countries	**Non-Triad Countries**	**t**
Effectual Strategy	2,7	2,5	3,51***
Causal Strategy	3,3	3,5	3,51***
Based on 193 non-triad countries and 183 triad countries			

p<0.1 *   p<0.01 **   p<0.001***

4.5 Discussion

Today's challenges call for effectiveness and creativity in management settings all over the world. One-step towards this could be proactive and collaborative decision-making. This study was meant to get an idea of managers' strategy choice and differences that might be connected with cultural characteristics, like power distance or uncertainty avoidance. Our findings let us suspect a connection between decision-making strategy in company contexts and cultural characteristics that are linked with the level of development of a country. We found a preference for control-based effectual decision-making strategy in highly developed triad countries. With cultural characteristics like low power distance, and a high score in individualism, these countries provide a surrounding for company cultures that nurtures effectual decision-making heuristics. Effectual decision-making strategy in company contexts builds on collaborative and autonomous working team members and

stakeholders. Cultures with low levels of power distance allow managers to support their teams and push performance through adding their means, like experiences or networks to the project (Sarasvathy, 2001). This is different in less developed, non-triad countries with high power distance. Here, managers are more likely purchaser of tasks on which employees work on. This perfectly fits the causal decision-making approach, which calls for employees who fit into a specific job profile. It also comes along with high levels of collectivism. Non- triad countries, on average are more collectivist orientated (Hofstede et al., 2010). Employees in that context have to fit in perfectly – working on their tasks, and do not attract attention through lateral thinking. We found this to be very different in higher developed, triad countries. Here, employees are ideally seen as individuals who indeed fit into a team, likewise work collaboratively and are creative on problem solving.

We found a tendency for control based decision-making in countries that show strong to medium uncertainty avoidance after Hofstede et al. (2010). Strong uncertainty avoidance calls for higher control in project strategy. As effectual strategy builds on control, instead of prediction (Sarasvathy, 2008), it accomplishes that need. Through the usage of resources managers have at hand, they are more likely in control as when working with resources that have to be obtained first. Also, the leverage of contingencies and unexpected challenges helps to control. Managers who work with the unexpected and treat it as natural events that arise occasionally throughout the process are more likely in control than being astonished by it. It is similar with partnerships, here partnering - very early in the process – helps to build relationships managers can rely on later in the process. However, effectual decision-making strategy originally was assigned to contexts of high uncertainty, goal ambiguity, and isotropy (Sarasvathy, 2008). Therefore, it might be questionable why companies in

non-triad countries are more likely to apply causal decision-making strategy. It is non-triad countries, which are surrounded by higher uncertainty and dynamism due to corruption, unstable political situations, or weak judicial authority. Especially here, effectual decision-making could help to increase control and focus on development and growth (Dew & Sarasvathy, 2007).

4.6 Contributions

This study contributes in different ways to research and practice: First, we linked effectual and causal decision-making (Sarasvathy, 2001) with culture research, thus enhancing our understanding of the concept and contribute to effectuation, and decision-making research. Second, we connect three dimensions of Hofstede's (2011) cultural characteristics, which best mirrors elements of our basic concept of decision making strategy. Building on our empirical data, we find the dimensions of power distance, uncertainty avoidance, and individualism connected with our strategy approach. Third, we test our expectations using an international sample of projects, thus providing new empirical data. We contribute to the culture and corporate entrepreneurship conversation by introducing two strategy approaches that are inherently connected with the three cultural dimensions by Hofstede. In doing so, we open up new insights and connecting points and therefore a new sphere of activity for research that looks for culture bound explanations in decision making strategy. Finally, our results offer one possible path that allows companies to provide managers decision-making authority, and therefore mandates for action. By applying effectual decision-making strategy, companies open a space for innovative problem solving and outcomes on different levels of activity.

