UNIVERSITY OF TWENTY, ENSCHEDE, THE NETHERLANDS

Effectuation and Causation: The Effect of "Entrepreneurial Experience" and "Market Uncertainty"

An Analysis of Causation and Effectuation in Business Plans

Master Thesis

By

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Foreword and Acknowledgements

This report indicates the internal master thesis carried out by Jeroen oude Luttikhuis performed at the University of Twente, faculty of Management and Governance. In this master thesis the relationship between entrepreneurs and their entrepreneurial strategies has been investigated. Do entrepreneurs rely on one entrepreneurial strategy or a simultaneity hereof? A distinction between entrepreneurs has been made based on 'market uncertainty', and 'entrepreneurial experience'.

At the first place, I would like to thank my 1st supervisor Jeroen Kraaijenbrink and Tiago Ratinho. I am grateful to have been supported by these two professionals and thank them for their inputs. Further, I would like to thank Dr. H. van der Kaap for some very helpful advice regarding the data analysis, after I ran into some trouble. Last, but not least, prayers go out to my family for their adequate support. They have always supported me during my time at the University of Twente.

It has been a long journey, but an instructive one. Enjoy reading!

Abstract

One frequently asked question in the field of entrepreneurship is: How come firms into existence? Entrepreneurship can be defined as the creation of organizations. Over the years, various approaches to entrepreneurship have been explained in existing literature. Early approaches towards entrepreneurship were planned strategies as opposed to emergent strategies. These approaches were influential for other entrepreneurial strategies, such as the causation and effectuation approach, introduced in the late 90's. Based on the underlying logic of causation and effectuation, strategies as 'transformative', 'visionary', and 'adaptive' were developed.

This research is based upon two entrepreneurial strategies, causation and effectuation. Causation as a planned strategy with as underlying logic prediction, as opposed to effectuation as an emergent strategy based on non-predictive control. The question remains: do entrepreneurs differ in applying entrepreneurial strategies when starting a business? This research attempts to answer this question for different groups of entrepreneurs: 1) highly experienced entrepreneurs and less experienced entrepreneurs, and 2) entrepreneurs in uncertain and less uncertain markets. The following research question covers the central theme of this research:

"*Do entrepreneurs have a preference for either the causation or effectuation approach, or a combination of these approaches, based on their experience and market uncertainty?"*

Based on theoretical explanations we expect entrepreneurs who are highly experienced to have a preference for the effectuation approach, over the causation approach. Revised, it seems plausible entrepreneurs with less experience prefer the causation approach. In addition, entrepreneurs in uncertain markets are expected to have a preference for the effectuation approach and entrepreneurs in less uncertain environments should favor the causation approach. The empirical setting of this study is the business plan context. Using a coding scheme, 199 business plans of high-tech companies have been analyzed.

Results of this study provide evidence for the conceptual literature on entrepreneurial expertise and decision making under uncertainty by entrepreneurs. Expert entrepreneurs rely much more on the effectuation approach than novice entrepreneurs as they score higher on all dimensions of effectuation. However, it seems that novice entrepreneurs do not rely more on causation than expert entrepreneurs do. Novice entrepreneurs score higher on the *predictive control dimension,* and *expected return dimension* of causation, whereas expert entrepreneurs score higher on the *ends-oriented dimension,* and *competitive analysis dimension* of causation. Results also indicate that entrepreneurs in uncertain environments rely more on effectuation than entrepreneurs in less uncertain environments. Entrepreneurs in uncertain environments score higher on the *non-predictive control dimension, means-oriented dimension,* and *partnerships dimension* of effectuation. Again, we cannot conclude that entrepreneurs in less uncertain environment rely more on causation than entrepreneurs in uncertain environments. Entrepreneurs in less uncertain environments score higher on the *predictive control,* and *ends-oriented dimension* of causation whereas those in uncertain environment do better on the *expected return,* and *partnerships dimension.*

The findings of this study contribute in several ways to the field of entrepreneurship. By developing an extensive coding scheme and building a database with effectual and causal data on 199 high-tech start-up companies, we have provided an opportunity for cognitive scientists to further expand the field of entrepreneurship, and specifically the causation and effectuation approach, related to the business plan context. This study also provided evidence relating effectuation to entrepreneurial expertise and decision making under uncertainty. From a practical point of view, results of this study should help us understand which strategies are employed by entrepreneurs, under which circumstances.

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1. INTRODUCTION AND RESEARCH QUESTIONS

1.1 BACKGROUND

1.1.1 MOTIVATION

According to Gartner (1988), entrepreneurship is the creation of organizations. But why is entrepreneurship so important? A study conducted by the Kaufmann foundation found evidence that it are only the start-up firms who account for net job growth in the United States (Kane, 2010). But how come firms into existence? There a various approaches to entrepreneurship, and therefore firm creation. Two of them are causation and effectuation.

The effectuation and causation processes are relatively new concepts in the field of entrepreneurship. The roots of the causation process lies in the normative theories of predictive rationality. After the empirical validity of predictive rationality was questioned, inspiration arose for research on theories that deviated from predictive rationality. Effectuation, which roots can be traced in the general literature on cognitive expertise, is one theory that deviates from predictive rationality and causation (Read, Dew, Sarasvathy, Song & Wiltbank, 2009).

Despite the roots of causation can be traced in the theory of predictive rationality and the work of effectuation being inspired by Simon's work, Sarasvathy (2001) was the first author to conceptualize causation and effectuation. She defines causation as "processes taking a particular effect as given and focus on selecting between means to create that effect" (p. 245). Effectuation is defined by her as "processes taking a set of means as given and focus on selecting between possible effects that can be created with that set of means (p. 245). Chapter 2 "Literature review' will shed more light on the differences between both constructs.

Recent literature has increasingly focused on the antecedents of causation and effectuation. Specifically, the concepts of causation and effectuation have been used in recent literature to explain the decision-making logic under (un)certain conditions and between novices and expert entrepreneurs in their decision-making. Sarasvathy (2001) was one of the first authors relating causation/effectuation and decision-making under uncertainty.

She explains in her article that if decision makers are dealing with a relatively predictable future, they will tend to make use of information gathering and information analysis methods which is in line with the causation approach. If decision makers are dealing with a relatively unpredictable future, they tend to gather information through experimental techniques aimed at discovering the underlying distribution of this unpredictable future. This is in line with the effectuation theory. Other researchers have used her explanation to make further contributions to the theory of decision-making in (un)certain situations (Sarasvathy & Kotha, 2001; Wiltbank, Dew, Read & Sarasvathy, 2006; Sarasvathy, Dew, Read & Wiltbank, 2008; Read, Dew, Sarasvathy, Song & Wiltbank, 2009; Brettel, Mauer, Engelen & Küpper, 2012).

The causation and effectuation concept have also been used by recent literature to explain the differences in the underlying logic of decision-making between expert entrepreneurs and novices. Sarasvathy (2001) proposed in her article that experts frame decisions according the effectual logic.

Dew, Read, Sarasvathy & Wiltbank (2009) tried to find empirical evidence for Sarasvathy's proposal by using think-aloud protocols from expert entrepreneurs who were asked to complete a task involving decision-making in the new venture creation process and compared it to novices. Their objective was to find evidence that both, novices and expert entrepreneurs, used different logical frames for making decisions. Other researchers who made contributions to the expert and novices literature in the entrepreneurial setting are: Read & Sarasvathy (2005), Read, Dew, Sarasvathy, Song & Wiltbank (2009), and Harms & Schiele (2012).

1.1.2 RESEARCH GAP

Sarasvathy (2001) mentions in her article that further empirical research on causation and effectuation has to be done: "under what circumstances which types of processes provide particular advantages and disadvantages is an issue to be resolved through future empirical studies" (p. 249). Judging from her comment, more empirical research is needed on whether entrepreneurs use causation or effectuation, or simultaneity of both approaches. This study empirically investigates whether less experienced and experienced entrepreneurs in different market conditions apply the causation or effectuation approach, or simultaneity of these approaches.

The approaches towards entrepreneurship, causation and effectuation have long been considered as the opposite of each other, based on their underlying logic: prediction and control. More recent literature has suggested that entrepreneurs use entrepreneurial strategies that emerge when they simultaneously apply elements of prediction and control. Wiltbank, Dew, Read & Sarasvathy (2006) for instance, have developed a framework which provides four entrepreneurial strategies (planning, visionary, adaptive, and transformative) based on the emphasis on prediction and control. Whether entrepreneurs in practice rely on the underlying logic of prediction or non-predictive control, or a combination of prediction and control, is an issue which has to be resolved through future empirical studies.

1.1.3 RESEARCH CONTRIBUTION

In the previous section it is described that causation and effectuation have long been assumed to be opposites of each other. More recent research has suggested that entrepreneurs do not rely purely on causation or effectuation but use elements of both approaches. Whether this is in fact the case, has to be investigated by future empirical studies.

This research attempts to fill this gap. By developing a coding scheme, which operationalizes the constructs of causation and effectuation, this research uses the business plan archive (www.businessplanarchive.org) with US business plans of high-tech companies, to collect information on the use of entrepreneurial strategies by entrepreneurs. After analyzing the data, it should be clear whether less experienced and experienced entrepreneurs in different market conditions use the causation or effectuation approach, or a combination of both approaches.

The contribution of this research is an empirical study which answers the question whether less experienced and experienced entrepreneurs and entrepreneurs in a low/highly uncertain market

have a preference for either the causation or effectuation approach, or a combination of these approaches.

Business plans are particularly appropriate to investigate the entrepreneurial strategy used by entrepreneurs since business plans are a snapshot of how founders conceived their venture in the early stages. Although it is likely that entrepreneurs estimate their firms' survival rate based on prediction in business plans, their entrepreneurial strategy does not necessarily need to rely on prediction alone.

1.2 RESEARCH QUESTIONS

In order to achieve the contributions described in the previous paragraph, the following question is regarded central and will be answered throughout this report:

"*Do entrepreneurs have a preference for either the causation or effectuation approach, or a combination of these approaches, based on their experience and market uncertainty?"*

Since the central research question of this report is considered broad, and hard to answer at one time, four sub-questions are designed in order to systematically come to a final answer of the central question. The following sub-questions should provide information for answering the central research question:

1. What is currently known in the existing literature about the causation/effectuation approach and their relationship with 'entrepreneurial experience' and 'market uncertainty?'
2. How can the concepts of causation/effectuation, entrepreneurial experience and market uncertainty be measured in business plans?
3. Does 'entrepreneurial experience' have influence on the choice of entrepreneurs for either the causation or effectuation approach?
4. Does 'market uncertainty' influence the choice of entrepreneurs for either the causation or effectuation approach?

1.3 IMPORTANT DEFINITIONS

This chapter ends with a number of definitions which should help clarify the readers' understanding of this master thesis.

Effectuation processes: "Take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Sarasvathy, 2001, p. 246).
Causation processes: "Take a particular effect as given and focus on selecting between means to create that effect" (Sarasvathy, 2001, p. 246).

Business plan: "a written document that describes the current state and the presupposed future of an organization (Honig & Karlsson, 2004, p. 29).

Entrepreneurial experience/expert: Read & Sarasvathy (2005) define an expert as "someone who has attained a high level of performance in the domain as a result of years of experience" (p. 46). They

also state that “although not hard and fast, the 10-year rule suggests that it takes a minimum of 10 years of deliberate practice for a novice ascend to the rank of expert” (p. 48).

Market uncertainty: Beckman, Haunschild & Philips (2004) give a definition of uncertainty that underpins most others’ definitions of uncertainty, namely “uncertainty is the difficulty firms have in predicting the future, which comes from incomplete knowledge” (p. 260). Note that this research often refers to ‘Knightian uncertainty’, “which consist of a future whose distribution is not only unknown, but unknowable” (Sarasvathy & Kotha, 2001, p. 5).

1.4 RESEARCH STRATEGY

Answers to the different sub questions, stated in the previous paragraph, are necessary in order to answer the central question of this research: *“Do entrepreneurs have a preference for either the causation or effectuation approach, or a combination of these approaches, based on their experience and their firms’ market uncertainty?”*

For answering the first sub question: *“What is currently known in the existing literature about the causation/effectuation approach and their relationship with ‘entrepreneurial experience’ and ‘market uncertainty?”*, an extensive literature review will be performed. Literature about the causation and effectuation approach, and their relation with ‘entrepreneurial experience’ and ‘market uncertainty’ will be studied. Based on this literature review, hypotheses are drawn and the appropriate research model will be given.

The second sub question*: “How can the concepts of causation/effectuation, entrepreneurial experience and market uncertainty be measured in business plans?”* will be answered in chapter 3 ‘Methodology’. A coding scheme will be developed to determine how causation/effectuation, market uncertainty and entrepreneurial experience will be measured in business plans. The literature review (chapter 2) will provide input for the coding scheme’s development.

The third and fourth sub question, respectively *“Does entrepreneurial experience influence the choice of entrepreneurs for either the causation or effectuation approach?”* and *“Does market uncertainty influence the choice of entrepreneurs for either the causation or effectuation approach?*” will be answered in chapter 4 ‘Data analysis’. Sub question three and four are directly related to the hypotheses, which are drawn from the literature. After developing the coding scheme (chapter 3 ‘Methodology’), data will be collected manually by analyzing the business plans. Since the data collection phase is a process conducted by the student, the data collection phase will not be a part of this thesis, and, therefore, continues directly with chapter 4 ‘Data Analysis’. In this chapter, data will be analyzed using statistical analytical tools. After analyzing the data, it will be clear if the variables ‘entrepreneurial experience’ and ‘market uncertainty’ have influence on entrepreneurs’ choice for either causation or effectuation. Chapter 5 presents the main conclusions and limitations of this study and assesses the theoretical and practical implications.

1.5 OUTLINE OF THE THESIS

In the previous paragraph is described how this research will be conducted. For the sake of clarity, this paragraph includes a provisional outline of the thesis’ chapters.

This thesis starts with a literature review in chapter 2, including all relevant literature with regard to causation/effectuation and their relationship with ‘entrepreneurial experience’ and ‘market uncertainty’. Hypotheses are drawn based on the literature review.

Chapter 3 ‘Methodology’ provides the coding scheme with which the business plans will be analyzed. This chapter also assesses the validity and reliability of this research, as well as it explains in more detail how data will be collected. In chapter 4 ‘Data Analysis’, the collected data will be analyzed according statistical analytical tools. This chapter will show if the hypotheses are confirmed or will be rejected. The last section consists of a final assessment of this research. It will handle the main conclusions and limitations, gives implications for theory and practice and will provide implications for further research.

2. LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter a literature review will be conducted regarding causation and effectuation, market uncertainty and entrepreneurial experience. The main purpose of this literature review is to examine what is already known in the existing literature about these subjects. This chapter starts with an extensive description of both approaches: causation and effectuation. In section 2.3, the dichotomy of causation and effectuation will be discussed. The relationship between entrepreneurial experience and causation/effectuation will be described in section 2.4, and hypotheses will be drawn based on explanations of different authors. The influence of market uncertainty on both approaches is discussed in section 2.5, and again hypotheses will be drawn. Section 2.6 graphically depicts the research model.

2.2 CAUSATION AND EFFECTUATION

Earlier focus of entrepreneurial studies has been on the 'finding' and 'exploiting' of existing opportunities. (Read, Song & Smit, 2009). It was assumed that opportunities were found through a formal search process (Perry, Chandler & Markova, 2011). This way of entrepreneurial thinking has shifted to how, in the absence of future goods and markets, firms come into existence (Venkataraman & Sarasvathy, 2000; Dew, Read, Sarasvathy & Wiltbank, 2011). The effectuation theory (Sarasvathy 2001) has become the dominant theory of entrepreneurial decision-making in the absence of those markets. The effectuation theory (Sarasvathy, 2001) offers an alternative view of how opportunities come into existence. Rather than 'finding' and 'exploiting' opportunities, the effectuation theory suggests opportunities are co-created by the entrepreneur and committed stakeholders (Read, Song & Smit, 2009).

Alvarez & Barney (2007) explained in their article the theory of opportunity discovery and creation by entrepreneurs. Following the theory of opportunity discovery, opportunities are assumed to be created when the competitive equilibrium of industries or markets is disrupted, due to technological change, political and regulatory change, and social and demographic changes. Following this theory, opportunities are assumed to exist as objective phenomena waiting to be discovered and exploited by entrepreneurs. The creation theory does not see opportunities as objective phenomena. Following the creation theory, opportunities are created through actions, reactions, and interactions of entrepreneurs when producing new products and services. The entrepreneurs' actions are central in the creation of opportunities.

In her doctoral dissertation Sarasvathy introduced the concept of effectuation. Each subject in her study had to solve ten decision problems regarding new venture creation. She noticed a clear pattern in how entrepreneurs created firms and markets. This pattern inverted the principles and underlying logic of the classic approach in market identification and creation, based on predictive logic and causation (Sarasvathy, 2003).

Sarasvathy further conceptualized effectuation as a theory of entrepreneurial expertise (Sarasvathy 2001). The processes of causation and effectuation can be illustrated by a chef preparing a meal. When preparing a meal using the causation process, the chef picks a meal in advance and selects the

ingredients needed to prepare the meal. Using an effectual approach, the chef looks for ingredients in the kitchen available to him/her and prepares a meal with the ingredients at hand. Using this approach, the chef can select multiple meals based on the ingredients available to him/her. (Sarasvathy, 2001).

