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A Study of Effectual Behavior Among Student Entrepreneurs

How do student entrepreneurs in a Venture Creation Program behave in a situation of uncertainty?

Terje Bogevik

Oscar Federl

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Supervisor: Roger Sørheim, IØT

Norwegian University of Science and Technology
Department of Industrial Economics and Technology Management

Assignment Text

To study how student entrepreneurs in a venture creation program display effectual behavior when dealing with uncertainty, by tracking four student launched startups in the early stages of venture creation.

The following main points will be included: Research methodology, theory on uncertainty and effectual behavior, case studies, analysis of empirical data with the use of a theoretical framework, summary of findings and conclusion.

Preface

This master thesis is written by two master students attending the NTNU's School of Entrepreneurship at the Norwegian University of Science and Technology (NTNU). The thesis is written as an assignment in the subject TIØ4945. The authors want to thank their supervisor Roger Sørheim for his guidance. His valuable support and feedback has been much appreciated. The authors would also like to thank the informants from each of the interviewed case firms for donating their time. Their participation has been of great value for this thesis.

Abstract

Deciding to start a new venture is undoubtedly a risky decision. In fact, around 90 per cent of all startups fail. This high failure rate is explained by the fact that entrepreneurs launching a new venture find themselves in an environment of extreme uncertainty. This uncertainty is a product of how well the entrepreneur is suited in terms of means to pursue the entrepreneurial opportunity they have chosen. To cope with this uncertainty, entrepreneurs need to acquire new learning and new means in order to create a more predictable and manageable situation. Sarasvathy describes how expert entrepreneurs predominantly display what she calls effectual behavior in order to effectively deal with uncertainty. However, little research has been done to address whether the principles of effectual behavior are advantageous to student entrepreneurs in the same way. To find out, the authors have formulated the following research questions: 1) *How do initial means affect the behavior of student entrepreneurs in a situation of uncertainty?* 2) *How are student entrepreneurs focusing on expanding their means through learning in order to reduce uncertainty?* 3) *How are student entrepreneurs displaying effectual and causal behavior in a situation of uncertainty?*

To answer these questions, a qualitative approach has been taken, with a multiple longitudinal case study as research design. Four case firms have been chosen, all from the same venture creation program. The student entrepreneurs in the case firms attended the same class and were tracked for two months through semi-structured interviews. Business model development was also tracked, through the use of Lean Canvases. A cross-case analysis was then conducted in order to investigate how theoretical elements in the existing literature could explain the behavior of the entrepreneurs in a situation of uncertainty.

Out of the four case firms, two of the ventures failed during these two months. The other two were already acquiring customers and still active after the interview sessions had been concluded. These two sets differed greatly in one key variable: The two cases that failed lacked means in terms of domain knowledge and network to a much greater extent than the cases that were still operating. The findings also suggested that learning through experimentation similar to the lean startup methodology may be inefficient when the entrepreneurs lack enough domain knowledge about the industry they are trying to enter. Both findings are suggested to be pursued further with quantitative studies.

Sammendrag

Å skulle starte opp en ny bedrift er utvilsomt risikabelt. Faktisk så feiler rundt 90 prosent av alle oppstartsbedrifter. Denne høye feilraten kan forklares ved at entreprenører som starter opp nye bedrifter befinner seg i en situasjon preget av ekstrem usikkerhet. Denne usikkerheten formes av hvor gode forutsetninger entreprenøren har for å skulle forfølge den entreprenørielle muligheten man har valgt å forfølge. For å kunne håndtere denne usikkerheten må entreprenører tilegne seg ny læring og nye midler for å skape en mer forutsigbar og overkommelig situasjon. Sarasvathy har beskrevet hvordan ekspertentreprenører først og fremst utviser såkalt effektuell oppførsel for å håndtere denne usikkerheten. Men det er blitt gjort lite undersøkelse rundt hvorvidt effektuell oppførsel også er fordelaktig for studententreprenører på samme måten. For å finne ut av dette har forfatterne formulert følgende forskningsspørsmål: *1) Hvordan påvirker initielle forutsetninger oppførselen til studententreprenører i en situasjon preget av usikkerhet? 2) I hvilken grad fokuserer studententreprenører på å utvide deres midler gjennom ny lærdom for å redusere usikkerhet? 3) Hva slags effektuell og kausal oppførsel utviser studententreprenører i en situasjon preget av usikkerhet?*

For å besvare disse spørsmålene har forfatterne valgt en langsgående kvalitativ saksstudie som studiedesign, med fire forskjellige case-bedrifter. Alle bedriftene er valgt fra ett og samme Venture Creation Program. Studententreprenørene er alle fra samme kull og har blitt fulgt over en periode på to måneder gjennom semistrukturerte intervjuer. Utviklingen av forretningsmodeller har også blitt studert gjennom bruk av Lean canvas. De forskjellige case-bedriftene har deretter blitt sammenlignet for å forstå hvordan de forskjellige teoretiske elementene i den eksiterende litteraturen kan forklare deres oppførsel i en usikker situasjon.