4.7 Limitations and Future Research

This study is not without limitations. Firstly, there is not much research that links culture and decision-making strategy in such a way as we have done in our study. A broadening of theory could lead to more connecting points and enrich the significance of the findings. Furthermore, the conceptualization with effectual-/causal decision making on the one hand, and Hofstede's cultural characteristics on the other hand, is on a meta-level of analyses. Going deeper into the principles of each decision making approach and searching for connection with cultural characteristics here, might enhance the conceptual basis of the paper, as well as enrich the data and variety of analyses. Moreover, other approaches in the literature, like the ones by Trompenaars and Hampden-Turner, (1998) might help to advance theory. Secondly, the chosen methodology for some of the hypotheses is built on descriptive statistics. Other, more elaborate, methods could strengthen our results. Thirdly, we differentiated between countries based on their level of development. Although this is an approach commonly found in economic research, other differentiations are necessary to enhance meaning in the findings.

In addition to these suggestions, future research should build on our study and deepen the understanding of culture and decision-making strategy in different cultural contexts. Theory work could widen the research horizon and understanding for connecting points of culture, decision-making strategy, and outcomes in company contexts. Interactions with other factors of decision making could also offer interesting insights for analyses. For example, discussion of power distance can enrich studies on organization structure: do different organization structures have different moderating effects? And how does preference of certainty have anything to do with the actual amount of certainty or

uncertainty? The empirical analyses, in sum, identifies a paradox of high uncertainty and preference for causal decision making in non-triad countries. Further elaboration on this seems necessary. Moreover, familiar and organizational background could influence managers' perception of cultural dimensions, not only the companies' location and environment. This calls for multi-level analyses.

4.8 Conclusion

With this study, we do first steps and provide data that offers insight on meta-level questions in the field of decision-making and culture. Do cultural characteristics and differences have an effect on managers' decision-making strategy? Is it possible to explain strategy choice by applying cultural dimensions? We link effectuation, decision-making, and culture research to provide answers, at these important crossroads. Three of four theory driven propositions could be confirmed, and we identified decision-making approaches being linked with the cultural dimensions of power distance and individualism (Hofstede, 2011). However, new questions arise from that paper that definitely call for further theory work and more elaborated empirical analysis.

Part 5

EFFECTUAL STRATEGY IN CORPORATE MANAGEMENT –REVIEW AND LESSONS LEARNED

5.1 Introduction

This dissertation deals with the question of how managers, working in corporate settings, think, decide, and act. As the topic is broad and multifaceted, the author chose three core questions that imply a theoretical investigation concerning decision-making outcomes, includes complexity as one of the most important context issues and challenges in project management, and compares managers' decision-making processes in different clusters. The structure of the dissertation mirrors this procedure. As such, the first part deals with: *when, whether, and with what outcomes the unique entrepreneurial heuristics of effectuation are utilized in a corporate setting.* Thereby, the author analyzes corporate project managers' decision-making context and theoretically links that with the decision-making context of entrepreneurs. Thus, the author describes outcomes that are valuable in a corporate setting and are closely linked with an effectual decision-making approach. The empirical part supports the theoretical investigation and shows that managers utilize causal, as well as effectual decision-making heuristics. Thus, complexity, as it is perceived by the managers, comes into play. With a moderator function, complexity influences the link between decision-making behavior and project management outcome. The last part of this dissertation compares manager's behavior along different cultural clusters.

This chapter mainly contains three parts. The limitations and future research propositions, implications, and contribution of that study and concluding remarks. I will start by discussing the limitations of this work and, in turn, the prospects for future research. In that context, I especially look at the study results, go into the decision making context "complexity", and take a look at the sample and clusters. Furthermore, limitations concerning method and scale, as well as biases, are part of this chapter. We also address the concern of generalizability. The next part treats implications and contributions of that study. Here, we summarize our main results and explain contributions to theory and practice. The chapter closes with concluding remarks.

5.2 Limitations and Future Research Propositions

This dissertation highlights intriguing relationships between managers' decision-making in the corporate context, project outcomes, and cultural influences. However, before discussing the implications of this dissertation, it is appropriate to discuss the lessons learned and chances for future research projects. During my dissertation, I was challenged through different obstacles. Some could be reached, while others limit the validity of my research and thus give rise to future research projects.

5.2.1 Study Results

We applied effectual- and causal decision making behavior to the corporate context. Thus, we analyzed managers' decision making in project contexts, introduced complexity (perceived), and checked the link to different performance measures. Finally, we clustered our sample and linked it with cultural characteristics of Hofstede (2011). However, we do fail to obtain the level of the decision making principles described by Sarasvathy (2008).