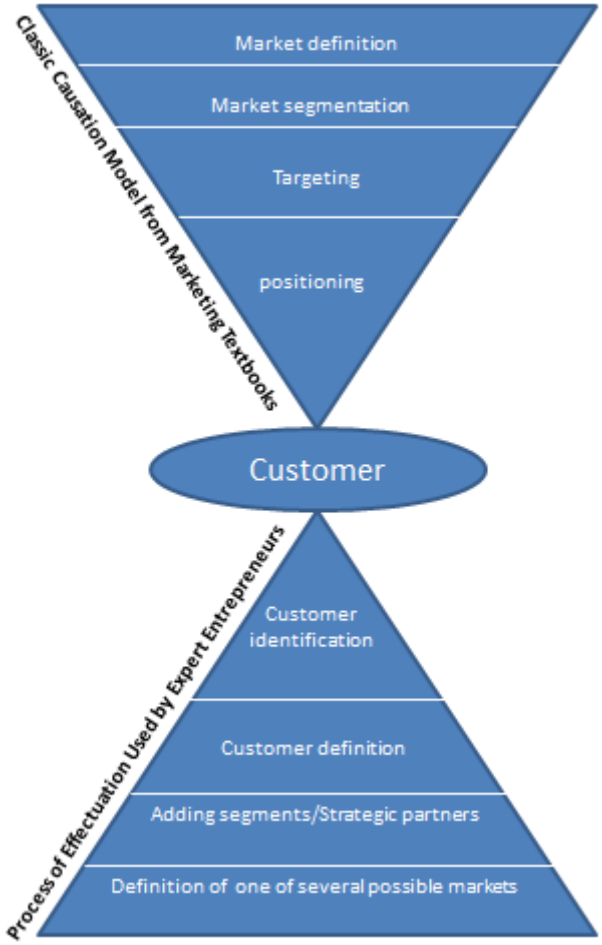
Sarasvathy embodied the process of effectuation in five principles that can be seen as the core of a rudimentary theory of effectuation, as opposed to causal processes. 1) *Means vs. goals.* The causal model has a pre-defined goal and selects between means to achieve that goal. The effectual model has certain means at hand and selects between goals with these given means. 2) *Affordable loss rather than expected return.* Causal models focus on maximizing the expected return by selecting the optimal and most promising strategy. In contrast to causal processes, the effectual logic predetermines how much loss can be afforded and experiments with as much strategies as possible given limited means. 3) *Strategic alliances rather than competitive analysis*. Causal models use detailed competitive analysis and extensive market research to reduce uncertainty whereas effectuation models reduce uncertainty by committing to stakeholders and forming strategic alliances. 4) *Exploitation of contingencies rather than exploitation of preexisting knowledge.* The effectual approach is preferable when unexpected contingencies arise over time whereas causation focuses on exploitation of preexisting knowledge to reach competitive advantage. 5) *Controlling an unpredictable future rather than predicting an uncertain one.* The focus of causal models lies on the predictable aspects of an uncertain future/environment. The underlying logic of the causal approach is 'to the extent we can predict the future, we can control it. The effectuation approach however, seeks to control certain aspects of an uncertain future/environment. The corresponding underlying logic is 'to the extent we can control the future, we do not have to predict it'. A contradictive view of both approaches is given in Table 1.

Table 1: Contrasting causation and effectuation (Sarasvathy, 2001, p. 251).

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

As mentioned before, in the past the identification of markets was seen as a search process (causal logic). This view of market creation has shifted to a process of creation and transformation (effectual logic) (Sarasvathy & Dew, 2005b). The problem of creating firms in the absence of markets can be seen as a general problem of decision-making in the absence of a predictable future, clear goals, and an independent environment. The problem spaces are identified by respectively Knight, March, and Weick. (Sarasvathy & Kotha, 2001). The problem space for effectuation (Sarasvathy, 2001) integrates these problem spaces which are inaccessible for causal approaches. (Sarasvathy & Kota, 2001). The effectuation approach is therefore more applicable for the creation of firms in the absence of markets than the causal approach. Figure 1 contrasts causation with effectuation in the creation of a new market.

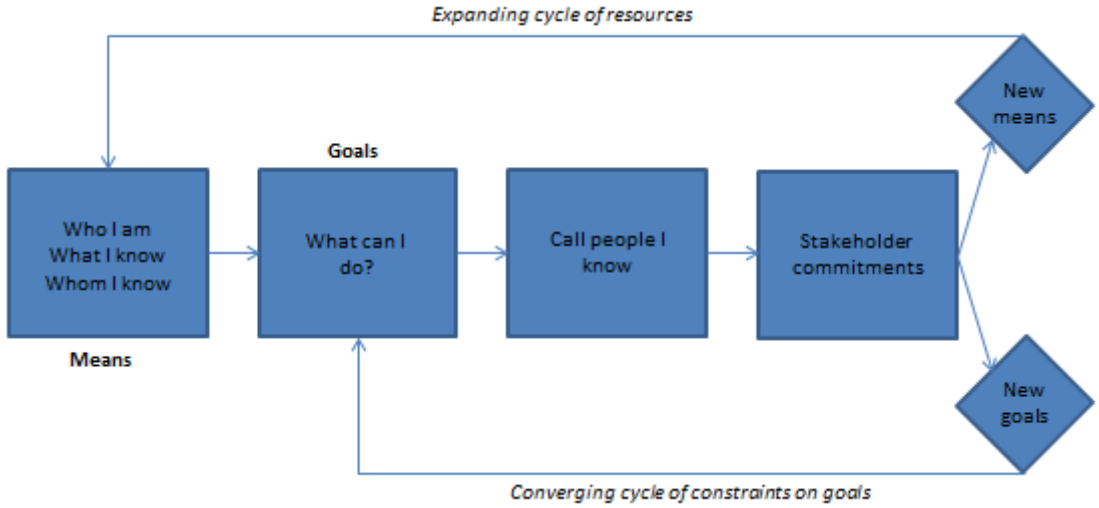
Figure 1: Creation of new markets (Sarasvathy & Dew, 2005, p. 389)



Entrepreneurs using the effectual approach start with the means available to them (Sarasvathy, 2001; Sarasvathy, Dew, Read & Wiltbank, 2008; Sarasvathy & Dew, 2005a). People have three categories of means available to them: who I am (traits, tastes, and abilities), what I know (education, experience, and expertise), and whom I know (social networks). The focus of effectuation lies on what 'can' be done given the existing means (Sarasvathy & Dew, 2005a). The next step of the effectuator is to identify several courses of actions given their means. These courses of action, e.g. defining your customers, are often determined in combination with selected stakeholders. During the process of stakeholder commitment, new goals and means can arise. This process of creating a

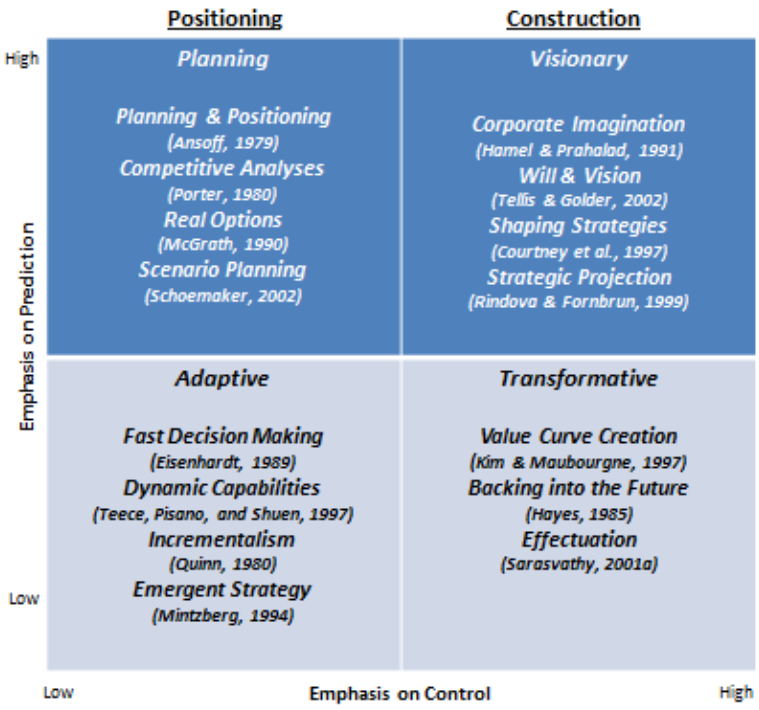
market does not assume opportunities are existent in the environment. Rather it seeks to fabricate them (Sarasvathy, Dew, Read & Wiltbank, 2008). The process of effectual interactions resulting in the creation of a new market is illustrated in Figure 2.

Figure 2: Dynamic processes of effectual interactions resulting in the creation of new markets (Sarasvathy & Dew, 2005, p. 391)



The process of creating a new firm or market following a causal approach can be described by using the segmentation, targeting and positioning process which is often used in marketing management books (Sarasvathy, 2001). Whereas effectuation focuses on what 'can' be done given their means, causation processes focus on what 'ought' to be done given existing goals. (Dew & Sarasvathy, 2005a). If the entrepreneur has a clear goal in mind, he/she can start segmenting the market. After the market is segmented, the entrepreneur selects a target segment, often based on the highest expected return. The next step is to develop and implement marketing strategies and programs. (Sarasvathy, 2001).

Figure 3: Specific approaches to situational control (Wiltbank, Dew, Read & Sarasvathy, 2006, p. 984)



As noted earlier, the creation of new firms and markets is a general problem of decision-making in the absence of a predictable future, clear goals, and an independent environment. Wiltbank, Dew, Read & Sarasvathy (2006) introduced a model, illustrated in Figure 3, based on the underlying variables of causation and effectuation, prediction and control. Based on these variables four different approaches arose which differ in whether and how they address the problem spaces identified by Knight, March, and Weick.

Planning approaches assume that the environment is beyond their control but can be predicted. Predictive techniques are used to favorably position the organization for the future. Adaptive approaches also assume the environment is beyond their control. Different from planning approaches, the adaptive approach also assumes the environment is unpredictable. Organizations following this approach are flexible and able to effectively respond to changes in the environment. The visionary approach assumes that the environment is both predictable and controllable. Organizations following this approach have a vision and shape the environment to reach their goals. The transformative approach (effectuation) implies that the future is shaped by human action. The future is shaped through interactions with others and the means available.

2.3 DICHOTOMY CAUSATION AND EFFECTUATION

When research in the entrepreneurial domain intensified, new perspectives came to light for explaining entrepreneurial behavior. These perspectives shifted from the traditional planning models to more emergent perspectives (Fisher, 2012). Sarasvathy (2001) introduced the effectuation construct as the theory for explaining these emergent perspectives (Kraaijenbrink, Ratinho & Groen, 2012). She distinguished effectuation from the traditional planning approaches (causation) according to five dimensions: 1) means vs. goals, 2) affordable loss vs. expected return, 3) strategic alliances vs. competitive analysis, 4) exploitation of contingencies vs. exploitation of preexisting knowledge, and 5) predictive control vs. non-predictive control. Based on these dimension, Sarasvathy (2001) explains effectuation as the inverse of causation.

However, several studies have commented on the notion that effectuation is the inverse of causation. As already shown in section 2.2, Wiltbank, Dew, Read & Sarasvathy (2006) have identified four different entrepreneurial strategies based on prediction and control. As opposed to Sarasvathy (2001), these authors have argued prediction and control are independent of each other. Therefore they can be applied simultaneously. Wiltbank, Dew, Read & Sarasvathy (2009) also found empirical evidence that indeed prediction and control are independent concepts.

In addition, Chandler, DeTienne, McKelvie & Mumford (2009) have performed a validation study to develop and test measures for causation and effectuation. These authors developed measures for the causation and effectuation construct which they used to test the dimensionality of the constructs, as suggested by Sarasvathy (2001). Results of their study indicated that causation is a uni-dimensional construct and effectuation a multidimensional formative construct.

Kraaijenbrink, Ratinho & Groen (2012) have performed a study in which they hypothesized that prediction vs. control, and means vs. ends are independent dimensions in entrepreneurial strategies. Results of this study confirmed the conceptualization of Wiltbank, Dew, Read & Sarasvathy (2006), that prediction and control are indeed independent dimensions and therefore four different combinations of strategies can be made (planning, adaptive, transformative, and visionary). In addition evidence was found that means and ends are, too, independent dimensions.

Whereas Sarasvathy (2001) has argued that causation is the inverse of effectuation, more recent studies has focused on the different dimension, on which these two constructs are based. Empirical evidence was found that prediction vs. control, and means vs. ends are independent dimensions.

Therefore entrepreneurs do not have to rely solely on causation or effectuation, instead entrepreneurial strategies can be applied which include elements of both constructs.

2.4 INFLUENCE 'ENTREPRENEURIAL EXPERIENCE'

Research on expert performance has received attention for decades, and started with the understanding of chess mastery. About 30 years ago Chase and Simon observed that chess mastery was not only linked to human intelligence. These authors observed that other factors are at work such as how information is stored, how problems are received, and how solutions are generated. (Read & Sarasvathy, 2005; Sarasvathy, 2008). This field of research has expanded to the entrepreneurial setting, which has only received attention lately.

Both, Read & Sarasvathy (2005), and Dew, Read, Sarasvathy & Wiltbank (2009) emphasize the need for studying entrepreneurship as a form of expertise. Dew, Read, Sarasvathy & Wiltbank (2009) argue that "a growing literature on entrepreneurial cognition suggests that theories developed in expert-novices studies in cognitive psychology can potentially illuminate important aspects of the entrepreneurial process including how experienced entrepreneurs acquire useful cognitive frameworks and scripts that enable them to become experts over time" (p. 288). In addition, the research of Read & Sarasvathy (2005) focus on "expertise research from the disciplines of psychology, cognitive science, and decision-making to describe how experience rooted in deliberate practice changes the way experts perceive, process, and use information" (p. 46).

In line with Read & Sarasvathy (2005, p. 46), this study defines an expert as "someone who has attained a high level of performance in the domain as a result of years of experience and deliberate practice".

Read & Sarasvathy (2005) use the lens of 'deliberate practice' to explain entrepreneurial expertise. The main reason for explaining entrepreneurial expertise through the lens of deliberate practice is due to a weakened connection when expertise is a function of simple experience. (Read & Sarasvathy, 2005; Dew, Read, Sarasvathy & Wiltbank, 2009). Expertise leads to superior performance when individuals acknowledge superior knowledge structures through a lengthy period of deliberate practice. Literature on deliberate practice suggests that the following five requirements are needed to reach superior performance through deliberate practice: 1) *motivation,* 2) *understandability,* 3) *feedback,* 4) *repetition,* and 5) *fit* (Read & Sarasvathy, 2005; Ericsson, Krampe & Tesch-Römer, 1993).

Deliberate practice in itself is not motivating and therefore individuals must seek for a larger objective in their practice to motivate themselves. Entrepreneurs can acquire their motivation by building products, processes, and firms. Entrepreneurs should cut complex tasks into several components to improve the understandability that enables them to organize the pattern identification and matching process. Feedback on performance is of crucial importance for entrepreneurs involved in deliberate practice as it can improve the pattern identification and matching process. With regard to the repetition and fit requirement of deliberate practice, it is important for an entrepreneur to develop less educated skills by repeatedly practicing it so an expert performance can be acquired. Read & Sarasvathy (2005) state that, although the rule is not hard and fast, a minimum of ten years of deliberate practice is required to reach the rank of expert.

Sarasvathy (2001) was the first author to study entrepreneurship as a form of expertise when she introduced the concept of effectuation. Read & Sarasvathy (2005) used the concepts of causation and effectuation and linked them to the expertise literature which resulted in four observations: 1) *expert entrepreneurs reject the use of predictive information.* Experts rely on stored patterns from previous experience to make decisions and therefore are less dependent on predictive information. 2) *expert entrepreneurs prefer to do things they can to control those parts of the environment they deem controllable.* Instead of developing plans to control uncertain environments, expert entrepreneurs try to control uncertain environments by matching current situations with previous experience and solutions. 3) *Expert entrepreneurs stick to their means and are flexible on goals*. Based on previous experience, expert entrepreneurs have developed more knowledge assets, and therefore means, to apply to a certain problem space. Novice entrepreneurs have no previous experience and therefore not the ability to rely on their means. 4) *Contingency, as opposed to planning, provides expert entrepreneurs with a wider range of viable strategy choices.* Because of their extensive experience, expert entrepreneurs know where failure is possible and therefore built contingency into their strategies. Since Sarasvathy (2001) argued that expert entrepreneurs are means-oriented instead of goal oriented, experts have more strategic options than novices.

Although effectuation is introduced as a form of entrepreneurial expertise and further conceptualized, empirical evidence proving this relationship is limited. Read, Dew, Sarasvathy, Song & Wiltbank (2008) conducted a protocol analysis to study how 27 expert entrepreneurs and 37 managers with little entrepreneurial expertise make marketing decisions under uncertainty. Result of this study indicated that indeed expert entrepreneurs relied on effectual and non-predictive approaches to tackle marketing related problems whereas the managers used primarily predictive and causal approaches.