Av de fire case-bedriftene hadde to gitt opp, mens to fortsatte videre med betalende kunder, etter at intervjuperioden var sluttført. Disse to gruppene skiller seg signifikant fra hverandre ved én variabel: De to case-bedriftene som gav opp hadde langt mindre forutsetninger med tanke på domenekunnskap og relevant nettverk enn de to som fortsatte. Et annet funn var at læring gjennom eksperimentering av typen Lean Startup kanskje ikke har så mye for seg når man mangler domenekunnskaper. Begge funn anbefales å studere videre kvantitativt.

Table of Content

1 Introduction

Deciding to start a new venture is undoubtedly a risky decision. In fact, around 90 per cent of all startups fail according to Giardino et al. (2014). This high failure rate could be explained by the fact that entrepreneurs, and especially those exploring new market opportunities, find themselves in an environment of extreme uncertainty (Alvarez and Barney, 2005; Ries, 2011; Moogk, 2012). This situation contrasts strongly with traditional business management, which takes place in a more predictable environment (Loasby, 2002), described as a situation of risk (Knight, 1921). Situations of uncertainty stems from the unpredictability of entrepreneurial opportunities. The degree of uncertainty can be related to the degree of innovation of the entrepreneurial opportunity (Knight, 1921). In addition, the prerequisites the entrepreneur possesses also play into how opportunity beliefs are formed about the opportunity the entrepreneur is pursuing (McMullen and Shepherd 2006; Shane, 2000; von Hippel, 1988). These opportunity beliefs are framed by different sources of perceived uncertainty within the environment the new venture is operating (Milliken, 1987). In order to increase their chance of success, entrepreneurs need to efficiently cope with and reduce uncertainty.

In an attempt to explain how expert entrepreneurs embrace uncertainty, Sarasvathy (2001) presented what has become one of the most dominant theories within the field of entrepreneurship, the theory on effectuation (Alvarez et al., 2016; Fisher 2012). Effectual behaviors, such as focusing on initial means and partnerships (Sarasvathy, 2008b; Read et al., 2009), are suggested to be important for new ventures in a situation of uncertainty (Sarasvathy, 2001; Berends et al., 2014).

Multiple studies have linked effectuation theory to entrepreneurial learning (Berends et al., 2016; Cai et al., 2017; Dew et al., 2008). The ability to learn is considered essential for successful entrepreneurs (Kirzner, 1973; Popta, 2002; Smilor, 1997). However, it does not exist consensus in the literature on what type of learning is most common in an entrepreneurial setting. Vicarious learning, learning through others, is saving resources (Kim and Miner, 2007) and is suggested to be especially advantageous in a situation of high uncertainty (Holcomb, 2009). Others are arguing experiential learning, learning through trial and error, is the dominant form of learning among entrepreneurs (Kakouris and Akritidis, 2012). Furthermore, other research is specifically suggesting that entrepreneurs should learn

through experiments in order to effectively handle uncertainty (Andries et al., 2013; Gilbert and Eyring, 2010; Moogk, 2012). Literature on entrepreneurship outside of academia is also advocating this experimental approach, the most widespread example being Ries' (2011) The Lean Startup Method (Blank, 2013). Fredriksen and Brem (2016) argues that the methodology such as Ries (2011) presents can almost be considered a practical implementation of Sarasvathy's (2001) effectuation.

1.1 Gaps in the Literature

The existing literature on effectuation is based on expert entrepreneurs (Sarasvathy, 2001; 2008b). There is growing evidence that expert entrepreneurs are using effectual behavior (Dew et al., 2008), but little research is done to investigate if, and when, novice entrepreneurs also behave effectually. One contribution is Dew et al. (2009) that found expert entrepreneurs to be more effectual compared to a group of MBA students. However, MBA students and novice entrepreneurs are not necessarily comparable and may behave differently based on what they have been taught. Thus, the existing literature on effectual behaviors among novice entrepreneurs is scarce, and further research is deemed necessary (Perry et al., 2012). There also appear to be a gap in empirical research in the field of adopting entrepreneurial learning in order to reduce uncertainty (Secundo et al., 2015). Wang and Chugh (2014) suggests more qualitative research on entrepreneurial learning is necessary to better understand how learning plays a part in entrepreneurial contexts.