Especially in the second empirical investigation, differentiation on the level of principles promises deeper insights. Partnerships, for example, could highly correlate with Hofstedes' "collectivism-(individualism) dimension". We also propose a closer look at the link between decision making and complexity in the first empirical investigation. Here, we found managers applying effectual decision making, preferably when complexity is perceived as low. As theory building in entrepreneurship literature tells us, expert entrepreneurs apply effectual decision making mainly when facing the effectual problem space, this finding is somehow contrary. This raises various questions for future research. What about goal definitions and ambiguity in project context? How does isotropy and uncertainty influence the applicability of prediction based tools and methods in project management? How does dynamic management methods like Scrum or agile project management approaches fit into this? Do they foster effectual decision making in some way; or at least in single dimensions?

When looking at the interaction, effects analysis showed a non-significant interaction effect of complexity and effectual decision-making strategy on soft success measures. The model demonstrates, when managers apply effectual decision-making strategy, complexity has a negative effect on learning, growth of experience, and enhancement of skills. In our discussion (3.6), we propose that complexity may lead to higher stress and a decrease in the capacity of gaining competencies. Accordingly, managers who perceive lower complexity gather more experiences and competency outcomes than those who perceive higher complexity. On this point, future research might look forward to insight into the connection between the effects and impact that perceived complexity has on stress levels

and with this on human cognition and decision-making. Future studies could go deeper into the decision making construct and discuss links on a more detailed level.

5.2.2 Decision-making Context

The effectuation approach has its roots in the entrepreneurship literature. As such, it is closely linked with a context called: "the effectual problem space", what in fact is connected with goal ambiguity, isotropy, and Knightian' uncertainty (Sarasvathy, 2008). In this work, we take this decision-making approach and transfer it to the corporate context. Thereby, we build on the similarities between the effectual problem space and project management context characteristics. After a review of the literature, we focus on complexity described by Müller, Geraldi, Turner (2012). Their definition of complexity is built on work by Geraldi, Maylor, and Williams (2011) who themselves made a comprehensive review of the literature. The categories of complexity (complexity of face, fact and interaction) bridge most of the elements which can be found in theory and thus are relevant for the project management context. To study complexity is challenging, as it comes from the task itself, the environment, and is influenced by experience or personal dispositions of each manager. This is why we focus on complexity perceived by the managers. With that we take into account, that complexity is perceived individually based on personal dispositions, experiences, and preferences.

Nonetheless, future research could go deeper into that field, and further unravel the nature of complexity in the project management context. Here, it might be interesting to analyze the influence of objective complexity and decision-making, different levels of complexity perception, and the link to experience and profession. Even cultural dispositions, like tolerance of ambiguity, can be an influencing factor. I found the topic of

complexity to be a broad field of research that is multifaceted in itself and needs more than was possible in the context of this dissertation project.

5.2.3 Sample and Clusters

When I started with the study construction and thought about the representativeness of my sample, I followed the idea of reaching as many managers as possible. In the end, I came up with 400 high and medium level managers in more than 40 different countries. What seems to be a good sample in total turned out to be highly diverse and fractured in the end; especially when it comes to clusters, the representativeness was narrowed extensively. To get sufficient results for the international comparison of managers' strategy future research should first, widen the sample, and second, choose clusters along different criteria.

Take for example the second empirical investigation. Here, we clustered along national income differences as it is a popular approach in economics. This approach differs between triad and non-triad countries. Triad countries (Canada, Mexico, US, EU, and Eastern Asia) account for over 50 percent of the world's gross domestic product, while only accounting for 8 percent of the world's population. However, these clusters are highly divers in itself. Future research could differentiate countries based on other criteria, e.g., on their typical Hofstede scores. This approach could improve results and keep cross-country data from loss of variation.

Another approach could be to work more explorative concerning cultural differences in strategy choice. The topic, as of yet, as not been widely researched yet and the dimensions by Hofstede (2011) are not without criticism. This holds a chance for deeper and new insights in that field of research.

5.2.3 Method and Scale

As research fields evolve, different methodological approaches are useful. In the beginning more qualitative, explorative approaches are applied. When the body of knowledge grows, researchers start working out measures to capture a phenomenon quantitatively (Edmondson & McManus, 2007). The empiric part for theory validation is mainly built on quantitative analyses. However, a mixed-method approach could widen the understanding of managers' entrepreneurial cognition and behavior. A focus only on a quantitative approach is, especially in the cognition and behavioral research, diagnostically less conclusive. Therefore, a combination of qualitative approaches like observation and interviews in addition to the quantitative survey approach could broaden future study insights.