In addition, Dew, Read, Sarasvathy & Wiltbank (2009) used a protocol analysis to study 27 expert entrepreneurs and 37 MBA students while making decisions regarding the creation of a new venture. Several empirical findings are notable: 1) experts were significantly more likely to draw on personal experience than novices. 2) experts are more concerned with project affordability. 3) novices are more likely to chase greater expected value projects. 4) compared with novices, experts prefer building ventures with partners. 5) with regard to sales, experts, more than novices, approach customers directly. The findings support the notion that expert entrepreneurs rely on effectual approaches and novices on causal and predictive approaches.

Although recognizing the research of Dew, Read, Sarasvathy & Wiltbank (2009) as highly innovative, results of the study have to be interpreted with caution (Baron, 2009). The main concern of Baron is the post-test only design with non-equivalent groups, as used by the authors. The choice for this experimental design raises several threats to internal validity. The two non-equivalent groups compared in this study (MBA's and highly experienced entrepreneurs) differ not only in their experience but also in many other respects. Due to these differences between groups, divergences in results do not have to be caused by experience solely. Baron describes maturation/age, selection, life history, and educational background as threats to internal validity. Baron also questions the relationship of this study to research on expert performance. According to Baron, it is difficult to apply the concept of deliberate practice to entrepreneurs, a necessary condition to reach expert performance. If so, it is a complex task to identify in which tasks they become experts.

The same sample groups (27 expert entrepreneurs and 37 MBA students) were used by Dew, Read, Sarasvathy & Wiltbank (2011) to study how expert entrepreneurs used the effectual logic in the creation of new markets. Again support was found that expert entrepreneurs significantly more used partnerships to build their venture than novices. An additional finding is that expert entrepreneurs articulated more new markets than novices.

Harms & Schiele (2012) have analyzed the antecedents and consequences of causation and effectuation in the entry-mode selection of international markets, which can be seen as an entrepreneurial process. Their study confirmed a positive relationship between effectuation and international experience and a negative relation between causation and international experience, indicating expert entrepreneurs are in favor of effectual approaches and novices of causal approaches.

Following the theory of Sarasvathy (2001) which introduced effectuation as a form of entrepreneurial expertise, and the empirical findings by Read, Dew, Sarasvathy, Song & Wiltbank (2008); Dew, Read, Sarasvathy & Wiltbank (2009); Dew, Read, Sarasvathy & Wiltbank (2011), and Harms & Schiele (2012), the following hypotheses can be drawn:

H1: "highly experienced entrepreneurs rely more on effectuation in their plans than entrepreneurs with less experience"

H2: "entrepreneurs with less experience rely more on causation in their plans than highly experienced entrepreneurs do"

2.5 INFLUENCE 'MARKET UNCERTAINTY'

Decision-making under uncertainty is according to Sarasvathy & Kotha (2001) the essence of entrepreneurship. Although several researchers have attempted to understand the decision-making process of entrepreneurs facing uncertainty, no models have comprised to explain new firm creation in the face of Knightian uncertainty.

Three different types of uncertainty: risk, uncertainty and true uncertainty can be distinguished. (Sarasvathy & Kotha, 2001; Sarasvathy, 2001). Risk consists of a future where the distribution is known and where problems involving risk are often related to speculation. Second, uncertainty involves a future where the distribution is unknown but can be identified using estimation techniques. Due to estimation techniques, the unknown distribution transforms into a known distribution whereas it becomes susceptible to analytical techniques. The third type of uncertainty, identified as true uncertainty, involves a future whose distribution is unknowable. The problem space of true uncertainty is inaccessible to causal and predictive approaches because prediction is impossible when the future is unknowable (Sarasvathy & Kotha, 2001). Sarasvathy (2001) introduced the theory of effectuation, (section 2.2.1) focusing on the controllable aspects of an uncertain future, which is suitable for decision-making in the face of high uncertainty (Brettel, Mauer, Engelen & Küpper, 2012).

The following statement of Sarasvathy (2001) indicates that the effectuation theory is more suitable for decision-making under uncertainty than predictive and causal theories: "human life abounds in contingencies that cannot easily be analyzed and predicted but can only be seized and exploited,

and, therefore, effectuation processes are far more frequent and very much more useful in understanding and dealing with spheres of human action. This is especially true when dealing with the uncertainties of future phenomena and problems of existence" (p. 250).

Although the effectuation theory has been used to explain decision-making under uncertainty, empirical work on this matter is limited. One of the first studies linking effectuation directly to decision-making in true uncertainty environments has been conducted by Sarasvathy & Kotha (2001). This case study examined the creation of RealNetworks; an internet firm specialized in streaming media, in the face of true uncertainty.

By listing the decision-events in the creation of RealNetworks and examining whether these decisions involved a causal or effectual logic using qualitative pattern matching techniques, Sarasvathy & Kotha (2001) found some interesting findings. Without listing all their findings, the overall conclusion is that using the effectual logic is more effective for decision-making under conditions of high uncertainty than the causal logic is.

Further support for the suggestion that effectuation is a more suitable approach than causation regarding decision-making in uncertain situations is provided by Chandler, DeTienne, McKelvie & Mumford (2011), and Brettel, Mauer, Engelen & Küpper (2012). In their validation study, Chandler, DeTienne, McKelvie & Mumford (2011) identified causation as a uni-dimensional construct and effectuation as a multidimensional construct with experimentation, affordable loss, and flexibility as sub-dimensions. Results of this study indicate that the causation construct is negatively associated with uncertainty whereas experimentation, a sub-dimension of effectuation, is positively associated with uncertainty. Brettel, Mauer, Engelen & Küpper (2012) relate the causation and effectuation approach to the innovativeness of R&D projects. These authors argue that project management can be seen as a decision-making problem and that innovative R&D projects face high uncertainty. Following the effectuation approach, evidence was found that principles of affordable loss, partnerships, and leveraging contingencies all have a positive impact on the output or efficiency of R&D projects involving high innovativeness. Support was also found that causation has a positive impact on output or efficiency for R&D projects involving low uncertainty. The goal-driven approach, expected return principle, and the avoiding contingencies principle confirmed this.

Following the effectuation theory as a basis for decision-making in the face of uncertainty, and the empirical evidence provided by Sarasvathy & Kotha (2001), Chandler, DeTienne, McKelvie & Mumford (2011), and Brettel, Mauer, Engelen & Küpper (2012), the following hypotheses can be drawn:

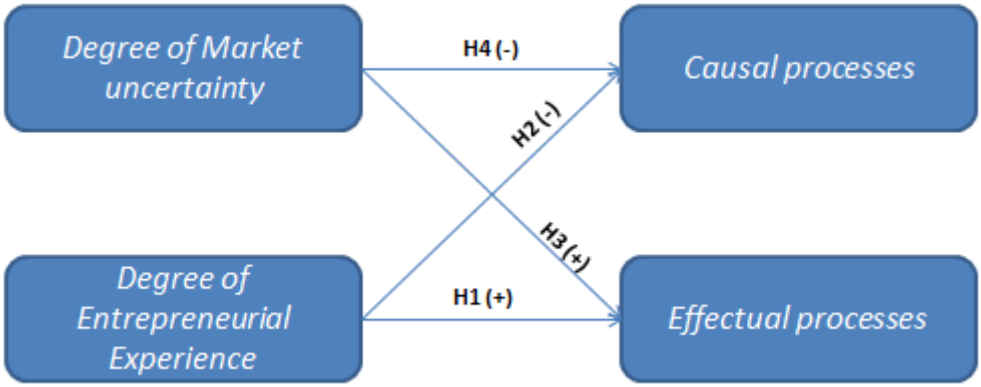
H3: "entrepreneurs facing a high level of uncertainty rely more on effectuation in their plans than entrepreneurs facing a low level of uncertainty"

H4: "entrepreneurs facing a low level of uncertainty rely more on causation in their plans than entrepreneurs facing a high level of uncertainty"

2.6 RESEARCH MODEL

Figure 4 illustrates the research model which is based on the hypotheses drawn in Chapter 2. It illustrates the different hypothesis and their expected relationships.

Figure 4: Research model



3. METHODOLOGY AND OPERATIONALIZATION

3.1 INTRODUCTION

The main purpose of this chapter is to describe the methodology and the development of measurements for all relevant constructs. In section 3.2 the appropriate research design will be described. How data is collected will be explained in section 3.3. Section 3.4 contains the operationalization of the effectuation and causation construct, as well as an operationalization for the variables 'entrepreneurial experience' and 'market uncertainty'. A coding scheme will be developed and used to measure both approaches in business plans. Validity and reliability will be treated in section 3.5 and 3.6 respectively. This chapter ends with a description of the methodology used for analyzing the data.

3.2 RESEARCH DESIGN

"The way in which researchers develop research designs is fundamentally affected by whether the research question is descriptive or explanatory" (De Vaus, 2001, p. 2). The aim of this study is to explain if the choice for the causation or effectuation approach is affected by the level of an entrepreneur's experience and his or her firms' market uncertainty. Since this study seeks to causally explain the relationship between these variables, it can be considered as an explanatory research.

In order to explain the relationship between the dependent variable 'causation/effectuation' and the independent variables 'market uncertainty' and 'entrepreneurial experience', a deductive reasoning is used to derive a set of propositions from the theory, which are mentioned in section 2.2.4.

Data for testing the propositions will be collected by analyzing business plans using measurements for the three constructs, which will be developed in the next section. Business plans are especially suitable for this study since business plans are a snapshot of how entrepreneurs conceive their ventures in their early days. Despite entrepreneurs are encouraged to predict and forecast the future of their ventures in business plans, their business strategy does not have to rely solely on prediction.

These business plans belong to American start-up companies, which are made available in a database by the University of Twente. The selection of the 200 business plans, used for this study, is carried out by using a non-probability sampling technique called 'purposive sampling'. Purposive (judgmental) sampling is a sampling technique in which units of observation are selected on the basis of the researcher's judgment about which ones are most useful and representative. (Babbie, 2007). From the plans made available to this study, only the ones which contained info on the respective variables were selected. The business plans which did not contain info on multiple variables were omitted.

Using appendix 1, we can clarify which type of research design most corresponds with this study. As already explained, this study has an explanatory purpose and literature has already given clues about how the relationship between the variables will develop. Multiple measures will be developed to increase the explanatory power of this study. Since 200 business plans will be analyzed and observations are made at one single point in time, the research design that most corresponds with this study is a cross-sectional research design.

Babbie (2007, p. 106) defines a cross-sectional study as “a study based on observations representing a single point in time”. Although cross-sectional studies are ideal for descriptive purposes, cross-sectional studies can also be explanatory. De Vaus (2001, p. 177) argues that “proper analysis that uses statistical controls enables cross-sectional data to provide valuable information about causal processes and for testing causal models”. However, explanatory cross-sectional studies have a significant problem. Conclusions of an explanatory cross-sectional study are based on observations made at one point in time, although they aim at understanding causal processes that occur over time. (Babbie, 2007). The limitations of the cross-sectional study will be further explained in section 3.5.

3.3 DATA COLLECTION

Data for this study has been collected through analyzing business plans. These business plans will be analyzed once and at a single point in time, since we deal with a cross-sectional study. Using a coding scheme, which will be developed in section 3.4, the relevant variables can be measured in business plans. So far, the constructs of effectuation and causation have not been applied to the business plan context. However, the effectuation and causation construct have been operationalized in other contexts. Therefore this study uses measures which have not been used before, as well as modifications of measurements used in other contexts.

3.4 OPERATIONALIZATION

In this section, measurements for causation/effectuation, ‘entrepreneurial experience’, and ‘market uncertainty’ will be developed. The causation/effectuation construct will be embodied in four dimensions which are derived from the theory: 1) predictive vs. non-predictive control, 2) means vs. ends orientation, 3) affordable loss vs. expected return, and 4) competitive analysis vs. strategic partnerships. Each dimension contains measures with regard to the business plan context.

3.4.1 MEASUREMENT OF CAUSATION AND EFFECTUATION

PREDICTIVE CONTROL VS. NON-PREDICTIVE CONTROL

The first dimension of the causation/effectuation construct is predictive control (prediction) as opposed to non-predictive control (control). According to this study, a business plan based on prediction contains analyses of current and past events and projects those patterns and trends onto future situations. Recent literature on effectuation and causation has already made attempts to operationalize this dimension. For instance, Dew, Read, Sarasvathy, & Wiltbank (2009) used the acceptance of market research numbers by subjects to investigate the weighting of predictive information. Following this operationalization, which was used for a think-aloud protocol analysis, market analysis complexity and the amount of pages spent on market analysis, can be used to measure prediction in business plans. A significant amount of pages spent on market analysis and a high market complexity shows agreement with predictive control and therefore causation. Other measures used in this study to measure predictive control are the amount of business plan pages, the amount of figures/tables regarding the market analysis section, the use of assumptions, and the

use of modal verbs with regard to obligations. A measurement of the verbs 'have to', 'should', and 'must' indicate what actions should be taken based on predictive information.

A business plan based on non-predictive control does not contain analyses and calculations, but the initial idea presented in the plan is the result of processes called 'learning by doing', and 'trial and error'. These processes involve creativity and therefore the chance of developing a new product/market is more likely than with prediction. Researchers have mostly been unsuccessful in operationalizing non-predictive control. Dew, Read, Sarasvathy, & Wiltbank (2009) suggest that the use of a non-predictive control logic "transforms means at hand into new outcomes that they themselves may not have initially envisioned" (p. 292), as referring to the creation of new markets and products, which they use as a measure for non-predictive control. Following their reasoning, this study uses the amount of new products and the identification of a new market as measures for non-predictive control. A third measure for non-predictive used in this study is 'past actions'. Past actions have already taken place and therefore can be controlled. This measure implies the assessment of the following business activities: 1) *business analysis* (idea, plan, and model), 2*) resource assembly* (attracting finance, hiring employees, buying equipment), 3*) product development* (product design, prototype, patent filed), 4*) legal start* (business registered), and 5*) marketing* (marketing efforts started, promotion done, and advertising). The fourth measure of non-predictive control is the amount of years between writing the business plan and founding the company. A significant amount of years between founding the company and writing the business plan points to non-predictive control and therefore effectuation. Other measurements for non-predictive control are past actions and the number of non-predictive based terms.

MEANS ORIENTATION VS. ENDS ORIENTATION

The second dimension of the causation/effectuation construct is means orientation as opposed to ends orientation. Means orientation indicates that the business plan is built upon the resources available to the entrepreneur at the time of writing. Sarasvathy, Dew, Read, & Wiltbank (2008) identify three categories of means available to human beings: 1) who I am (traits, abilities, and attributes of the entrepreneur), 2) what I know (education, experience, and expertise), and 3) whom I know (social contacts). In their study Dew, Read, Sarasvathy, & Wiltbank (2009), used the number of times a subject drew on personal experience to measure means orientation. In addition, the meta-analytic review of Read, Song, & Smit (2009) shows that start-up experience, education, and advisors/network contacts are commonly used to measure who I am, what I know, and whom I know. Translated to the business plan context, means orientation can be measured by counting the members of the advisory board (whom I know), start-up experience (who I am), education (what I know), and the fit with previous experience (who I am). A count of the words that denote possibility or likelihood is also included. A count of the words 'can', 'could', 'may', and 'might' indicate what can be realized based on the means at hand.

Ends orientation implies that business plans are built around (a) defined goal(s) and the necessary actions to achieve it. The end orientation starts with goals as given and then focuses on selecting between means to reach that goal. Recent literature does not specifically define measurements for goal-orientation since there are many goals that can be identified. Translating the ends-orientation

to the business plan, 'growth intention', and 'mentioning of an intended market share' seems like good indicators to measure ends-orientation in business plans.

AFFORDABLE LOSS VS. EXPECTED RETURN

The next dimension for the causation/effectuation construct is the affordable loss principle as opposed to the expected return principle. Business plans build upon the affordable loss principle clearly indicate the financial resources the entrepreneur(s) is/are willing to lose. Dew, Read, Sarasvathy, & Wiltbank (2009) use the availability of money mentioned by a subject as a measure of affordable loss. Translating this to the business plan context, we can measure affordable loss by determining the amount of capital asked by the entrepreneur(s), and therefore the amount of capital that is available to them. Another measure that will be used in this study to measure the affordable loss principle is risk taking.

The expected return principle is based on maximizing expected returns for a decision by selecting the optimal strategy (Sarasvathy, 2001). Business plans build upon the expected return principle make projections based on the most promising strategy and/or are based on calculations that provide the maximum output. One measure used by Dew, Read, Sarasvathy, & Wiltbank (2009) is the amount of segments chosen by a subject. This measure can easily be translated to the business plan context by measuring the amount of segments targeted in business plans. Following the description of Sarasvathy (2001), we can also measure the expected return principle by determining whether the business plan describes a clear strategy. Furthermore, we use the amount of years and precision of financial projections as measurements of the expected return principle.