1.2 Purpose and Research Questions

This thesis seeks to examine how opportunity beliefs and uncertainty apply to nascent entrepreneurs during the early stage of launching their startups, and if and how they use effectual behavior to cope with this uncertainty. Thus, the authors aimed to better understand how novice entrepreneurs behave and learn in the early phases of a new venture, which is considered a situation of high uncertainty. Bird and Schjoedt (2009, p. 327) argue that knowledge on how entrepreneurs behave benefits the society as it allows entrepreneurs "to shape and change their behaviors for better outcomes." The authors therefore believe addressing this topic is important in order to reduce the high failure rate among startups, thus benefiting society as a whole.

Based on the literature presented in the introduction, the authors decided the purpose of this study to be as followed:

Investigate how student entrepreneurs in a Venture Creation Program behave in a situation of uncertainty.

As the aim was to study novice entrepreneurs, it became natural to set the scope to Venture Creation Programs (VCP). A VCP can be described as an educational program, typically part of a university, that specializes in venture creation (Lackéus and Middleton, 2015). In these settings, student entrepreneurs are often "fully involved as entrepreneurs in the start-up process, from idea selection, team composition, to venture formation and the process of attracting investors" (Rasmussen and Sørheim, 2006, p. 189). The students are in other words practitioners of entrepreneurship in an educational environment, thus a VCP appeared as a great environment to investigate novice entrepreneurs.

To address the purpose of the thesis, the authors have formulated the following research questions:

RQ I: *How do initial means affect the behavior of student entrepreneurs in a situation of uncertainty?*

RQ II: *How are student entrepreneurs focusing on expanding their means through learning in order to reduce uncertainty?*

RQ III: *How are student entrepreneurs displaying effectual and causal behavior in a situation of uncertainty?*

1.3 Contribution

The authors believe they can make an important contribution to the scarce understanding of how student entrepreneurs, and perhaps novice entrepreneurs in general, behave in the early process of a new venture. By performing a longitudinal, multiple case study on four early stage startup companies, the authors expect to gather data that may indicate and explain

behavior that is not yet vastly covered in the existing literature. The goal is to find answers that can both contribute to the understanding of entrepreneurial learning through quantitative studies, as well as enhancing the understanding of effectual and causal behavior among novice entrepreneurs.

1.4 Structure of the Thesis

In this chapter, the importance of understanding entrepreneurial behavior and learning in situations of uncertainty has been addressed, as well as the gap in the literature on the topics. In the following chapter, a literature review on these topics will be presented. Chapter 3 presents the methodology used by the authors when gathering data in the longitudinal, multiple case study. In Chapter 4, a comprehensive presentation of the four case firms will be presented, before the findings will be analyzed in a cross-case manner in Chapter 5. Lastly, the conclusion will be presented in Chapter 6, followed by the implications for further research, venture creation programs, and student entrepreneurs in Chapter 7.

2 Literature Review

2.1 Entrepreneurial opportunity

2.1.1 Entrepreneurial opportunity

The creation of new firms is about grasping economic opportunities. The theory of entrepreneurial opportunity is based on a number of elements supporting the validation of such an economic opportunity (Sarasvathy et al., 2003). Mainly, the opportunity has to have some economic end that can be reached through actions performed by the entrepreneur (Shane and Venkataraman, 2000). These actions needs to be implemented through products, services, firms and markets. Hayek (1945), Knight (1921) and Buchanan and Vanberg (1991) divide entrepreneurial opportunity into three distinct categories. These are opportunity recognition, opportunity discovery and opportunity creation. Buchanan and Vanberg (1991) and Sarasvathy et al. (2003) describe the different types of entrepreneurial opportunity as opportunity recognition, opportunity discovery and opportunity creation. The different types of opportunity differ in terms of whether supply and demand already exist or need to be created:

Opportunity Recognition

Supply and demand already exist. The entrepreneur recognizes the opportunity and implements the necessary actions and processes needed to match up the recognized supply and demand, either through an existing firm or through establishing a new one. This type of opportunity is about exploiting the current market situation.

Opportunity Discovery

This type of opportunity arises when either the supply or the demand side (but not both) already exists. The corresponding side has to be “discovered”. That is, either there exists a supply of some technology or resource that meets an uncovered demand, or there exists a demand which is met by providing some new product or service on the supply side. Either way, this type of opportunity has to do with exploring existing markets.

Opportunity Creation

If neither supply nor demand exist, both need to be created for a new opportunity to arise. This type of opportunity has to do with the creation of new markets as well as new technology or products in order to serve those markets.