Another challenge in quantitative research are the measures. DeVellis (2003, p. 7) writes that "most-of the variables of interest to social and behavioral scientists are not directly observable". As so, researchers strive to operationalize the theoretical construct of interest. To minimize measurement errors, we mainly used measures that are established in the research field. Nevertheless, the operationalization of cognition phenomena is not easy (DeVellis, 2003).

One of the first scales to measure effectual and causal decision-making was developed by Chandler et al. (2011) and Brettel et al. (2012). Wiltbank et al., (2009) focuses on prediction based and non-prediction based decisions when operationalizing the construct of interest. This dissertation chose the scale developed by Brettel et al. (2012) first, because the scale captures all principles that have been described by Sarasvathy (2008) and second, it has been validated in a corporate context. Currently, scholars work on alternatives to

capture effectual- and causal decision-making. Future research could validate the study results with another measurement scale.

5.2.5 Bias and Generalizability

Interpretation of our results is also limited by the usual concerns about bias and generalizability. In our study, managers were asked to think about their last project and how decisions were made in that context. One of the questions was "How concrete was your project before you started, and how was it specified?", we then offered alternate answers and a Likert scale. Typically, this procedure is strained by *retrospective bias* as a result of post hoc rationalization (March & Sutton, 1997). With highlighting the last project, they have worked in we sought to reduce the likelihood of retrospective bias. However, future research could apply another design approach, like an experimental design, or could involve third-party views in the process.

In this study, the sample focuses on *corporate managers*. In detail, we could address business owners, first- and second-level management (in sum 43.7%), as well as middle management (56. 3%). The gender distribution has been 70.8 percent males and 29.3 percent females. When acknowledging that women are the minority on the higher hierarchical levels of a company, the distribution can be considered as good. All managers in our study were on average 40 years old, had 14 years of professional experience, and worked on average nine years in the company. All participants had to be responsible for one or more projects, have project management experience, and the ability to provide detailed project strategy information.

Most of the *projects* managers have been engaged in distribution and marketing projects (17 percent), business development and product development projects (13 percent), and

engineer projects (11 percent). Projects contain, on average, nine project members and hold a project budget from 1.000 to 270.000.000 US-Dollar. Looking at all managers, nearly a third (28 percent) work with a new and challenging topic. Half of all projects (46 percent) contain a time limit and 20 percent need to be worked out with a team. This information is relevant as number of team members, number of languages, and time zones help to draw inferences from the project to project complexity.

Accordingly, our results can only be transferred to managers in project contexts with similar characteristics. Replications of this study in small- and medium sized companies could help to improve generalizability of the study results.

5.3 Implications and Contributions

This dissertation, as mentioned earlier, sheds light on the question of how managers think, reason, and behave. We investigate to what extent they create valuable project outcomes and problem solutions through the identification and implementation of the means and contingencies they face. In the first two sections we focus on when, whether and with what outcomes the unique entrepreneurial heuristics of effectuation are utilized in a corporate setting, and how complexity perception affects managers' decision-making. The third part is reserved for analyzing how decision-making strategy varies over different cultures. All parts are linked through a theoretical and practical relevance in different fields. In the following, we summarize the main outcomes of this dissertation and work out the contributions to theory and practice. Thereby, we focus on value of this work as a whole.

5.3.1 Summary of Findings

The question at the core of this dissertation is how managers think, decide, and act in a way that let them create valuable project outcomes or problem solutions. Specifically, the context perspective motivated the question as to what degree project managers apply effectual decision-making principles. These are typically applied by expert entrepreneurs mostly in the effectual problem space, when goals are unclear (March, 1982), isotropy is high (Fodor, 1983), and high uncertainty makes prediction impossible (Knight, 1921). This work transfers the decision making approach to corporate context and with that to project management, and settings that are marked by complexity. In the theoretical framework, we mainly connect effectual- and causal decision making with managers project management context in the corporate world. Theory let us assume that the effectual problem space merges with the concept of complexity we have used in this study (see, 3.2.3). This context perspective shows, that effectual decision-making can be an interesting theoretical framework for complex project management challenges. In line with that, we discuss three levels of outcomes, mainly employee's autonomy on the people's level, product variety on the product level, and finally inventions/innovations on the innovation-level.