STRATEGIC PARTNERSHIPS VS. COMPETITIVE ANALYSIS

The last dimension for measuring the causation/effectuation construct is strategic partnerships as opposed to competitive analysis. Firms using strategic partnerships clearly describe the most important partners and mention their openness to potential partners in business plans. Dew, Read, Sarasvathy, & Wiltbank (2009) use the amount of times the subject mentions partnership activities as a measurement for strategic partnerships. Translating this to the business plan context, strategic partnerships can be measured by counting the partnerships mentioned/described and the amount of pages spent on describing partnerships. A significant amount of partnerships mentioned and pages to describe partnerships point to effectuation. The meta-analytic review of Read, Song, and Smit (2009) also indicates that the number of alliances is a commonly used method to measure strategic partnerships. Another measurement used for strategic partnerships is the openness of the firm towards potential partners.

Business plans using competitive analysis clearly describe their competitors. In business plans, an advanced competitive analysis describes/mentions the most important competitors, their strengths and weaknesses, and products/services which they are offering. Although no operationalization of the competitive analysis principle can be found in recent literature, we can reverse the measures of the strategic partnership principle since Sarasvathy has argued that effectuation, and therefore strategic partnerships, is the inverse of causation and thus the expected return principle. Doing this, we can use the amount of competitors described/mentioned and the amount of pages spent on describing competitors as a measurement for the competitive analysis principle.

3.4.2 MEASUREMENT OF 'ENTREPRENEURIAL EXPERIENCE'

Read & Sarasvathy (2005) indicate that when "simple expertise is approached using the simple construct of experience, however, the connection with performance weakens" (p. 47). These authors suggest that measuring simple experience is not enough to determine if a person is an expert or novice entrepreneur. These authors suggest that a more advanced articulation of the experience view is needed to make a distinction between experts and novices. Read & Sarasvathy (2005) mention deliberate practice as the special type of experience that leads to superior performance. Ericsson & Lehman (1996) define expert performance as "consistently superior performance on a specified set of representative tasks for a domain" (p. 277). According to Ericsson, Krampe, & Tesch-Römer (1993), the design of the task should take preexisting knowledge of persons into account so that the task can be correctly understood, also suggested by Greeno & Simon (1988): "much of an individuals' success depends on whether he/she knows the specific principles and procedures of the domain" (p. 593). In addition, Ericsson, Krampe, & Tesch-Römer (1993) suggest that subjects should repeatedly perform the same or similar tasks to improve superior performance. The above mentioned explanations of deliberate practice are more clearly summarized by Read & Sarasvathy (2005). These authors suggest that *1) fit, 2) understandability, and 3) repetition* of the task are important elements of the deliberate practice view to reach superior performance. Following the deliberate practice view, this study measures the entrepreneurial experience construct by counting the amount of years of experience the founders of a firm, have in the specific industry they initially will enter. When 'industry experience' is high, it is save to suggest the task *fits* with the entrepreneurs existing knowledge, the entrepreneurs *understand* the tasks in the specific industry and have *repeated* these tasks several times. 'Previously founded companies' will be used to distinguish between novice and expert entrepreneurs and will also be used as a measure for 'entrepreneurial experience'.

3.4.3 MEASUREMENT OF 'MARKET UNCERTAINTY'

Using a dichotomous variable, market uncertainty is measured by looking whether the firms used for this research are IT related or non-IT related. 'IT' refers here to 'Information technology' which is defined by Huff & Munro (1985) as "the broad range of technologies involved in information processing and handling, such as computer hardware, software, telecommunications, and office information, and includes such 'technologies' as new systems development methodologies" (p. 328).

A more recent definition is given by March & Smith (1995): "technology used to acquire and process information in support of human purposes. It is typically instantiated as IT systems – complex organizations of hardware, software, procedures, data, and people, developed to address tasks faced by individuals and groups, typically within some organizational setting" (p. 252).

From the year 2000 and onwards, internet has become a powerful tool. The amount of users has grown from 361 million in 2000 to almost 2 billion worldwide. (Pingdom, 2010). The business plans of high-tech start-up ventures used in this study are written around 2000, the period internet was starting to grow at rapid pace. During this period it was uncertain how the internet (growth) would develop. Therefore, this study assumes that ventures who were involved with information technology and used internet as a core resource, participate in an uncertain environment. Examples

of ventures participating in less uncertain environments are those ventures focusing on selling tangible consumer products such as bottled water products, golf products, and party accessories.

3.4.4 CODING SCHEME

The following (shortened) coding scheme (Table 2) will be used to measure the constructs of causation/effectuation, entrepreneurial experience, and market uncertainty in business plans. A more extensive version of the coding scheme is depicted in Appendix 2. Explanations of the measurements for these constructs have already been given in section 3.4.1. to 3.4.3.

Table 2: Coding scheme

Construct	**Variable**	**Measurement**
Team Size	Size of entrepreneurial team	Total number of management
Predictive control	Business plan pages	# pages
	Market analysis pages	# pages
	Assumptions	5-point Likert scale
	Market analysis complexity	5-point Likert scale
	Market analysis tables/figures	# tables/figures
	Number of instances of obligations, necessities, and duties	# 'have to', 'must', and 'should'
Non-predictive control	New markets	Yes/no
	Age at time of writing	#
	New products	#
	Past actions	5-point Likert scale
Ends-oriented	Growth intention	5-point Likert scale
	Market share	Yes/no
Means-oriented	Members advisory board	#
	Start-up experience	#
	Entrepreneurial team business competencies	#
	Entrepreneurial team technical competencies	#
	Number of instances of theoretical possibilities	# 'can', 'could', 'may', and 'might'
	Fit with previous experience	5-point Likert scale
Expected return	Market segmentation	#
	Projected years	#
	Selected strategy	5-point Likert scale
	Precision financial projections	5-point Likert scale
Affordable loss	Required start-up capital	$
	Risks	5-point Likert scale
Competitive analysis	Pages on competitive analysis	# pages
	Amount of competitors	#
Seeking partnerships	Amount of partnerships	#
	Pages on partnerships	# pages
	Openess to partnerships	5-point Likert scale
Control variables	Industry experience	#

	Team experience	5-point Likert scale
	Market uncertainty	Yes/no

3.5 VALIDITY

This section deals with the validity of the measurements. Validity is described by Babbie (2007) as "a term describing a measure that accurately reflects the concept it is intended to measure" (p. 153).

3.5.1 INTERNAL VALIDITY

According to Babbie (2007) internal validity "refers to the possibility that the conclusions drawn from experimental results may not accurately reflect what went on in the experiment itself" (p. 240). Shadish, Cook & Campbell (2002) and Babbie (2007) have identified many sources of internal validity: history, maturation, testing, instrumentation, statistical regression, selection biases, mortality, causal time order, diffusion or imitation of treatments, compensation, compensatory rivalry, and demoralization.

However, De Vaus (2001) suggests that most of these threats identified above arise because of the over-time element. Since a cross-sectional design represents observations at a single point in time, most of the above mentioned threats to internal validity are not an issue in this study. According to De Vaus (2001) the main threat to internal validity in cross-sectional designs is the establishment of cause without a time dimension.

This study seeks to empirically investigate the relationship between less experienced and experienced entrepreneurs and entrepreneurs facing low/high uncertainty towards the use of causation/effectuation. Even though two variables are correlated, it cannot be assured that the differences are due to a causal link between the variables. E.g. when 'entrepreneurial experience' is correlated to 'effectuation', it cannot be assured that there is a causal relationship between 'entrepreneurial experience' and 'effectuation'. Other variables could be at work, so caution should be exercised when drawing conclusions.

Another significant issue is that conclusions of a cross-sectional study are based on observations at a single point in time, but often they aim at understanding causal processes that occur over time (Babbie, 2007). Teti (2005) also argues that questions about the stability of a process or characteristic over time cannot be answered. For this reason, it should be carefully remembered that observations and conclusions of this study are made at a single point in time and does not seek to explain causal processes that occur over time.

3.5.2 STATISTICAL CONCLUSION VALIDTY

Statistical conclusion validity is defined by Shadish, Cook & Campbell (2002) as "the validity of inferences about the correlation (covariation) between treatment and outcome" (p. 38). This type of validity refers to the appropriate use of statistics to infer whether the independent variable (entrepreneurial experience and uncertainty) and dependent variable (causation/effectuation) covary (Shadish, Cook & Campbell, 2002).

One common threat to statistical conclusion validity is 'low statistical power' which is defined as "the probability that a statistical test will reject the null hypotheses when it is false (Shadish, Cook & Campbell, 2002, p. 45). When using a large enough sample size, this threat is neutralized.

The second threat to statistical conclusion validity occur when 'assumption of test statistics are violated'. Inferences about covariation between variables may be inaccurate if assumptions of statistical tests are ignored or even violated. This threat to statistical conclusion validity can be neutralized by taking these assumptions into consideration.

The third threat is 'unreliability of measures'. Conclusions about covariation may be inaccurate when using unreliable measures. This threat will be neutralized in section 3.6 'reliability' where inter-rater reliability scores will show the measures used in this study are indeed reliable.

The last threat to statistical conclusion validity, which is applicable to this study, is 'inaccurate effect size estimation'. When the effect size is measured poorly, estimates of covariance between the variables can be inaccurate (Shadish, Cook & Campbell, 2002). This threat can be neutralized by taking outliers into consideration.

3.5.3 CONSTRUCT VALIDITY

Construct validity is defined by Babbie (2007) as "the degree to which a measure relates to other variables as expected within a system of theoretical relationships" (p. 154). Teti (2005) uses a more convenient description of construct validity: "is my understanding of this construct similar to that which is generally accepted to be the construct?" (p. 188).

The construct of causation/effectuation in this study has been operationalized according to the principles of Sarasvathy. The dimensions 'predictive control vs. non predictive control, means vs. ends orientation, competitive analysis vs. strategic partnerships, and affordable loss vs. expected return covers the causation/effectuation construct in this study. These dimensions have represented the causation/effectuation construct for several years in literature on this subject. Therefore, the understanding of the causation/effectuation construct by this study is generally accepted by the literature on this subject.

The variables representing the above mentioned dimensions of causation/effectuation are not all generally accepted by recent literature. This could be justified because the causation/effectuation construct has not been applied to the business plan context in recent literature.

3.5.4 EXTERNAL VALIDITY

"External validity concerns inferences about the extent to which a causal relationship holds over variations in persons, settings, treatments, and outcomes" (Shadish, Cook & Campbell, 2002, p. 83). Translating this to the business plan context, the question is whether results and relationships found in this study also hold when there is variation in business plans.

If we want to generalize from results that are obtained in a sample to a wider population, it is crucial that the sample we draw conclusions from, is representative (De Vaus, 2001). De Vaus (2001) argues that the best way of achieving a representative sample is to use probability sampling methods.

This study uses a sample of 200 business plans from a population of 495 business plans of high-tech start-up firms. In agreement with the concerned parties of this study, it is agreed to select 200 business plans for the sample. This type of sampling is not considered a non-probability sampling method, and therefore the representativeness of the sample can be taken into question.

De Vaus (2001) argues that "as long as the initial sample is well selected the cross-sectional study should yield data that are reflective of the population they were designed to represent" (p. 185). Since this is not the case in this study, we should be careful with generalizing conclusions of this study to other contexts.

3.6 RELIABILITY

Babbie (2007) defined reliability as "that quality of measurement method that suggests that the same data would have been collected each time in repeated observations of the same phenomenon" (p. 150).

To determine whether the data is collected in a reliable manner, Cohen's Kappa was calculated for all relevant variables. "Cohen's Kappa is a measure of the over-all agreement between two raters classifying items into a given set of categories (Kvålseth, 1989, p. 223). Kvålseth (1989) indicates that when certain items are rated, in this case the relevant variables, some indication about the agreement between raters/coders is desired. According to Fleiss, Levin, & Paik (1981) Kappa values above 0.75 indicate excellent agreement beyond chance, values between 0.40 and 0.75 indicate fair to good agreement and values below 0.40 represent poor agreement between coders.

In the first round of coding, business plans 1 – 15 were coded independently by me and two other independent coders. This thirst round of 'pilot coding' resulted in (too low) values for Cohen's Kappa using the norm of Fleiss, Levin & Paik. The differences between coders were analyzed by all coders together with regard to the relevant cases. After analyzing the differences, the coding scheme was adjusted properly.

In the second round of coding, business plans 15 – 35 were coded. I coded all 20 plans and the two other coders divided them into odd and even. Using three coders, this actually resulted in results between two coders. Values for Cohen's Kappa clearly indicated improvement. Differences on cases between the coders were analyzed again after which the coding scheme was adjusted to its final state. Differences on variables where Cohen's Kappa was not applicable were tackled during the analysis. The scores range from 0.206 (poor agreement) to full agreement. The variable 'selected strategy' shows poor agreement between coders. The differences were resolved by manually analyzing case differences. 'Fit with previous experience' has a Kappa value of 0.429 which represents fair to good agreement. All other variables show Kappa values of 0.714, 0.833 or full agreement, which indicate excellent agreement between coders.

For the sake of clarity, it should be clear that during the 'pilot coding' the coders had no contact with each other, nor did they had pre-knowledge that could have influenced their way of coding.

3.7 DATA ANALYSIS METHODOLOGY

Several variables had to be re-coded for the purpose of statistical analysis. To make a distinction between highly experienced entrepreneurs and entrepreneurs with less experience, the 'industry experience' variable was divided into three groups: 0 through 10 years, 11 through 20 years and 21 years and more. The second group, 11 through 20 years has no statistical purpose. Only groups 0 through 10 and 21 years and more will be used for statistical analysis since this will provide us a clear distinction between less experienced and highly experienced entrepreneurs.

The variable 'start-up experience' will be used to make a distinction between novice and expert entrepreneurs. Novice entrepreneurs are those people who have never started a business before. For this reason we divided this variable in two groups: no companies previously founded, and more than 1 company previously founded.

Also, variables of the effectuation and causation construct have been re-coded. To test whether different entrepreneurs score higher or lower on the different dimensions of causation/effectuation, the variables have to be grouped. For this instance, dummy variables and variables which consist of counts have been re-coded. Dummy variables which consisted of no = 0 and yes = 1, have been recoded to no = 1 and yes = 5. Variables which involved counts have been recoded to an ordinal scale of 5, based on the distribution of cumulative percentages. Also, analysis on variable level will be performed to check if results on group level differ from variable level.

After recoding these variables, eight new variables were created: *predictive control dimension* (business plan pages, market analysis pages, assumptions, market analysis complexity, market analysis tables and figures, and number of obligations), *ends oriented dimension* (intended market share, growth intention), *expected return dimension* (amount of segments, projected years, strategy detail, financial analysis detail), *competitive analysis dimension* (pages on describing competitors, amount of competitors), *non-predictive control dimension* (identification new market, age at time of writing, amount new products/services, mentioning of past actions), *Means oriented dimension* (advisory board members, previously founded companies, entrepreneurial technical and business competences, number theoretical possibilities, fit with previous experience), *affordable loss dimension*, (required start-up capital, detail risk analysis), and *seeking partnerships dimension*, (amount of partners, pages on describing partnerships, openess to potential partners).

4. DATA ANALYSIS

4.1 INTRODUCTION

This chapter contains the actual analysis of the collected data. First, the descriptive statistics will be given for all variables of causation and effectuation. Section 4.2 investigates whether there are any patterns between the causal and effectual data. In section 4.3, the relationship between 'entrepreneurial experience' and causation/effectuation will be tested, on group level and variable level. Section 4.4 provides insight in the relation between 'market uncertainty' and causation/effectuation. Again, on group level and variable level.

4.2 DESCRIPTIVE STATISTICS

Appendix 4.1 provides the descriptive statistics of all variables used in this study. For all the variables number of cases, minimum, maximum, mean, and standard deviation are given.

The variables shown in appendix 2 and 4.1 have been used to code the business plans. This study makes use of 33 variables. Three of which are dichotomous variables (identification of new market, mentioning of intended market share, and market uncertainty), ten variables with a ordinal measurement scale (Use of assumptions, complexity of market analysis, past actions, growth intention, previous experience, strategy description, detail of financial analysis, risk analysis, openess to potential partnerships, and entrepreneurial team experience), and twenty variables with a scale measurement (entrepreneurial team size, business plan pages, market analysis pages, market tables/figures, number of obligations, age, amount new products/services, advisory board, previously started companies, team business competences, team technical competences, theoretical possibilities, segments targeted, projected years, start-up capital, pages on competitors, amount of competitors, pages on partnerships, amount of partners, and years of industry experience).

For this study, data on 199 cases is collected. Each variable with less than 199 cases has been checked manually. It appears that the variables entrepreneurial team size, number of obligations, age, growth intention, previously started companies, technical competences, business competences, theoretical possibilities, fit with previous experience, start-up capital, and years of industry experience have less cases than 199. Appendix 4.1.1 provides the descriptive statistics for the same variables after recoding, which will be used for the statistical analysis.

4.3 PATTERNS BETWEEN CAUSATION AND EFFECTUATION

Appendix 4.2 shows the correlations between all the variables of causation and effectuation. The variables mentioned in rows are fully described, whereas the variables mentioned in columns are abbreviations due to the amount of variables and therefore space limit. The Spearman correlation coefficient is used because this coefficient is non-parametric and can also be used for ordinal variables (Huizingh, 2012). The Spearman correlation provides insight in the correlation between variables. A negative value indicates variables are negatively correlated and vice-versa. A value of zero indicates no correlation between variables. Appendix 4.2 also shows if the correlation between variables is statistically significant or not.