These three distinctive types of entrepreneurial opportunity can be distinguished by different challenges with regards to understanding of the market situation, technological capabilities and how supply and demand can be developed. This is a way of describing entrepreneurial opportunity (Knight, 1921) as objective to the environment, where opportunities exist for all to pursue. The nature of entrepreneurial opportunities however; whether they are objective or subjective (Alvarez and Barney, 2007), is subject to recent debate (Hansen et al. 2011; Venkataraman et al. 2012). Scholars disagree about whether entrepreneurial opportunities form within the market itself or whether the opportunity arises due to individual skill set and knowledge (Kirzner, 1979; Shane, 2000). According to Davidsson (2015) and Grégoire et al. (2010), there is no point in discussing opportunity recognition outside the entrepreneur's beliefs about the feasibility of an idea for a new venture, because whether that idea can be termed an entrepreneurial opportunity only becomes clear after actions have been taken to pursue that opportunity. These subjective understandings of entrepreneurial opportunity are described as "opportunity beliefs" and forms the basis for entrepreneurial action; actions taken by the entrepreneur in pursuit of such an opportunity.

2.1.2 Opportunity beliefs

The opportunity beliefs formed by entrepreneurs can be defined by the entrepreneur's degree of certainty that the venture idea is feasible, that it in fact represents an entrepreneurial opportunity (Grégoire et al., 2010). According to McMullen and Shepherd (2006), the process of an entrepreneur recognizing an opportunity is two-fold: An opportunity is initially perceived as a "third-person opportunity". That is, the opportunity is observed as an objective opportunity existing for someone to pursue. Next, the entrepreneur forms opportunity beliefs about whether this opportunity might be a subjective opportunity, i.e. an opportunity relevant for him or her, and whether it is worth pursuing (McMullen and Shepherd 2006). These beliefs are based on the evaluated risk, uncertainty and ambiguity associated with the opportunity, matched against the entrepreneur's knowledge, values and motivation (Shepherd et al., 2007). Strong opportunity beliefs in an entrepreneurial opportunity are closely related

to entrepreneurial action, according to Bergmann (2017). This positive effect of confidence in opportunity beliefs on successful venture emergence has been shown empirically through longitudinal studies by Dimov (2010).

The factor influencing how opportunity beliefs are formed is human capital. Human capital is the acquired knowledge, skills and abilities (Becker, 1964; Schultz, 1959) of the entrepreneur. Specific human capital is important for the formation of opportunity beliefs. When considering human capital relevant for the launching of new ventures, two aspects of human capital are especially important (Bergmann, 2015); professional experience and knowledge about entrepreneurship through formal entrepreneurship education:

Professional experience

When starting a new venture, professional experience within the relevant industry can be important in order to understand customer problems (von Hippel, 1988). Knowledge about the domain in question and the different customers and actors within it represents contextual understanding that makes novice entrepreneurs better capable of acquiring information and testing feasibility (McMullen and Shepherd 2006; Shane, 2000). The confidence in opportunity beliefs also increases (Dimov 2010; Fiet 1996) with accumulated domain knowledge. According to Shepherd and DeTienne (2005), the degree of prior knowledge of customer problems directly increases both the number of opportunities recognized by the entrepreneur and the innovativeness of those opportunities.

Formal entrepreneurship education

Entrepreneurship education constitutes a knowledge of entrepreneurship literature and frameworks for launching new ventures. There is empirical evidence to suggest that entrepreneurship education increases students' intentions of, and motivations for, conducting entrepreneurial activities (Peterman and Kennedy, 2003; Pittaway and Cope 2007). Martin et al. (2013) has provided quantitative research about the effects of formal entrepreneurship education on human capital assets (which again influences opportunity beliefs). But even though some correlations could be observed, the effect sizes on average were small, suggesting that other factors such as might play a larger role. So there exists little evidence to support any significant effect of formal entrepreneurship education on the ability to recognise entrepreneurial opportunity and the formation of opportunity beliefs (Bergmann, 2017; Souitaris et al., 2007).

2.2 Entrepreneurial Uncertainty

Uncertainty is a result of lack of knowledge. For managers of firms, this involves a lack of knowledge when put into a situation where knowledge acquired from previous experience is incongruent with the knowledge required to solve problems and challenges related to the managing and development of the firm (Jalonen, 2012). When starting a new venture, uncertainties are even more severe than when dealing with established firms. McMullen and Shepherd (2006, p. 133) state that "uncertainty constitutes a conceptual cornerstone for most theories of the entrepreneur", implying that the study of uncertainty surrounding entrepreneurial opportunity is fundamental to understanding challenges entrepreneurs must overcome when launching a new venture. So, the nature of uncertainty is central to venture creation, where it is entrepreneurial action that transforms this uncertainty into entrepreneurial opportunities. In the following subsections, two different theories on uncertainty will be presented: economic uncertainty (Knight, 1921) describes degree of uncertainty, while environmental uncertainty (Milliken, 1987) deals with different categorized types of uncertainty.