Findings Empirical Investigation I

The first empirical investigation of this dissertation (see part 3) shows that managers apply effectual decision making as well as causal decision making in corporate settings. On a more detailed level, the regression analyses finds that effectual decision making is directly related to learning and expertise enhancement, generation of new ideas, and widening of competencies and capabilities. Complexity in that setting has a moderating function: the

higher the perceived complexity, the more managers stick to causal decision-making, probably using tools that build on predictive calculi. Lower perceived complexity leads managers to apply effectual decision-making more intensively which widens their experiences and competency outcomes. The result of an effectual process is often co-created ideas, solutions – often new outcomes. Somewhat surprising is the result that project success (hard success measures) increase under high complexity and causal decision making. An explanation for this could be that hard success measures are those that perfectly fit causal decision strategy, like meeting project deadlines in time.

Findings Empirical Investigation II

The second empirical investigation of this dissertation (see part 4) provides findings that assume a link between decision-making strategy in corporate company contexts and cultural characteristics that are linked with the level of development of a country. Here, we found a preference for effectual decision-making strategy in highly developed triad countries. Characteristics like low power distance, and high individualism lay the ground for collaborative and autonomous working team members and stakeholders which are typical for an effectual strategy approach (Sarasvathy, 2001). This is different in less developed, non-triad countries with high power distance. Here, managers more likely assign tasks what fits causal decision-making approaches.

Findings Wrap-up

When looking back, this work successfully proves the use of both decision making approaches in project work and practice. Thereby, managers seem to apply effectual

decision making differently than expert entrepreneurs (Sarasvathy, 2001). While expert entrepreneurs apply effectual decision making mainly in contexts that are marked by goal ambiguity, isotropy, and uncertainty (Sarasvathy, 2008), managers seem to effectuate when they perceive lower levels of complexity in their projects. This is interesting as it ignores the main argument in the entrepreneurship literature: to co-create and control instead of predicting where the context does not allow for prediction –what typically is the case in the effectual problem space. Managers instead co-create in contexts that for them "allow" co-creation. This is when manager's experience low complexity that lets them exchange ideas, co-create solutions, and let things evolve. The findings add new insights and allow for new proposition building, thus extending existing theory and knowledge. The theoretical and practical contributions are described in the following section.

5.3.2 Contributions to Theory

Contributions to Project Management

This paper brings the entrepreneurial cognition literature together with project management where different research perspectives exist. Specifically, the corporate perspective, which deals with project management and its contribution to value-creation in the company (e.g. Crawford, Hoobs, and Turner, 2006; Thomas and Mullaly, 2007), calls for a broader view on project management and enhancement of project management literature through the integration of enriching insights of other disciplines (Hanisch & Wald, 2011; Shenhar & Dvir, 2007; Söderlund, 2004). Of particular theoretical interest to our investigation are distinct propositions derived directly from the management literature on the growth of firms. Companies are obliged to run projects and look for activities in

order to create value (Narayanan, Yang & Zahra, 2009). "Project strategy, then, simply becomes the specific way in which the project is going to create or ad new value" (Patanakul & Shenar, 2012, p. 7). This can be pursued causally and/or effectually, and in turn leads to meaningful different outcomes. In the first empirical investigation (see 3.4.3), we describe projects along the four key principles of effectuation. These principles are clearly distinguished from causal decision making strategy, which is often connected with conventional planning approaches in traditional project management, such as Lean Project Management, Kaizen, Critical Path, 6-Sigma and Total Quality Management to name a few (Besner & Hobbs, 2008; Kapsali, 2013). We show that effectuation can offer an important conceptual basis for describing and analyzing manager's decision-making in project contexts. The first empirical investigation (see Chapter 3) proves that managers apply effectual- as well as causal decision making in project contexts. Both approaches are connected with different types of outcomes that have to somehow fit the decision making approach. In this study, performance measures have been subdivided in soft- and hard success factors. Whereby soft success measures involve learning and expertise enhancement, hard success measures, like reaching a goal in time, fit causal tools and techniques perfectly. However, when cherishing the call for thinking out of the box, developing creative problem solving solutions etc., the stream of project management research could profit from researching alternate success measures. With its insights, the study contributes to the literature of project management.