In appendix 4.3, the descriptive statistics of all dimensions relating to causation and effectuation are given. The mean score for causal dimensions (*predictive control = 2.5, ends = 3.0, expected return = 2.98, competitive analysis = 2.70*) exceed all mean scores for effectual dimensions (*non-predictive control = 2.15, means = 2.32, affordable loss = 2.18, seeking partnerships = 2.35.* Concluding, entrepreneurs in general use more causal reasoning in their business plans than effectual reasoning but do apply these approaches simultaneously.

4.4 RELATIONSHIP 'ENTREPRENEURIAL EXPERIENCE' AND CAUSATION/EFFECTUATION

In this section, the relationship between 'entrepreneurial experience' and the dimensions of causation and effectuation will be analyzed. First, 'industry experience' will be used to compare less experienced and highly experienced entrepreneurs. Secondly, the relationship will be explained comparing novice and expert entrepreneurs using the variable 'previously founded companies'.

An independent-Samples T-test will be performed. The T-test is commonly used to determine whether the averages of two groups are equal to each other (Huizingh, 2012. De Vaus, Velleman & Bock (2012) mention four conditions which should be met before using the T-test:

- Independence condition: the data retrieved from one business plan is independent from the data retrieved from other business plans.
- **Randomization condition:** Cases are randomly assigned to the different groups.
- Independent groups assumption: is met if 'randomization condition' is met.
- **Nearly normal condition:** the nearly normal condition should be checked for both groups. De Vaus, Velleman & Bock (2012) argue the normality assumption matters most for small sample sizes. Sample sizes of the different groups are as following: *low industry experience N = 122, high industry experience N = 22, novice entrepreneurs N = 84,* and *expert entrepreneurs N = 91*. For sample sizes *N* < 15 the independent samples T-test should not be used if histograms show severe skewness. The sample size of high industry experience is somewhat low but histograms do not show severe problems.

4.4.1 'INDUSTRY EXPERIENCE' AND CAUSATION/EFFECTUATION

H_1: "highly experienced entrepreneurs rely more on effectuation in their plans than entrepreneurs with less experience".

Appendix 4.4 shows the results of the independent samples T-test which was performed to compare the mean scores of highly experienced entrepreneurs and less experienced entrepreneurs. Following the theory, as described in chapter two, we would have expected highly experienced entrepreneurs to use more effectuation in their business plans than less experienced entrepreneurs. Results in the table of appendix 4.4 show this is indeed the case for the affordable loss, and seeking partnerships dimension of effectuation. However, less experienced entrepreneurs score on average higher on the non-predictive, and means dimension of effectuation. Based on theory, not a result we would have expected. The independent samples T-test explains whether these results are significant or not. For all dimensions of effectuation, equal variances are assumed. Results of the independent samples T-test show significance values of $P > 0.05$ for all dimensions, which means we have to assume the H_0.

Concluding, we have found no significant evidence that highly experienced entrepreneurs use more effectuation in their plans than less experienced entrepreneurs. Therefore we **reject** H_1.

H_2: "entrepreneurs with less experience rely more on causation in their plans than highly experienced entrepreneurs do".

Our expectation was that entrepreneurs with less experience rely more on causation than highly experienced entrepreneurs. Appendix 4.4 provides the mean scores and the results of the independent samples T-test. In contrast to what the theory argued, highly experienced entrepreneurs score on average higher on all dimensions of causation. We **reject** H_2. Undoubtedly a result we did not anticipate. The independent samples T-test assumes equal variances for all dimensions of causation. Although highly experienced entrepreneurs score on average higher, the results are not statistically significant. *P*-values of all dimensions of causation are higher than *P* 0.05. We have to assume the H_0 which means that we have found no statistical evidence that highly experienced entrepreneurs rely more on causation in plans than less experienced entrepreneurs.

Above we have analyzed the relationship between 'entrepreneurial experience' and causation/effectuation on group level. The variables of causation and effectuation were divided into eight different dimensions: (causation: *predictive control, ends oriented, expected return, competitive analysis*) and (effectuation: *non-predictive control, means oriented, affordable loss, seeking partnerships*). Appendix 4.5 shows the results of the relationship between 'entrepreneurial experience' and causation/effectuation on variable level. A 'high' or 'low' in the column 'mean difference' indicate whether highly experienced or less experienced entrepreneurs score higher on the corresponding variable.

The analysis on group level showed that highly experienced entrepreneurs score higher on all dimensions of causation. Analysis on variable level indicate that less experienced entrepreneurs score on average higher on the variables 'complexity of market analysis', 'growth intention', 'amount of segments targeted', and 'detail of strategy description'. These results are in line with our expectation. However, these differences are not significant. In line with the analysis on group level, the analysis on variable level shows no significant difference in the use of causation by less experienced and highly experienced entrepreneurs. The analysis on group level for effectuation showed no significant differences between groups. On variable level however, highly experienced entrepreneurs score significantly higher on 'fit with previous experience'. A finding in line with theory.

4.4.2 'START-UP EXPERIENCE' AND CAUSATION/EFFECTUATION

The same hypotheses will be tested using a different measurement for 'entrepreneurial experience'. Following the theory, which often distinguishes between novice and expert entrepreneurs, 'previously founded companies' will be used as the measurement variable for 'entrepreneurial experience'.

H_1: "highly experienced entrepreneurs rely more on effectuation in their plans than entrepreneurs with less experience".

Using 'industry experience' as a measure for 'entrepreneurial experience', less experienced entrepreneurs scored higher on the non-predictive control dimension and the means dimension. Using 'previously founded companies' as the measurement variable, results are somewhat different. The table in appendix 4.6 shows that expert entrepreneurs score on average higher on all dimensions of effectuation. A promising result in line with effectuation theory as a form of entrepreneurial expertise. The corresponding independent samples T-test in appendix 4.6 shows that the difference on the 'seeking partnerships' dimension is statistically significant (*P = 0,034 < P 0,05*). The differences between expert and novice entrepreneurs on the 'non-predictive control dimension', and 'affordable loss dimension' are not far from significant (*P = 0,107,* and *P = 0,159*). As expected, expert entrepreneurs do use more effectual reasoning in their business plans than novice entrepreneurs do.

H_2: *"entrepreneurs with less experience rely more on causation in their plans than highly experienced entrepreneurs do".*

Using 'industry experience' as the measurement variable for 'entrepreneurial experience', highly experienced entrepreneurs scored on average higher on all dimensions of causation. The inverse of what we would have expected. Appendix 4.6 shows results differ using the variable 'previously founded companies'. Novice entrepreneurs now score on average higher on the 'predictive control dimension', and 'expected return dimension'. These results are more in line with the theory and our hypotheses. Still, expert entrepreneurs score higher on the 'ends dimension', and 'competitive analysis dimension'. The differences between novice and expert entrepreneurs are not statistically significant since *P*-values on all dimensions of causation are higher than *P 0,05*.

Above we have analyzed the relationship between 'start-up experience' and causation/effectuation on group level. The variables of causation and effectuation were divided into eight different dimensions: (causation: *predictive control, ends oriented, expected return, competitive analysis*) and (effectuation: *non-predictive control, means oriented, affordable loss, seeking partnerships*). Appendix 4.7 shows the results of the relationship between 'entrepreneurial experience' and causation/effectuation on variable level. A 'novice' or 'expert' in the column 'mean difference' indicate whether novice or expert entrepreneurs score higher on the corresponding variable.

Analysis on group level showed expert entrepreneurs scored on average higher on all dimensions of effectuation. The differences for the 'seeking partnership dimension' were even significant. Appendix 4.7 presents the results of the independent samples T-tests for all relevant variables of effectuation. Analysis of the relationship between 'start-up experience', and effectuation on variable level provide results that are in line with the analysis on group level. For all variables of effectuation, expert entrepreneurs score on average higher than novice entrepreneurs. There is a significant difference between expert and novice entrepreneurs in the capital they require for their start-up, and their degree of describing partners in business plans.

With regard to causation, results of the analysis on variable level are to a large extent in line with those on group level. Analysis on group level indicated that novice entrepreneurs score higher on the 'predictive control' dimension of causation. Results on variable level confirm this, although experts on average have more business plan pages. Experts are more goal oriented which was also shown by the analysis on group level. Expert entrepreneurs score on average higher on the 'competitive analysis dimension' of causation. After analyzing on variable level, novice entrepreneurs do better, a

finding more in line with the theory. The differences for the variables 'growth intention', and 'number of obligations' are statistically significant.

4.5 RELATIONSHIP 'MARKET UNCERTAINTY' AND CAUSATION/EFFECTUATION

In this section, the relationship between 'market uncertainty' and the dimensions of causation and effectuation will be analyzed. Again, we analyze whether the averages of two groups are equal to each other. First, we check the appropriate assumptions again:

- Independence condition: the data retrieved from one business plan is independent from the data retrieved from other plans.
- Randomization condition: cases are randomly assigned to the different groups.
- Independent groups assumption: is met if 'randomization condition is met'.
- Nearly normal condition: the sample sizes for 'market uncertainty' are as following: *low market uncertainty N = 10, high market uncertainty N = 189*. For sample sizes $N < 15$, the independent samples T-test should not be used if histograms show severe skewness, which is indeed the case for *low market uncertainty* in relation to the dimensions of causation and effectuation. For this reason we will use the **Wilcoxon rank sum (or Mann-Whitney U test)** to check whether the means of both groups are equal. The Wilcoxon rank sum (or Mann-Whitney U test) is a distribution-free test which does not assume a normal underlying distribution.

H_3: "entrepreneurs facing a high level of uncertainty rely more on effectuation in their plans than entrepreneurs facing a low level of uncertainty".

Based on theory, we would expect entrepreneurs in uncertain markets to rely more on effectuation in their business plans than entrepreneurs in less certain markets. The table in appendix 4.8 provides the mean ranks of both entrepreneurial groups. Results show that entrepreneurs in uncertain markets score better on the *non-predictive control dimension, means-oriented dimension, and seeking partnerships dimension* of effectuation. For the *affordable loss* dimension, the difference between groups is negligible. Entrepreneurs in uncertain markets significantly rely more on partnerships in their plans than entrepreneurs in less certain markets (Mann-Whitney $U = 319.5$, $z = -3{,}552$, $P = 0{,}000 < P = 0{,}05$. The differences for *non-predictive control dimension, means-oriented dimension, and affordable loss dimension* are not significant. As hypothesized, there is indeed some evidence that entrepreneurs in uncertain markets rely more on effectuation in their business plans than entrepreneurs in less certain markets.

H_4: "entrepreneurs facing a low level of uncertainty rely more on causation in their plans than entrepreneurs facing a high level of uncertainty".

Entrepreneurs in less uncertain markets score on average better on the *predictive control dimension,* and *ends-oriented dimension* of causation. However, the differences between both groups are not that large causing statistical significance. In contrast to theoretical expectations, entrepreneurs in uncertain markets score higher on the *expected return dimension, and competitive analysis dimension.* Although there are some differences between groups, results of the Wilcoxon rank sum (or Mann-Whitney U test) show *P*-values higher than *P 0,05* for all dimensions of causation. We

assume $H_{0,}$ indicating that there is no significant difference in the use of causation in business plans between entrepreneurs in uncertain and less uncertain markets. We **reject** H_4.

Appendix 4.9 provides the results of the Wilcoxon rank sum (or Mann-Whitney U) test for all variables of causation and effectuation. On group level, analysis showed that entrepreneurs in uncertain environments scored better on the *non-predictive control dimension, means-oriented dimension, and seeking partnerships dimension (significant)* of effectuation. Analysis on variable level confirms the results found on group level. Differences on all variables of the *seeking partnerships dimension* (amount partners, pages on partners, and openess towards partners) are statistically significant. Although analysis on group level showed entrepreneurs in uncertain markets are more means-oriented in their business plans, entrepreneurs in less uncertain markets significantly build their business plans on previous experience. Of all variables related to effectuation, entrepreneurs in uncertain markets score higher, except for 'fit with previous experience', 'detail risk analysis, and 'identification new markets'.

With regard to the variables of causation, no significant differences were found between entrepreneurs in uncertain and less uncertain environments, as analysis on group level already showed. Group level analysis showed that entrepreneurs in less uncertain markets scored higher on the *predictive control dimension*. However, it are entrepreneurs in uncertain markets who score higher on the 'business plan pages', and 'complexity market analysis' variables of this dimension. Noteworthy, entrepreneurs in uncertain markets score higher on both variables of the *competitive analysis dimension* ('amount of competitors', and 'pages on competitors'). A finding which was not anticipated based on the literature.

5. CONCLUSIONS AND DISCUSSION

5.1 INTRODUCTION

This chapter provides an answer to the main question of this research. At first, the most important findings will be discussed. A distinction will be made between results on variable level and group level. Secondly, the contribution of this thesis to existing theory and practice will be given. Limitations of this research will be given in section 5.4. This chapter ends with the implications for further research.

5.2 MOST IMPORTANT FINDINGS

The main objective of this master thesis was to provide an answer for the following main research question: *"Do entrepreneurs have a preference for either the causation or effectuation approach, or a combination of these approaches, based on their experience and market uncertainty?".*

MOST IMPORTANT FINDINGS ANALYSIS ON GROUP LEVEL

At first, the relationship between 'industry experience' and causation/effectuation has been analyzed. Following theoretical explanations, we hypothesized highly experienced entrepreneurs to use more effectual logic in their business plans than less experienced entrepreneurs. Reversed, less experienced entrepreneurs should use more causal logic than highly experienced entrepreneurs. In line with our expectations, highly experienced entrepreneurs build their business plans to a greater extend around the *affordable loss* and *partnerships* principle than less experienced entrepreneurs. However, it are the less experienced entrepreneurs who rely more on the *non-predictive control* and *means dimension* in their business plans. Since the *means dimension* is an indication of 'who I know', 'what I know', and 'whom I know', experienced entrepreneurs were expected to build their plans to a greater degree around *means*. Although there are differences between groups in their use of causation/effectuation in business plans, none of these differences were found to be significant. With regard to causation, it should be the less experienced entrepreneurs who favor the causal logic in business plans. Less experienced entrepreneurs cannot rely as much as highly experienced entrepreneurs on their *means* (who I know, what I know, and whom I know). Instead, they will rely more on doing research when starting a new business. This said, it are actually the highly experienced entrepreneurs who apply more causal logic in their business plans. Results of this study indicate that for all four dimensions of causation (*predictive control, ends-oriented, expected return,* and *competitive analysis*) highly experienced entrepreneurs score higher than less experienced entrepreneurs.

Secondly, the relationship between 'entrepreneurial experience' and causation/effectuation was analyzed again, this time using 'start-up experience' instead of 'industry experience. Many scientific papers in entrepreneurship use the comparison of novice and expert entrepreneurs. In this research, and many scientific articles, a novice entrepreneur has not been involved in starting a new business before, whereas experts do have. Using 'start-up experience' as a measure for 'entrepreneurial experience', results of this analysis are in line with theoretical explanations, and empirical evidence as provided by recent studies on this matter (Dew, Read, Wiltbank & Sarasvathy, 2009). Expert

entrepreneurs rely to a greater extent on the effectual logic in their plans than novice entrepreneurs do. For all dimensions of effectuation, it are the expert entrepreneurs who score higher. Expert entrepreneurs rely significantly more on *partnerships* in their plan than novices. Although not significant, there is also a strong indication that expert entrepreneurs rely to a greater extend on *non-predictive control* and *affordable loss* while in the start-up phase of their business. These findings can be considered as empirical evidence for the explanations by Read & Sarasvathy (2005), who suggested effectuation as a form of entrepreneurial expertise. When using 'industry experience' as the measurement variable for 'entrepreneurial experience', expert entrepreneurs scored higher on all dimensions of causation, entirely the opposite of theoretical explanations and our hypotheses. Using 'start-up experience' as the measurement variable, results shifted in positive direction. Novice entrepreneurs rely more on *prediction* and calculate to a greater extent than experts what their return on investment will be. On the other hand, experts focus more on their competitors than novices. Experts are also more goal oriented in their business plans. However, the differences between expert and novice entrepreneurs on the dimensions of causation are not significant.

The last analysis on group level indicates the relationship between 'market uncertainty' and causation/effectuation. Following the theory, as explained in chapter two 'literature review', we have hypothesized entrepreneurs in a uncertain environment to rely more on effectuation in their business plans than entrepreneurs in less uncertain environment. Reversed, we hypothesized entrepreneurs in less uncertain markets to rely more on causation than entrepreneurs in highly uncertain markets. This seems plausible since less uncertain markets are easier to *predict(ion)*, which happens to be the underlying factor of causation. Entrepreneurs in uncertain environments follow the *non-predictive control* logic more than entrepreneurs in less uncertain environments. They also rely more on *partnerships* and their plans are to a greater extend based on their means at hand. These findings are in line with our hypotheses. However, differences are not that large causing significance. No difference on the *affordable loss dimension* was found between both groups of entrepreneurs. With regard to causation, results are mixed. Following theory, entrepreneurs in less uncertain environments use a more predictive logic in their plans, and are more goal oriented. Entrepreneurs in uncertain markets spent more effort in calculating their expected return, as do they spent more effort in investigating its competitors.