2.2.1 Economic Uncertainty

Knight (1921) distinguishes between three degrees of economic uncertainty: true uncertainty, uncertainty and manageable risk (Table 3.1). The major difference between entrepreneurial decision making and traditional business management is actually that the former takes place under conditions dominated by uncertainty, whereas the latter takes place under conditions of manageable risk (Loasby, 2002). According to Knight (1921), the difference between situations of uncertainty and situations of manageable risk is "measurability". Uncertainty can however be reduced to manageable risk through learning. True uncertainty describes a situation where the situation is uncertain, but also impossible to get control of. Uncertainty is considered transformed into manageable risk when two criteria have been met (Wald, 1950):

- Possible future outcomes of actions are known.
- A probability of all outcomes can be calculated.

So, in theory, a situation is defined as risky when decision makers are aware of all possible outcomes of their actions, as well as able to assign a certain probability to the different possible outcomes. In practice, this transformation is only possible with a limited amount of precision, as the variables shaping the future are simply too complex to control. Thus, one

could instead interpret manageable risk as a state of relatively stable conditions where the outcome of actions can be predicted with fair likelihood, and where planning strategies for dealing with these risks are effective.

True uncertainty	Uncertainty	Manageable risk
Possible outcomes are unknown, and the probability distribution of these outcomes is impossible to assign.	The probability distribution of possible outcomes exists but is unknown to the entrepreneur. The distribution has to be revealed through learning.	All possible outcomes are known, as well as the probabilities of these events. Decision making is based on calculated risk.

Table 2.1 - Three types of economic uncertainty (Knight, 1921)

Traditional economic and financial models for making business decisions are usually designed for decisions made in conditions of manageable risk. Examples of this are calculations of net cash flow or calculations of the present value of a new investment (Brealey and Myers, 1988; Cyert and DeGroot 1987). Both strategies apply well under situations of risk, but are less applicable under conditions of uncertainty (Grossman and Hart, 1986).

2.2.2 Environmental uncertainty

While Knight (1921) was significant for defining the older literature on uncertainty, Milliken's (1987) theory of environmental uncertainty is the governing paradigm for more recent literature. Her theory on environmental uncertainty seeks to understand how an organization perceives and interacts with its environment. While some consider environmental uncertainty as objective and part of the external environment, Milliken (1987) views uncertainty in relation to the perception of the environment through the subjective entrepreneur. So really, Milliken (1987) is describing perceived environmental uncertainty. She states that there is no "clear evidence of a relationship between objective characteristics of the environment and perceptions of uncertainty" (Milliken, 1987, p. 133). Therefore, the uncertainty that is really relevant to talk about is the one in the eye of the beholder. Environmental uncertainty is divided into three different categories: state uncertainty, effect uncertainty and response uncertainty.

State uncertainty

This type of uncertainty is related to lack of information about or understanding of how the environment operates and how different environmental elements interact. Decision makers find it difficult to assign probabilities to possible events that may impact the environment of the organization. This is the type of uncertainty most authors usually are referring to when talking about "environmental uncertainty", according to Milliken (1987). So, it is also the type of uncertainty that most empirical research has been done on.

Effect uncertainty

This term refers to the uncertainty of how changes in the environment will impact the organization, and how deeply. If the state of the environment changes, what implications will these changes have for the venture? How will relations to customers, competitors and other relevant parties interacting with the venture be affected by for instance political regulations, technological discoveries, new market trends or changes in competition?

Response uncertainty

Response uncertainty is the uncertainty related to the organization's options as to how to respond to its environment. This kind of uncertainty deals with decision makers being unable to predict the consequences of their actions and is derived from the same type of uncertainty as the one described in decision making theory (Conrath, 1967). This uncertainty is high when the decision maker is not confident on what entrepreneurial actions to take and may also include uncertainty around what viable actions are actually available, as well as what their outcomes might be.

2.2.3 Mitigating entrepreneurial uncertainty

Uncertainty in an entrepreneurial setting is mainly caused by the lack of knowledge by the entrepreneur about the conditions the new venture is operating under. One of the challenges when trying to mitigate that uncertainty, is that it is difficult to actually estimate and understand the full extent of one's lack of knowledge; ''(...) our lack of economic knowledge is, in good part, our difficulty in modeling the ignorance of the economic agent'' (Sarasvathy et al., 2003, p. 145). This is the reason why it can be difficult to understand what kind of

learning the entrepreneur must achieve in order to reduce this uncertainty, as well as how exactly knowledge plays a part in this process.