Contributions to Entrepreneurship

Simultaneously, our study contributes twofold to the theory building in entrepreneurship literature. First, we transfer the logic of effectual decision making, originally developed in entrepreneurship research (Sarasvathy, 2001), to the empirical setting of corporates. In that context, we introduce the concept of complexity. When unraveling the literature for uncertainty, dynamism, and complexity in entrepreneurship and corporate context several paths can be found to link the different influencing factors. In 3.2.3 we thoroughly describe connecting parts between the elements of the effectual problem space and the dimensions of the concept of complexity by (Müller et al., 2012). Complexity then becomes a central part concerning decision making context and flows into our survey. With that we add a new term to the discussion of when whether and with what effects the effectual decision making heuristics are applied in corporate context. Second, we adapt the measurement model of Brettel et al. (2012) to our worldwide examination to look at decision making in general and empirically analyze the effects effectual-and causal decision making have on project success. With that we widen the field of application of this approach, and doing this, gain new insights that enrich theory building. Looking at the results, we see managers using both decision making approaches. Interesting and most surprising is that managers seem to apply effectual decision making not when they perceive higher levels of complexity. Instead, they draw on effectual decision making when complexity is perceived as low and the project context gives room for means based co-creation. This finding is somehow contrary to what theory tells us, thus raises research questions (see 5.2.1) and simultaneously widens knowledge in that specific domain of research.

5.3.3 Contributions to Practice

When thinking about practical impact of this study, the link to educational issues is close. Corporates set up workshops and seminars to foster entrepreneurial cognition and behavior (Barringer & Bluedorn, 1999). Expert entrepreneurs apply effectual decision making when starting new ventures most of the time in contexts of high uncertainty, goal ambiguity, and isotropy.

Education could take advantage of these findings. Effectual decision making could possibly be integrated, not only in startup and entrepreneurship workshops, but also in workshops offered in corporate context relaying issues like design thinking or the like. Moreover, the field of application has been widened through our empirical findings. Managers prefer to apply effectual decision making not preferably when uncertainty is high. Instead, safe contexts seem to give raise to effectual reasoning. Transferred to corporate context, somehow artificial crash barriers could set up a room for looking through an effectual lens on problems and/or project challenges. This could help to initiate innovation and plays a role when thinking in terms of long term profit and grows (Ireland, et al., 2006; Morris, et al., 2011).

Nevertheless, the unpredictability and complexity increases in most corporate contexts. For that "new methods of managing, planning and executing strategy are needed" (Thomas & Mengel, 2008, p.307). As such, project management has to review its education program and should think about how to prepare managers for today's project environments. Effectual decision making could maybe be partly adapted to that contexts. This can be backed up by a study of Gustavsson (2016) who analyzed the applicability of agile project management methods in branches others than software development. The main outcome of

this study was that branches which are not in the IT industry mostly profit from team work, customer interaction, and the flexibility of the agile project management approach. These elements are central to effectuation, which involves stakeholder co-creation while considering to only invest means at hand and only these that are affordable, as well as leveraging of contingencies. Considering this, effectual decision-making could be a promising supplement to enhance agile approaches.

5.4 Conclusion

This dissertation investigates challenges and chances effectual decision-making has in a corporate setting. The results indicate that managers, who chose strategies that allow employees to co-create, work positively with unforeseen events and/or go new paths with means at hand, are crucial for the corporate world. The impact that arises from a good match of the decision making strategy and process with the characteristics of the idea, the environment, and the person involved has been discussed by Davidsson (2005). The effectual approach allows for design and co-creation or at least let managers create problem solutions that fit the various settings. When talking about action, the philosopher William James (1905) wrote in his essay: "real effectual (…) [decision making] *is just what we feel it to be* (…)". We know little about "what makes action act, and try to solve the concrete questions of where effectuation in this world is located, of (…) what the more remote effects consists" (James, 1905). Considering that words, the findings from this dissertation can be understood as one of many building blocks that help to understand the whole story. In this way, I hope to provide meaning and inspiration for future research and practitioners along the way.

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