MOST IMPORTANT FINDINGS ON INDIVIDUAL LEVEL

The relationships between causation/effectuation and 'entrepreneurial experience', and 'market uncertainty' have also been analyzed on variable level.

At first, the relationship between 'industry experience' and causation/effectuation has been analyzed on variable level. Results of the analysis on variable level for effectuation variables confirm group analysis results. The most important finding on variable level is that highly experienced entrepreneurs significantly use their previous experience more than less experienced entrepreneurs in starting their new business. For all other variables pertaining the *means dimension* of effectuation, less experienced entrepreneurs score higher. Group level analysis showed that highly experienced entrepreneurs scored higher on all dimensions of effectuation. Variable level analysis does confirm this. However, of the 14 variables related to causation, less experienced entrepreneurs have more

complex market analysis sections, higher growth intentions, target more segments, and give a more extensive description of their strategy in business plans.

Secondly, the relationship between 'start-up experience' and causation/effectuation has been analyzed on variable level. Analysis on group level showed that expert entrepreneurs scored better on all four dimensions of effectuation. On variable level, results show a perfect match with group level results. On all 15 variables related to the effectuation constructs, expert entrepreneurs score higher than novice entrepreneurs. Expert entrepreneurs significantly give a more extensive description of their partners in business plans, as opposed to novices. They also significantly ask a larger amount of start-up capital in their plans. Group level analysis showed that novice entrepreneurs score higher on the *predictive control,* and *expected return dimension* of causation. Although they score higher on the *predictive control dimension*, expert entrepreneurs use a larger amount of business plan pages, and market analysis pages. Novice entrepreneurs significantly use more verbs related to obligations such as 'have to', 'must', and 'should' in their business plans. With regard to the *expected return dimension* of causation, expert entrepreneurs target more segments and give a more detailed description of their financial analysis. However, novices give a more detailed description of their strategy, and project more years of revenue. Expert entrepreneurs scored higher on the *ends-oriented dimension,* and *competitive analysis dimension*. Results on variable level confirm this. Expert entrepreneurs significantly show a higher growth intention than novices. They also mention more often an intended market share.

At last, the relationship between 'market uncertainty' and causation/effectuation has been analyzed on variable level. Results have shown that entrepreneurs in uncertain markets score better on the *non-predictive control dimension, means dimension,* and *partnerships dimension* of effectuation. Of the 15 variables related to effectuation, entrepreneurs in uncertain markets score better on all variables except for identification new markets, detail risk analysis, and fit with previous experience. Entrepreneurs in less uncertain markets even rely significantly more on their previous experience when starting a new business. For the variables related to the *partnerships dimension*, results show entrepreneurs in uncertain markets significantly mention more partners, give a more detailed description of their partners, and are more open to them. With regard to causation, entrepreneurs in less uncertain markets scored higher on the *predictive control,* and *ends dimension*. Entrepreneurs in uncertain markets scored higher on the *expected return dimension*, and *competitive analysis dimension*. Results on variable level are not very different. However, entrepreneurs in uncertain markets use a larger amount of business plan pages, and have more complex market analysis. They also show a higher growth intention in business plans. Although it are entrepreneurs in uncertain markets who rely more on the *expected return dimension,* entrepreneurs in less uncertain markets show more years of revenue projection, and give a more detailed financial analysis.

5.3 IMPLICATIONS FOR THEORY AND PRACTICE

This research has contributed in several ways to entrepreneurship, and specifically to the theory of causation and effectuation.

The first contribution is the development of an extensive coding scheme which operationalizes the constructs of causation and effectuation for the business plan context. Only a small amount of papers in existing literature have attempted to operationalize the constructs of causation and

effectuation. Operationalizing causation and effectuation to the business plan context is a relatively new field of research within entrepreneurship. Other researchers can use this coding scheme to code more business plans and collect causal and effectual data. The second contribution of this research is a database with causal and effectual data of 199 high-tech start-up companies. A great amount of time was invested in building this database. This database can be used for future research.

In addition to these general contributions to theory, this study contributes in many ways to the field of entrepreneurship. Specifically to the use of causation/effectuation by entrepreneurs, effectuation as a form of entrepreneurial expertise, and decision-making under uncertainty.

Sarasvathy (2001) explained the theory of effectuation as the inverse of causation theory. This would implicate that entrepreneurs should focus on either the causation or effectuation approach. This study has proven the opposite: when starting a new business, and writing their business plan, entrepreneurs do use elements of both the causation and effectuation approach. Evidence is provided for the conceptual framework introduced by Wiltbank, Dew, Read & Sarasvathy (2006). These authors explained that based on the underlying logic of causation and effectuation, *prediction* and *control,* four entrepreneurial strategies can be used by entrepreneurs (planned, adaptive, transformative, and visionary).

This study also contributes to the theory of effectuation as a form of entrepreneurial expertise. Recent literature has conceptually explained this relationship and has attempted to find empirical evidence (Read & Sarasvathy, 2005; Dew, Read, Sarasvathy & Wiltbank, 2009; Read, Dew, Sarasvathy, Song & Wiltbank, 2008; Dew, Read, Sarasvathy & Wiltbank, 2011). Distinguishing novice entrepreneurs from expert entrepreneurs, using the variable 'previously founded companies', this study found evidence that expert entrepreneurs rely more on effectuation than novices. Group level analysis showed expert entrepreneurs scored higher on all dimension of effectuation. Analysis on variable level confirmed these results. On all variables related to the effectuation construct, expert entrepreneurs scored higher.

The effectuation theory has also been used to explain decision-making under uncertainty. Empirical work on this matter is limited. One of the first studies linking effectuation directly to decision-making in uncertain environments has been conducted by Sarasvathy & Kotha (2001). The overall conclusion of their study was that using the effectual logic is more effective for decision-making under conditions of high uncertainty than the causal logic is. This study found some empirical evidence supporting this notion. Entrepreneurs in uncertain environments follow the *non-predictive control* logic more than entrepreneurs in less uncertain environments. Entrepreneurs in uncertain environment also rely more on their *means* at hand and they significantly rely more on *partnerships* than entrepreneurs in less uncertain environments.

The findings of this study have also implications for practice. This study has helped us to understand which strategies high-tech entrepreneurs employ in the start-up phase of their businesses. It has also shown which strategies different groups of entrepreneurs employ in their start-up phase. Entrepreneurs who have planned to start a new business can take these findings into consideration. This study has shown that the effectual logic is preferred over the causal logic when entrepreneurs are more experienced or face high market uncertainty.

These findings have also implications for how the field of entrepreneurship should be teached to future entrepreneurs. The causation and planning approaches have found their way into MBA programs long time ago. This research has established a link between effectuation and entrepreneurial experience, as well as a link between effectuation and market uncertainty. It could be beneficial for future entrepreneurs to have a better understanding of the effectuation theory and other emerging theories.

5.4 RESEARCH LIMITATIONS

Next to its valuable contributions, this research has definitely certain limitations. Without degreasing the value of this study, these limitations will be explained below, and can be used as a focus for future research.

The first limitation is with regard to the operationalization of the causation/effectuation construct. In current literature, only a limited number of papers attempted to operationalize these constructs. Although some variables of causation/effectuation are based on operationalization efforts of current literature, most of them are not, which has severe consequences for the construct validity. It is not even sure that the variables used in this study for causation and effectuation, are indeed a good representation of both constructs. Also, we were not able to operationalize the *exploitation of contingencies rather than exploitation of preexisting knowledge* dimension, as identified by Sarasvathy (2001). These contingencies arise unexpectedly over time and are responded to in time by the different stakeholders involved. Literature on causation and effectuation has had real troubles operationalizing this dimension, as had we. Therefore, it was decided to not include this dimension in this research.

The second limitation stems from the business plan context itself. As we have seen, the causal logic is much more used in business plans than the effectual logic, if we make no distinction between entrepreneurs. This is hardly surprising, since some variables of causation can be traced back in all plans, such as 'business plan pages'. By only taking a snapshot of the initial business plan, the reflection of causation and effectuation used by entrepreneurs is slightly crooked. Effectuation revolves around the thought process of entrepreneurs, and their actions and interactions. For this reason, the business plan context seems less suitable for measuring effectuation than for measuring causation. A more suitable method to collect effectual data is using the 'think aloud protocol'. Using this method, subjects are asked to perform a task and then verbalize what they think while performing this task.

The third limitation of this research is the low number (*N*) of cases for 'low market uncertainty'. This research has operationalized 'market uncertainty' as whether the business plan was involved in information technology (high) or not (low). As our empirical setting was the Business Plan Archive, a database of 495 US business plans of high-tech companies, the *N* for 'low uncertainty' cases was low. With the low *N* we risk the chance of making a so called 'Type ll' error. A type ll error occurs when the H_0 is false, but we fail to reject it (De Veaux, Velleman & Bock (2012). The results in appendix 4.8 show that on seven out of eight dimensions of causation/effectuation no significant difference was found between entrepreneurs in high and low conditions of market uncertainty. However, there are differences in means between the two groups of entrepreneurs. If the *N* was larger than we have

now, it could be possible these differences are significant and we failed to reject the H_0 due to a low sample size.

The last limitation of this research is its generalizability. As mentioned above, this research uses a database of business plans from high-tech companies. The sample used for this study is therefore not a representative representation of all businesses. Therefore, we have to be careful with generalizing these results to other businesses. The results of this study can only be generalized to companies in the specific Business Plan Archive.

5.5 IMPLICATIONS FOR FURTHER RESEARCH

Researching the field of entrepreneurship, and more specifically the causation/effectuation construct, using the business plan context as empirical setting is still underdeveloped. Although this study has made an attempt, we recommend further research on this matter.

One of the most important subjects that need to be further explored, is the operationalization of the causation/effectuation constructs. A few papers have attempted to operationalize those constructs. However, for the business plan context those attempts are minimal. This research has come up with multiple measurement variables for both constructs. It is however still unclear if these variables actually represent the different dimensions of the causation/effectuation construct. Therefore, we advise future research to focus on validating measurements for causation and effectuation.

This study resulted in some interesting findings. However, further research is needed to check if these findings hold over different research settings and different samples. For example, do the results from this study also hold when a 'think aloud protocol' is used, instead of the business plan context? Or, are results still the same if another batch of 199 business plans will be coded? If the findings of this study also hold when different research settings and samples are used, generalizability will increase.

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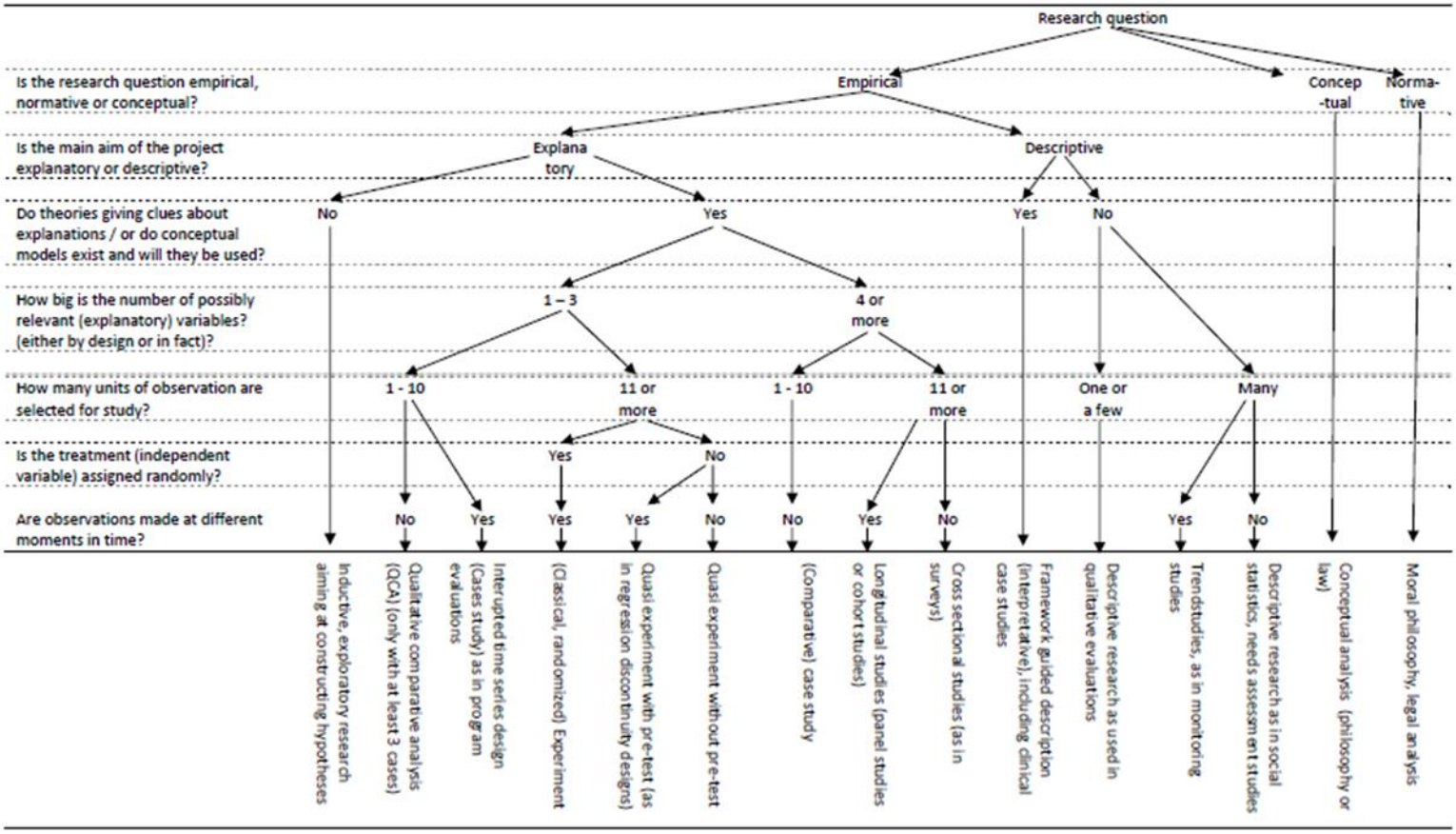
APPENDICES

APPENDIX 1: A TYPOLOGY OF RESEARCH DESIGNS



APPENDIX 2: CODING SCHEME

Construct	Variable	Code	Variable description	Measurement variable	Unit
Name of the company		company			
Founding date		founding date			
Date of BP		date			
Names of the Entrepreneurs		names			
Team size		teamsize	Size of the entrepreneur/managers team	Total number of entrepreneurs/management team members at the time of seeking investors	#
Predictive control	Business plan pages	bppages	Number of pages of business plans	Rounding to whole pages	#
	Market analysis pages	mktpages	Pages dedicated to market analysis, excluding marketing strategy	Rounding to ½ pages. No pages spent on describing market analysis = 0	#
	Assumptions	assumpt	To which extent have assumptions been used to develop the business plans and financial projections?	1) Very Low (No assumptions were reported in the plan) 2) Low (Assumptions are general and do not impact plans) 3) Average (Assumptions are general and have a minor impact in the plans) 4) High (Assumptions are well identified and have a significant impact in the plans) 5) Very high (Assumptions are very well identified and have a large impact in the plans)	1-5

	Market analysis complexity	mktcompl	Complexity of the market analysis	1) no market analysis at all 2) short and and superficial market analysis based on own projections 3) general market analysis based on own projections and little external data 4) extensive market analysis including external data 5) very extensive and precise market analysis mostly based on external data	1-5
	Market analysis tables/figures	mkttabfig	Amount of tables and figures used in the marketing section of the business plan	Total amount of figures and tables	#
	Number of instances of obligations, necessities and duties	obligs	Use of modal verbs (deontic modality)	Word count of conjugations of verbs 'have to', 'must', 'should'	#
	Number of prediction-based terms	predterms	Use of words relating to prediction (based on RWTH Aachen)	Word count of the following words: predict, prediction, predictable, forecast, plan, foresee, anticipate, envision, vision, projection, extrapolate, prognosis, trend, expectation, outlook, prospect, future, long-term, goal, aim, objective, target, roadmap, blueprint, market, marketplace, industry, sector, competition, compete	#
Non-predictive control	New markets	newmkts	(a) new market(s) have/has been identified in the business plan	Does the plan mention the identification of a new/unidentified market? (no/yes)	0-1
	Age at the time of writing	age	Number of years between founding the company and writing the business plan	(#) Rounding to ½ years. Cannot be determined? Missing variable	#
	New products	newprods	Amount of new products, services or combination of products and services identified in business plans	No new products, services or combinations of products and services are introduced = 0	#