When state and effect uncertainties are accounted for and mitigated, this will in return reduce response uncertainty. With time, interpretations of threats and opportunities are formed, and a venture will ultimately end up with a situation of manageable risk rather than uncertainty, as stated previously (Knight, 1921). At this point, the venture is considered a well-established firm and not a startup anymore, since startups are defined as new ventures operating under conditions of extreme uncertainty (Ries, 2011). Even though these different states of uncertainty are well established in literature, the need to develop a more scientific method of how to manage strategic uncertainty has been stated by Scott Antony (2014) and is currently lacking. Such a theory could be drawn from existing theory on deliberate and emergent strategies (Mintzberg and Waters, 1985), discovery-driven planning (McGrath and MacMillan, 1995) and business model experimentation (Blank, 2013; Ries, 2011), according to Borseman et al. (2016).

2.3 Effectuation

When trying to cope with uncertainty, entrepreneurs need to act different than business managers of established companies. During the last decades, researchers have pursued a better understanding of how entrepreneurs act during the process of new venture creation. This has led to the development of many theories in the field of entrepreneurship. Some of the most dominant and groundbreaking research done in the field is Sarasvathy's (2001) take on effectual and causal approaches by entrepreneurs (Alvarez et al., 2016; Chandler et al., 2011).

The basis of effectuation logic was established through comparing expert entrepreneurs with MBA students and expert corporate managers (Read et al., 2016). In her research, Sarasvathy sat down with a number of expert entrepreneurs and presented them all with the same uncertain business case, allowing for multiple strategic outcomes (Sarasvathy, 2008b). The expert entrepreneurs had to meet the following criteria: They had to have been staying for over ten years with a company they had founded, including taken it public (Read et al. 2016). Besides, the companies had to be "ranging in size from $200M to $6.5B" (Sarasvathy, 2008b, p. 2). Compared to the control groups of MBA students and corporate managers, the

entrepreneurs displayed “a unique set of decision-making strategies” (Read et al., 2016, p. 126). These expert entrepreneurs did not use the traditional market research approach taught at business school. Instead, they focused on the resources at their disposal, and avoided performing detailed planning in favor of a more spontaneous approach (Sarasvathy, 2008b). Sarasvathy found that there was a coherent logic in the thinking of the expert entrepreneurs, a distinct form of rationality that differentiated them from other actors in venture creation. Sarasvathy coined this rationality effectual reasoning (ibid.).

There is no consensus in the literature on whether effectuation is mainly a cognitive logic, a set of heuristics or a mode of action (Arend et al., 2015; Gregoire and Cherchem, 2017). Sarasvathy and Kotha (2001) refer to effectuation as a logic of action and control. Sarasvathy and Dew (2008, p. 732) also describe effectuation as a logic, more specifically “a set of internally consistent decision criteria for guiding action.” By looking at effectuation as an internal logic affecting the entrepreneur’s action, the authors argue that the use of effectual logic will be visible through the actions taken by the entrepreneur. According to Bird and Schjoedt (2009, p. 328), “behaviors are best understood as discrete units of action that can be observed by others (...).” In this thesis, effectual behavior will therefore be used to describe actions taken by the entrepreneur that appear to be guided by effectual logic.

2.3.1 The Five Principles of Effectuation

In multiple publications and textbooks, Sarasvathy and co-authors present five principles they argue form the core of effectual theory. These principles are compared to the logic of causation and summed up in Table 2.2. A more detailed explanation is presented below the table, based on the findings in the literature (Sarasvathy, 2001; 2008b; Read et al. 2016).

Starting point

Sarasvathy (2001) argues that there are two different ways to reach the same aspiration or end-goal: One could take either a causal or effectual approach. If taking the causal approach, the entrepreneur decides upon a fixed goal, finds out what means she needs to reach this goal, and then acquires these means. If taking the effectual approach, on the other hand, she will first investigate what means she currently has at hand, and only then decide between multiple possible goals she would be able to reach (Sarasvathy, 2001). However, Read et al. (2016) argue that goals exist in hierarchies, stressing that effectual entrepreneurs do have goals on a

higher level, e.g. becoming a millionaire by the age of 30, but they rather focus on their means before deciding on lower-level goals, such as developing an online platform for selling second-hand electric cars.

	Causal view	**Effectual view**
Starting point	A predetermined goal	A given set of means
Investment	Expected returns	Affordable loss
Other actors	Competitive analysis	Strategic alliances/pre-commitments
View on unexpected events	Exploitation of pre-existing knowledge	Exploitation of contingencies
Outlook on the future	Predict an uncertain future	Control an unpredictable future

Table 2.2 – The five principles forming the core of effectuation (Sarasvathy, 2001; 2008b; Dew et al. 2016)

The means of an entrepreneur are divided into three categories: who you are, what you know, and whom you know. The first being the entrepreneur's personal traits, tastes, and abilities, the second being his or her education, training, and expertise, and the third comprising n the entrepreneur social and professional network (Sarasvathy, 2008b). When choosing a causal process, one sets a distinct goal, develops a strategic plan and subsequently executes on this. In effectual processes, on the other hand, detailed planning is discarded in favor of execution. Sarasvathy states that by taking action instead of planning, effectual entrepreneurs' "set of means and consequently the set of possible effects change and get reconfigured" (Sarasvathy, 2001). This will eventually lead to the emerging of a more distinctive path towards an end goal. Fisher (2012, p. 1024) explains that for an effectual entrepreneur "goals change, are shaped and constructed over time, and are sometimes formed by chance." Thus, contrary to a causal process, the stakeholders (and other contingencies) "determine what opportunity gets created" (Sarasvathy & Dew, 2005, p. 543). This means that the end result of the venture

creation process might be completely different from the initial idea that sparked the process in the first place (Read et al., 2009). For example, a nurse with no previous experience in the toy industry can through a causal approach decide to manufacture and sell teddy bears to toy stores in Europe, then acquire the necessary means to achieve this (e.g. industry insights, production facilities, funding, etc.). On the other hand, she can take an effectual approach, identifying her means (e.g. knitting experience, connections at hospital gift store, etc.) and start selling homemade knitwear through the hospital gift store, with the potential of eventually ending up with a completely different product and market.

Investment

When using a causal approach, the decision makers will traditionally spend time researching market opportunities and use prediction formulas as Net Present Value (NPV) to identify the highest potential return on investment (Dew et al, 2016). However, such decision making tools demand variables that are difficult, if not impossible, to predict for the uncertain future entrepreneurs might face. Thus, effectual entrepreneurs live by the affordable loss principle, meaning they will try to minimize the resources it takes to get from idea to market. They will use their means to identify the best product-market-fit, reducing the amount of time, effort, and money to the minimum. Effectual entrepreneurs prefer "options that create more options in the future over those that maximize returns in the present" (Sarasvathy, 2001, p. 252). NPV is based on predictions of the future that are outside of the control of the effectual entrepreneur, whereas affordable loss makes the entrepreneur look at the resources at her disposal. She then decides what she is willing to lose, hence taking control by preparing for a potential loss (Read et al. 2016).

Other actors

Entrepreneurs will also have different perspectives on the actors outside of their own organization. Entrepreneurs taking a causal approach usually focus on competition, aiming at positioning their company strategically in the marketplace (Sarasvathy, 2001). This is supported by traditional literature on organizational strategy, e.g. Porter's (1980) focus on competitive analysis. Effectual entrepreneurs, on the other hand, focus on partnerships with established organizations, rather than viewing them as competitors. Sarasvathy (2001) coined this the strategic partnership principle. Such partnerships, however, are not limited to organizations, but may involve "all stakeholders willing to make actual commitments to the project" (Read et al., 2016, p. 159), e.g. suppliers, customers, and investors. When taking this

approach, the entrepreneur can expand her initial resources by utilizing the means provided through partnerships, such as market-insights, existing customers or financial capital. These additional resources may help limit the financial investments necessary to get from idea to market, hence it is in line with the affordable loss principle presented above.

View on Unexpected Events

Contingencies, good or bad, are inevitable for entrepreneurs starting a new venture. It is important, however, how entrepreneurs choose to handle them (Harmeling and Sarasvathy, 2013). In a causal process, one would plan in detail in order to mitigate uncertainty, e.g. through spending time writing a thorough business plan before executing on it. By exploiting her pre-existing knowledge, the entrepreneur attempts to avoid unexpected events (Sarasvathy, 2008b). Supporters of this causal approach would argue that "as uncertainty increases, organizations that work more diligently to analyze and predict more accurately the changing situation in which they operate will outperform those who do not" (Wiltbank et al., 2006, p. 985). Effectual entrepreneurs have a different approach to uncertainty. The leveraging contingency principle describes how entrepreneurs do not see all surprises as a bad thing, but rather focus on taking advantage of any surprises coming their way (Sarasvathy, 2008b). They have a "willingness to shift strategy" (Read et al., 2009, p. 584). Read et al. (2016) suggested to divide such surprises into three categories; unexpected people (accidental interactions with other people), unexpected events, and unexpected information. By exploiting both good and bad contingencies, entrepreneurs will use the result of uncertainty as input in their new venture creation process (Sarasvathy, 2008b).