	Past actions	pastact	Business plan mentions past actions related to business development such as customer feedback or product development	At the time the plan was written, how many of the following business activities had already been taken: - business analysis (e.g. business idea, business model, business plan) - resource assembly (e.g. attracting finance, hiring employees, buying equipment) - product development (e.g. product design, prototype, patent filed) - legal start (e.g. business registered) - marketing (e.g. marketing efforts started, promotion done, advertising) 1. none or 1 *(none is hypothetical, since of all them did this for writing the plan)* 2. 2 3. 3 4. 4 5. all (business is already running) Writing a business plan counts so 1 is the default value.	1-5
	number of non-predictive control based terms	contrterms	Use of words related to non-predictive control (based on RWTH Aachen)	Word count of the following words: control, shape, influence, reshape, persuade, endogenous, empower, overpower, partner, cooperate, collaborate, create, explore, revolutionalize, commit, disrupt, untested, unseen, unexplored, unchartered, non-ventured, realize, overthrow, experience	#
Ends oriented (defined goals)	Growth intention	grwtint	Business plans mention a clear growth intention (sales growth, production growth, revenue growth, going public, self-funding, product growth, profit growth, job growth)	The business plan reflects... 1) ...no growth intention (e.g., single person company, minor revenues) 2) ...a minor growth intention (e.g., 2-10 employees, <2 million revenues) 3) ...a moderate growth intention (e.g., 11-50	1-5

				employees, <10 million revenues) 4) ...a strong growth intention (e.g, 51-250 employees, <50 million revenues) 5) ...a very strong growth intention (e.g., 250+ employees, 50+ million in revenues)	
	Market share	mktshare	Mentioning of an intended market share in the business plans	Mentioning of an intended market share (no/yes)	0-1
Means oriented	Members advisory board	advbrd	Amount of members participating in advisory board, board of directors (only if role is not active and therefore advisory), or industry experts.	No advisory members mentioned = 0	#
	Start-up experience	stpexp	The amount of companies previously started by the founding team. No founders mentioned, info management team is used.	Total amount of companies previously started by the founders.	# -999 if unspecified number
	Entrepreneurial team business competencies	busexp	The business competencies of the management team according to their educational background	Number of management team members holding a higher education degree in Business Administration related studies (General Management, Accounting, Economics, MBAs, Entrepreneurship studies, Business School studies)	# Missing if no information on the founding team
	Entrepreneurial team technical competencies	techexp	The technical competencies of the management team according to their educational background	Number of management team members holding a higher education degree in Technical studies (Science, Technology, engineering & Mathematics)	#

	Number of instances of theoretical possibilities	theor	Use of modal verbs to denote possibility, likelihood or uncertainty (epistemic modality)	Word count 'can', 'could', 'may', 'might'	#
	Fit with previous experience	expfit	Degree to which the business plan fits / is a continuation of the previous experience of the founding team. No founders mentioned, info management team is used.	1) not at all related to previous experience of the founding team 2) similar competences required than in previous activities of the founding team (previous job, other ventures) 3) in the same industry as previous activities of the founding team (previous job, other ventures) 4) similar kind of product/service as previous activities of the founding team (previous job, other ventures) 5) direct continuation of previous activities of the founding team (previous job, other ventures)	1 - 5
Expected return	Market segmentation	segm	The amount of market segments targeted in business plans	No segments targeted = 0	#
	Projected years	projyrs	Amount of years projected	No years of revenue projection = 0	#
	Selected strategy	strat	The business plans describe a clear strategy (promotion, pricing, distribution, sales) for achieving established goals	1) No strategy described 2) Short and general description of strategy 3) General description of strategy 4) Extensive strategy description 5) Very extensive strategy description	1-5
	Precision of financial projections	finprc	Amount of detail of the financial projects	1) no financial projections at all 2) short-term and general financial projections (may include balance sheet, income statement, …) 3) long-term general financial projections	1 -5

				(may include balance sheet, income statements, …) 4) extensive financial projections (may include balance sheet, income statements, operational costs, planned investments, …) 5) very extensive and detailed financial projections (may include monthly calculations, …)	
Affordable loss	Required start-up capital	stpcap	Amount of capital asked in business plans	Amount of capital in $	
	Risks	risks	The business plans mention the risks with regard to the feasibility of the plan	1) No risks mentioned 2) Short and general description of risks 3) General risk analysis 4) Extensive risk analyis 5) Very extensive risk analysis	1-5
Competitive analysis	Pages on competitive analysis	companl	Amount of pages spent on describing competitors	Rounding to ½ pages. No pages on describing competitors = 0	#
	Amount of competitors	compet	Amount of competitors mentioned/described in business plans	No competitors mentioned/described = 0	#
Seeking partnerships	Amount of partnerships	partns	Amount of partnerships mentioned/described in business plans	No partnerships described = 0	#
	Pages on partnerships	partnsanl	Amount of pages spent on describing partners(hips)	Rounding to ½ pages. No pages on describing partners(hips) = 0	#
	Openess to potential partnerships	openpartns	To which level mentions the plan their openess towards potential partnerships? (actual and potential)	1) No partnerships are mentioned. 2) Partnerships are described in general 3) Partnerships are described in general and some partners identified 4) Partnerships are described in detail with	1-5

				some partners identified 5) Partnerships with specific partners are described in detail	
Control variables	Industry experience	expind	Total amount of years experience of the founders in the specific industry. No founders mentioned, info management team is used.	Total amount of years experience of the founders in the specific industry.	#
	Team experience	expteam	Team's exposure to different industries.	1) no industry experience 2) limited industry experience; 1-5 years mostly within a single industry 3) moderate industry experience; 5-10 years within some industries 4) experienced; 10-15 years of experience within multiple industries 5) very experienced; decades of experience across many industries and positions	1-5
	Market Uncertainty	mktunc	Information Technology firms vs. Non-Information Technology firms.	Is the business, as described in the plan, related to Information Technology? (no/yes)	0-1

APPENDIX 3: INTER-RATER RELIABILITY (COHEN'S KAPPA)

Inter-rater reliability scores			
Variable	**Code**	**Tiago & Jeroen OL**	**Jeroen K & Jeroen OL**
Entrepreneurial team	Teamsize	Full agreement (1)	-
Business plan pages	Bppages	-	-
Market analysis pages	Mktpages	-	-
Assumptions	Assumpt	0,833	0,714
Market analysis complexity	Mktcompl	0,833	0,833
Market analysis tables/figures	Mkttabfig	0,714	0,714
Number of instances of obligations, necessities, and duties	Obligs	0,714	-
New markets	Newmkts	Full agreement (1)	0,833
Age at the time of writing	Age	-	-
New products	Newprods	0,833	0,833
Past actions	Pastact	-	-
Growth intention	Grwtint	Full agreement (1)	Full agreement (1)
Market share	Mktshare	Full agreement (1)	Full agreement (1)
Members advisory board	Advbrd	0,833	0,714
Entrepreneurial team business competencies	Busexp	0,714	0,833
Entrepreneurial team technical competencies	Techexp	0,714	Full agreement (1)
Number of instances of theoretical possibilities	Theor	0,833	-
Fit with previous experience	Expfit	0,714	0,429
Market segmentation	Segm	Full agreement (1)	Full agreement (1)
Projected years	Projyrs	-	-
Selected strategy	Strat	0,206	0,714
Precision of financial projection	Finprc	-	Full agreement (1)
Required start-up capital	Stpcap	Full agreement (1)	Full agreement (1)
Risks	Risks	Full agreement (1)	Full agreement (1)
Pages on competitve analysis	Companl	-	-
Amount of competitors	Compet	-	-
Amount of partnerships	Partns	-	-
Pages on partnerships	Partnsanl	-	Full agreement (1)
Openess to potential partnerships	Openpartns	0,833	0,833
Industry experience	Indexp	-	Full agreement (1)
Team experience	Expteam	Full agreement (1)	0,833
Market uncertainty	Mktunc		

APPENDIX 4: SPSS OUTPUT

APPENDIX 4.1: DESCRIPTIVE STATISTICS ALL VARIABLES.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Size entrepreneurial team	188	1	16	4,36	2,46
Business plan pages	199	4	129	30,71	20,07
Market analysis pages	199	0	16	2,26	2,30
Use of assumptions	198	1	5	2,28	1,40
Complexity of market analysis	199	1	5	2,92	1,10
Amount tab/fig in market analysis	199	0	17	1,04	2,01
Number of obligations	198	0	6	,82	1,27
Identification new market	199	0	1	,06	,23
Years between founding and writing	76	0	51	3,12	6,41
Amount new products/services	199	1	21	1,67	2,08
Mentioning of past actions	199	1	5	3,64	1,01
Growth intention	176	1	5	4,32	,94
Mentioning of intended market share	199	0	1	,26	,44
Members advisory board	199	0	23	1,60	3,00
Companies previously founded	175	0	10	1,06	1,47
Entrepreneurial team business competences	182	0	10	1,40	1,46
Entrepreneurial team technical competences	183	0	5	,80	1,03
Number of theoretical possibiliteis	197	0	10	2,50	2,19
Fit with previous experience	180	1	5	3,18	1,00
Amount of segments targeted	197	1	18	2,27	2,25
Years of revenue projection	198	0	10	3,38	1,84
Detail strategy description	198	1	5	3,31	,91
Detail of financial analysis	197	1	5	3,21	1,27
Required start-up capital	145	$0	$40,000,000		7245101,98
Detail risk analysis	199	1	5	1,69	1,24
Pages on describing competitors	199	0	10	1,70	1,72
Amount of competitors	199	0	61	6,17	7,33
Amount of partners	198	0	41	2,77	5,63
Pages on describing partnerships	199	0	6,0	,82	,79
Openess to potential partnerships	199	0	5	2,68	1,15
Years of industry experience	183	0	130	9,40	14,66
Industry experience entrepreneurial team	181	2	5	3,88	,69
Market uncertainty	199	0	1	,95	,22
Valid N (listwise)	50				

APPENDIX 4.1.1: DESCRIPTIVE STATISTICS FOR VARIABLES USED IN CALCULATIONS.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Market analysis pages	199	1	5	3,19	1,24
Assumptions	199	1	5	2,27	1,40
Market complexity	199	1	5	2,92	1,10
Market analysis tables/figures	199	1	5	1,75	1,13
Obligations	198	1	5	1,79	1,18
Business plan pages	199	1	5	3,05	1,43
Intended market share	199	1	5	2,05	1,76
Intented growth intention	176	1	5	4,32	,94
Amount of segments	197	1	5	1,91	1,16
Projected years	198	1	5	3,48	1,47
Strategy detail	198	1	5	3,31	,91
Detail of financial analysis	197	1	5	3,21	1,27
Pages on describing competitors	199	1	5	2,85	1,00
Amount of competitors	199	1	5	2,55	1,30
Identification new market	199	1	5	1,22	,92
Age at time of writing	76	1	5	2,63	1,34
Amount new products/services	199	1	5	1,49	1,03
Mentioning of past actions	199	1	5	3,64	1,01
Members advisory board	199	1	5	1,79	1,26
Companies previously founded	175	1	5	1,98	1,19
Entrepreneurial team business competences	182	1	5	2,35	1,29
Entrepreneurial technical competences	183	1	5	1,80	1,01
Number of theoretical possibilities	197	1	5	2,96	1,30
Fit with previous experience	180	1	5	3,18	1,00
Required start-up capital	145	1	5	3,13	1,42
Detail risk analysis	199	1	5	1,69	1,24
Amount of partners	198	1	5	1,83	1,13
Pages on describing partnerships	199	1	5	2,52	1,20
Openess to potential partners	197	1	5	2,71	1,12
Start-up experience	175	0	1	,52	,50
Industry experience	183	1	3	1,45	,70
Valid N (listwise)	49				

APPENDIX 4.2: SPEARMAN CORRELATION COEFFICIENTS

Correlations

	SET	BPP	MAP	UA	CMA	AT/F	NO	INM	YFW	APS	MPA	GI	MIM	MAB	CPV	EBC	ETC	NTP	FPE	AST	YRP	DSD	DFA	RC	DRA	PC	AC	AP	PP	OPP
Size entrepreneurial team	1,000	,276**	,130	,054	,111	,211**	,012	,003	,238*	,005	,361**	,094	-,077	,026	,073	,395**	,358**	,263**	,092	,069	,040	,178*	,038	,224**	,151*	,041	,150*	,39**	,18*	,292**
Business plan pages	,276**	1,000	,449**	,335**	,384**	,245**	,256**	-,087	,026	-,072	,156*	,114	,098	,235**	,069	,165*	,093	,418**	-,014	,150*	,305**	,476**	,434**	,144	,368**	,479**	,20**	,19**	,4**	,346**
Market analysis pages	,130	,449**	1,000	,268**	,802**	,588**	,084	-,064	,069	,050	,084	,105	,161*	,100	,032	,052	-,051	,266**	,089	,140	,279**	,296**	,236**	,097	,146*	,344**	,28**	,24**	,3**	,336**
Use of assumptions	,054	,335**	,268**	1,000	,333**	,151*	,203**	-,007	-,036	-,005	,044	,085	,173*	,012	-,012	,063	,096	,203**	-,058	,043	,340**	,160*	,361**	-,037	,223**	,171*	,139	,00	,12	,126
Complexity of market analysis	,111	,384**	,802**	,333**	1,000	,469**	,071	-,106	,038	,037	,031	,131	,052	,123	-,062	,115	,054	,228**	-,026	,180*	,261**	,324**	,232**	,039	,163*	,362**	,30**	,24**	,3**	,326**
Amount tab/fig in market analysis	,211**	,245**	,588**	,151*	,469**	1,000	,106	-,005	-,126	,042	,174*	,054	,094	,051	-,044	,116	,081	,158*	,149*	,058	,204**	,209**	,093	-,009	,017	,180*	,19**	,31**	,17*	,246**
Number of obligations	,012	,256**	,084	,203**	,071	,106	1,000	-,004	-,063	-,083	,035	,061	,086	,105	-,137	-,017	,001	,349**	-,011	-,134	,060	,298**	,048	,054	,313**	,194**	,075	,001	,06	,111
Identification new market	,003	-,087	-,064	-,007	-,106	-,005	-,004	1,000	,041	,027	-,029	-,081	-,044	-,014	,113	,091	,017	,063	,039	,178*	-,132	-,031	-,086	-,096	-,009	-,151*	-,122	-,04	-,06	-,065
Years between founding and writing	,238*	,026	,069	-,036	,038	-,126	-,063	,041	1,000	,179	,329**	,075	-,098	,148	,124	,063	,125	,180	,016	,273*	,041	-,147	,020	,076	,125	-,153	-,055	,216	,06	,203
Amount new products/services	,005	-,072	,050	-,005	,037	,042	-,083	,027	,179	1,000	,180*	-,119	-,098	-,074	-,036	-,144	-,035	,051	-,032	,054	-,015	-,011	,010	-,23**	-,088	-,063	-,063	,18*	,05	,055
Mentioning of past actions	,361**	,156*	,084	,044	,031	,174*	,035	-,029	,329**	,180*	1,000	,053	-,060	,026	,048	,171*	,235**	,023	,049	,094	,073	,178*	,048	,051	,105	,099	,152*	,42**	,2**	,303**
Growth intention	,094	,114	,105	,085	,131	,054	,061	-,081	,075	-,119	,053	1,000	,119	,110	,086	-,040	,061	-,057	,060	,030	,464**	,082	,045	,419**	,060	,194**	,23**	,074	,16*	,131
Mentioning of intended market share	-,077	,098	,161*	,173*	,052	,094	,086	-,044	-,098	-,098	-,060	,119	1,000	-,061	,072	,021	,017	,085	,095	,072	,192**	,046	,144*	-,049	,086	,107	,054	-,03	-,02	-,048
Members advisory board	,026	,235**	,100	,012	,123	,051	,105	-,014	,148	-,074	,026	,110	-,061	1,000	-,007	,070	,007	,100	,080	,022	,178*	,066	,170*	-,011	,156*	,163*	,128	,005	,06	,093
Companies previously founded	,073	,069	,032	-,012	-,062	-,044	-,137	,113	,124	-,036	,048	,086	,072	-,007	1,000	,074	,011	,027	,058	,007	-,076	-,078	,009	,168	,030	,019	,115	,108	,16*	,095
Entrepreneurial team business competences	,395**	,165*	,052	,063	,115	,116	-,017	,091	,063	-,144	,171*	-,040	,021	,070	,074	1,000	,429**	,175*	-,087	,163*	-,015	,149*	,037	-,005	,052	-,024	-,045	,138	,08	,120
Entrepreneurial team technical competences	,358**	,093	-,051	,096	,054	,081	,001	,017	,125	-,035	,235**	,061	,017	,007	,011	,429**	1,000	,187*	,110	,155*	,031	,015	-,054	,110	,041	,122	,175*	,22**	,10	,149*
Number of theoretical possibiliteis	,263**	,418**	,266**	,203**	,228**	,158*	,349**	,063	,180	,051	,023	-,057	,085	,100	,027	,175*	,187*	1,000	-,090	,159*	,067	,281**	,174*	,054	,321**	,236**	,123	,104	,2**	,230**
Fit with previous experience	,092	-,014	,089	-,058	-,026	,149*	-,011	,039	,016	-,032	,049	,060	,095	,080	,058	-,087	,110	-,090	1,000	-,039	,106	,051	,033	-,081	-,028	,076	,030	,076	,05	,016
Amount of segments targeted	,069	,150*	,140	,043	,180*	,058	-,134	,178*	,273*	,054	,094	,030	,072	,022	,007	,163*	,155*	,159*	-,039	1,000	,114	,071	,088	-,135	,011	,080	-,007	,019	,03	,091
Years of revenue projection	,040	,305**	,279**	,340**	,261**	,204**	,060	-,132	,041	-,015	,073	,464**	,192**	,178*	-,076	-,015	,031	,067	,106	,114	1,000	,126	,502**	,045	,089	,233**	,121	,068	,2**	,176*
Detail strategy description	,178*	,476**	,296**	,160*	,324**	,209**	,298**	-,031	-,147	-,011	,178*	,082	,046	,066	-,078	,149*	,015	,281**	,051	,071	,126	1,000	,104	,112	,096	,265**	,148*	,26**	,4**	,339**
Detail of financial analysis	,038	,434**	,236**	,361**	,232**	,093	,048	-,086	,020	,010	,048	,045	,144*	,170*	,009	,037	-,054	,174*	,033	,088	,502**	,104	1,000	,055	,231**	,142*	,026	,038	,2**	,156*
Required start-up capital	,224**	,144	,097	-,037	,039	-,009	,054	-,096	,076	-,23**	,051	,419**	-,049	-,011	,168	-,005	,110	,054	-,081	-,135	,045	,112	,055	1,000	,063	,096	,27**	,114	,14	,157
Detail risk analysis	,151*	,368**	,146*	,223**	,163*	,017	,313**	-,009	,125	-,068	,105	,060	,086	,156*	,030	,052	,041	,321**	-,028	,011	,089	,096	,231**	,063	1,000	,203**	,107	,037	,06	,028
Pages on describing competitors	,041	,479**	,344**	,171*	,362**	,180*	,194**	-,151*	-,153	-,063	,099	,194**	,107	,163*	,019	-,024	,122	,236**	,076	,080	,233**	,265**	,142*	,096	,203**	1,000	,62**	,19**	,2**	,319**
Amount of competitors	,150*	,202**	,280**	,139	,296**	,192**	,075	-,122	-,055	-,063	,152*	,232**	,054	,128	,115	-,045	,175*	,123	,030	-,007	,121	,148*	,026	,274**	,107	,620**	1,00	,19**	,2**	,317**
Amount of partners	,390**	,187**	,243**	-,004	,240**	,309**	,001	-,039	,216	,181*	,416**	,074	-,027	,005	,108	,138	,218**	,104	,076	,019	,068	,259**	,038	,114	,037	,194**	,19**	1,00	,6**	,667**
Pages on describing partnerships	,177*	,366**	,254**	,125	,278**	,173*	,061	-,056	,062	,054	,201**	,157*	-,022	,059	,163*	,081	,096	,236**	,054	,029	,230**	,391**	,187**	,136	,059	,245**	,22**	,58**	1,0	,784**
Openess to potential partnerships	,292**	,346**	,336**	,126	,326**	,246**	,111	-,065	,203	,055	,303**	,131	-,048	,093	,095	,120	,149*	,230**	,016	,091	,176*	,339**	,156*	,157	,028	,319**	,32**	,67**	,8**	1,000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

APPENDIX 4.3: DESCRIPTIVES OF CAUSATION AND EFFECTUATION DIMENSIONS.

Descriptives dimensions causation

	N	Mean	Std. Deviation
Predictive control dimension (Causation)	199	2,50	,818
Ends dimension (Causation)	199	3,00	1,224
Expected return dimension (Causation)	199	2,98	,777
Competitive analysis dimension (Causation)	199	2,70	1,022

Descriptives dimensions effectuation

	N	Mean	Std. Deviation
Non-predictive control dimension (Effectuation)	199	2,15	,633
Means dimension (Effectuation)	199	2,32	,587
Affordable loss dimension (Effectuation)	199	2,18	1,105
Seeking partnerships dimension (Effectuation)	199	2,35	1,010

APPENDIX 4.4: INDEPENDENT SAMPLES T-TEST 'INDUSTRY EXPERIENCE' AND CAUSATION/EFFECTUATION.

Group Statistics

	Industry experience	N	Mean	Std. Deviation	Std. Error Mean
Predictive control dimension (Causation)	Low experience	122	2,55	,782	,071
	High experience	22	**2,69**	,823	,176
Ends dimension (Causation)	Low experience	122	3,08	1,167	,106
	High experience	22	**3,39**	1,234	,263
Expected return dimension (Causation)	Low experience	122	3,06	,733	,066
	High experience	22	**3,08**	,847	,180
Competitive analysis dimension (Causation)	Low experience	122	2,73	,986	,089
	High experience	22	**2,89**	1,154	,246
Non-predictive control dimension (Effectuation)	Low experience	122	**2,17**	,653	,059
	High experience	22	2,13	,569	,121
Means dimension (Effectuation)	Low experience	122	**2,35**	,562	,051
	High experience	22	2,25	,580	,124
Affordable loss dimension (Effectuation)	Low experience	122	2,26	1,118	,101
	High experience	22	**2,57**	1,105	,236
Seeking partnerships dimension (Effectuation)	Low experience	122	2,36	1,035	,094
	High experience	22	**2,45**	,940	,200

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Predictive control dimension (Causation)	Equal variances assumed	,045	,832	-,775	142	**,440**	-,142	,183	-,503	,220
	Equal variances not assumed			-,748	28,266	,461	-,142	,189	-,529	,246
Ends dimension (Causation)	Equal variances assumed	,462	,498	-1,117	142	**,266**	-,304	,273	-,843	,234
	Equal variances not assumed			-1,074	28,190	,292	-,304	,283	-,885	,276
Expected return dimension (Causation)	Equal variances assumed	,534	,466	-,088	142	**,930**	-,015	,174	-,359	,328
	Equal variances not assumed			-,080	26,972	,937	-,015	,192	-,410	,379
Competitive analysis dimension (Causation)	Equal variances assumed	,459	,499	-,669	142	**,505**	-,157	,234	-,620	,307
	Equal variances not assumed			-,599	26,809	,554	-,157	,262	-,694	,380
Non-predictive control dimension (Effectuation)	Equal variances assumed	,772	,381	,239	142	**,812**	,035	,149	-,258	,329
	Equal variances not assumed			,263	31,854	,794	,035	,135	-,240	,310
Means dimension (Effectuation)	Equal variances assumed	,396	,530	,819	142	**,414**	,107	,131	-,152	,366
	Equal variances not assumed			,801	28,574	,430	,107	,134	-,167	,381
Affordable loss dimension (Effectuation)	Equal variances assumed	,067	,797	-1,184	142	**,239**	-,306	,258	-,817	,205
	Equal variances not assumed			-1,193	29,285	,242	-,306	,256	-,830	,218
Seeking partnerships dimension (Effectuation)	Equal variances assumed	,379	,539	-,397	142	**,692**	-,094	,237	-,562	,374
	Equal variances not assumed			-,424	30,929	,674	-,094	,221	-,545	,357

APPENDIX 4.5: RESULTS INDEPENDENT SAMPLES T-TESTS 'INDUSTRY EXPERIENCE' AND CAUSATION/EFFECTUATION ON VARIABLE LEVEL.

	Mean difference	Sig. 2-tailed			Mean difference	Sig. 2-tailed
Business plan pages	High (2.77)	0,566		Identification new market	Low (0,0037)	0,941
Market analysis pages	High (0,5)	0,358		Years founding/writing	Low (2,554)	0,35
Use of assumptions	High (0,27)	0,424		Amount new product/services	High (0,26)	0,625
Complexity market analysis	Low (0,08)	0,733		Mentioning past actions	High (0,03)	0,88
Amount tab/fig market analysis	High (0,79)	0,342		Members advisory board	Low (0,25)	0,74
Number of obligations	High (0,02)	0,95		Companies previously founded	Low (0,5)	0,17
Growth intention	Low (0,07)	0,718		Entrepreneurial business comp.	Low (0,48)	0,181
Mentioning market share	High (0,16)	0,187		Entrepreneurial technical comp.	Low (0,32)	0,185
Amount segments targeted	Low (0,21)	0,676		Number theoretical possibilities	Low (0,67)	0,212
Years of revenue projection	High (0,09)	0,825		Fit previous experience	High (0,84)	**0,000**
Detail strategy description	Low (0,09)	0,655		Required capital	Low (63426,9)	0,972
Detail financial analysis	High (0,14)	0,586		Detail risk analysis	High (0,36)	0,226
Pages on competitors	High (0,385)	0,251		Amount of partners	Low (0,31)	0,807
Amount of competitors	High (1,42)	0,441		Pages on describing partners	High (0,032)	0,872
				Openess to potential partners	High (0,07)	0,79

APPENDIX 4.6: INDEPENDENT SAMPLES T-TEST 'START-UP EXPERIENCE' AND CAUSATION/EFFECTUATION.

Group Statistics

	Start-up experience	N	Mean	Std. Deviation	Std. Error Mean
Predictive control dimension (Causation)	Novice entrepreneur	84	**2,57**	,855	,093
	Expert entrepreneur	91	2,52	,785	,082
Ends dimension (Causation)	Novice entrepreneur	84	2,94	1,088	,119
	Expert entrepreneur	91	**3,14**	1,252	,131
Expected return dimension (Causation)	Novice entrepreneur	84	**3,05**	,758	,083
	Expert entrepreneur	91	3,03	,692	,073
Competitive analysis dimension (Causation)	Novice entrepreneur	84	2,68	1,064	,116
	Expert entrepreneur	91	**2,78**	,984	,103
Non-predictive control dimension (Effectuation)	Novice entrepreneur	84	2,05	,572	,062
	Expert entrepreneur	91	**2,18**	,628	,066
Means dimension (Effectuation)	Novice entrepreneur	84	2,40	,630	,069
	Expert entrepreneur	91	**2,49**	,628	,066
Affordable loss dimension (Effectuation)	Novice entrepreneur	84	2,13	1,059	,116
	Expert entrepreneur	91	**2,40**	1,143	,120
Seeking partnerships dimension (Effectuation)	Novice entrepreneur	84	2,24	,958	,104
	Expert entrepreneur	91	**2,56**	1,057	,111

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Predictive control dimension (Causation)	Equal variances assumed	,630	,428	,418	173	**,677**	,052	,124	-,193	,296
	Equal variances not assumed			,417	168,408	,678	,052	,124	-,194	,297
Ends dimension (Causation)	Equal variances assumed	4,790	,030	-1,137	173	,257	-,202	,178	-,554	,149
	Equal variances not assumed			-1,144	172,377	**,254**	-,202	,177	-,552	,147
Expected return dimension (Causation)	Equal variances assumed	,586	,445	,202	173	**,840**	,022	,110	-,194	,239
	Equal variances not assumed			,202	168,104	,840	,022	,110	-,195	,239
Competitive analysis dimension (Causation)	Equal variances assumed	1,482	,225	-,618	173	**,537**	-,096	,155	-,401	,210
	Equal variances not assumed			-,616	168,783	,538	-,096	,155	-,402	,211
Non-predictive control dimension (Effectuation)	Equal variances assumed	,978	,324	-1,413	173	**,159**	-,129	,091	-,309	,051
	Equal variances not assumed			-1,419	172,972	,158	-,129	,091	-,308	,050
Means dimension (Effectuation)	Equal variances assumed	,002	,969	-1,026	173	**,306**	-,098	,095	-,285	,090
	Equal variances not assumed			-1,026	171,762	,307	-,098	,095	-,285	,090
Affordable loss dimension (Effectuation)	Equal variances assumed	,013	,911	-1,618	173	**,107**	-,270	,167	-,600	,059
	Equal variances not assumed			-1,623	172,997	,106	-,270	,166	-,599	,058
Seeking partnerships dimension (Effectuation)	Equal variances assumed	1,298	,256	-2,132	173	**,034**	-,326	,153	-,628	-,024
	Equal variances not assumed			-2,140	172,942	,034	-,326	,152	-,627	-,025

APPENDIX 4.7: RESULTS INDEPENDENT SAMPLES T-TESTS 'START-UP EXPERIENCE' AND CAUSATION/EFFECTUATION ON VARIABLE LEVEL.

	Mean difference	Sig. 2-tailed		Mean difference	Sig. 2-tailed
Business plan pages	Expert (3,08)	0,313	Identification new market	Expert (0,05)	0,177
Market analysis pages	Expert (0,121)	0,734	Years founding/writing	Expert (1.732)	0,296
Use of assumptions	Novice (0,03)	0,88	Amount new product/services	Expert (0,15)	0,627
Complexity market analysis	Novice (0,10)	0,552	Mentioning past actions	Expert (0,17)	0,226
Amount tab/fig market analysis	Novice (0,47)	0,153	Members advisory board	Expert (0,23)	0,624
Number of obligations	Novice (0,41)	**0,043**	Entrepreneurial business comp.	Expert (0,24)	0,27
Growth intention	Expert (0.32)	**0,035**	Entrepreneurial technical comp.	Expert (0,03)	0,876
Mentioning market share	Expert (0,07)	0,291	Number theoretical possibilities	Expert (0,07)	0,832
Amount segments targeted	Expert (0,19)	0,555	Fit previous experience	Expert (0,06)	0,673
Years of revenue projection	Novice (0,23)	0,39	Required capital	Expert (4021036,74)	**0,001**
Detail strategy description	Novice (0,08)	0,522	Detail risk analysis	Expert (0,21)	0,294
Detail financial analysis	Expert (0,05)	0,788	Amount of partners	Expert (1,12)	0,192
Pages on competitors	Novice (0,12)	0,66	Pages on describing partners	Expert (0,353)	**0,003**
Amount of competitors	Expert (1.16)	0,305	Openess to potential partners	Expert (0,28)	0,104

APPENDIX 4.8: WILCOXON RANK SUM (OR MANN-WHITNEY U) TEST 'MARKET UNCERTAINTY' AND CAUSATION/EFFECTUATION.

Ranks

	Market uncertainty	N	Mean Rank	Sum of Ranks
Predictive control dimension (Causation)	Low	10	**105,85**	1058,50
	High	189	99,69	18841,50
Ends dimension (Causation)	Low	10	**109,60**	1096,00
	High	189	99,49	18804,00
Expected return dimension (Causation)	Low	10	99,10	991,00
	High	189	**100,05**	18909,00
Competitive analysis dimension (Causation)	Low	10	70,35	703,50
	High	189	**101,57**	19196,50
Non-predictive control dimension (Effectuation)	Low	10	79,05	790,50
	High	189	**101,11**	19109,50
Means dimension (Effectuation)	Low	10	92,00	920,00
	High	189	**100,42**	18980,00
Affordable loss dimension (Effectuation)	Low	10	**100,55**	1005,50
	High	189	99,97	18894,50
Seeking partnerships dimension (Effectuation)	Low	10	37,45	374,50
	High	189	**103,31**	19525,50

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	Predictive control dimension (Causation)	Ends dimension (Causation)	Expected return dimension (Causation)	Competitive analysis dimension (Causation)	Non-predictive control dimension (Effectuation)	Means dimension (Effectuation)	Affordable loss dimension (Effectuation)	Seeking partnerships dimension (Effectuation)
Mann-Whitney U	886,500	849,000	936,000	648,500	735,500	865,000	939,500	319,500
Wilcoxon W	18841,500	18804,000	991,000	703,500	790,500	920,000	18894,500	374,500
Z	-,330	-,555	-,051	-1,692	-1,193	-,453	-,032	-3,552
Asymp. Sig. (2-tailed)	,741	,579	,959	,091	,233	,651	,975	**,000**

Grouping Variable: Market uncertainty

APPENDIX 4.9: RESULTS WILCOXON RANK SUM (OR MANN-WHITNEY U) TEST 'MARKET UNCERTAINTY' AND CAUSATION/EFFECTUATION ON VARIABLE LEVEL.

	Mean rank difference	Sig. 2-tailed		Mean rank difference	Sig. 2-tailed
Business plan pages	High (10,53)	0,573	Identification new market	Low (4,69)	0,526
Market analysis pages	Low (3,79)	0,838	Years founding/writing	High (8,44)	0,452
Use of assumptions	Low (7,53)	0,67	Amount new product/services	High (2,53)	0,852
Complexity market analysis	High (2,74)	0,877	Mentioning past actions	High (26,38)	0,14
Amount tab/fig market analysis	Low (36,27)	0,025	Members advisory board	High (1.16)	0,941
Number of obligations	Low (16,54)	0,314	Companies previously founded	High (10, 71)	0,487
Growth intention	High (20,85)	0,183	Entrepreneurial business comp.	High (25,92)	0,117
Mentioning market share	Low (14,53)	0,307	Entrepreneurial technical comp.	High (24,01)	0,128
Amount segments targeted	High (15,96)	0,346	Number theoretical possibilities	High (8,27)	0,666
Years of revenue projection	Low (14,48)	0,419	Fit previous experience	Low (40,39)	**0,012**
Detail strategy description	High (16, 43)	0,348	Required capital	High (20,37)	0,157
Detail financial analysis	Low (13,85)	0,438	Detail risk analysis	Low (10,37)	0,489
Pages on competitors	High (33,11)	0,072	Amount of partners	High (34,86)	**0,041**
Amount of competitors	High (27,59)	0,135	Pages on describing partners	High (66,07)	**0,000**
			Openess to potential partners	High (64,33)	**0,000**