Outlook on the Future

As indicated in the principles presented above, the causal and effectual processes have a contradicting view on future events. Entrepreneurs pursuing a causal view of the future, would try to make predictions in order to control the future: "To the extent that we can predict the future, we can control it" (Sarasvathy, 2001, p. 252). Again, writing a business plan and using financial models to predict the future are excellent examples of causal behavior. Such planning assumes firstly that relevant historical information is available, and secondly that this information is reliable enough to make good decisions (Read et al., 2016). Entrepreneurs exploiting new market opportunities, however, will seldom have enough relevant and reliable historical information to lean on (ibid.). Therefore, effectual entrepreneurs will discard such predictions, and rather take action in order to control the

future: “To the extent that we can control the future, we do not need to predict it” (Sarasvathy, 2001, p. 252). They act as if the future is not discoverable, thus it cannot be predicted, but instead they perceive it as being created by the decisions-making of the involved actors (Sarasvathy, 2008b). While a causal focus on prediction will give the entrepreneur some degree of control in a stable environment, focusing on control is more useful in the uncertain situations of new venture creation (Read et al., 2016).

2.3.2 The Effectual Process

Based on previous research on the topic, Wiltbank et al. (2006) presented a interactive and dynamic model of effectuation (Figure 2.1), based on the principles presented above.

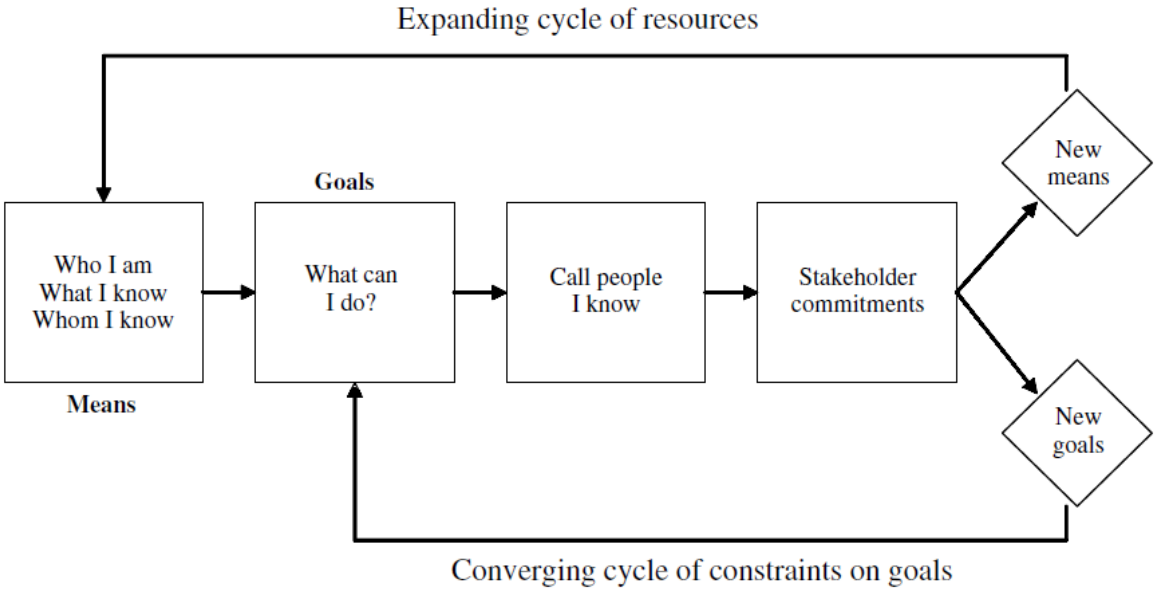

Figure 2.1 - The effectual process (Wiltbank et al., 2006, p. 992)

Effectual entrepreneurs start the process by focusing on their given means and then allow possible goals to emerge by exploiting these means (Fisher, 2012). The following step is to get in touch with other people (stakeholders or otherwise) in order to get input on how to proceed. These may be people in their network, or random people they meet or get introduced to (Wiltbank et al., 2006). During this part of the process they find people willing to participate, “they move toward obtaining actual commitments from these potential stakeholders” (Wiltbank et al., 2006, p. 992). It is not a specific goal or opportunity that determines which stakeholders get involved, it is rather the stakeholders who determine what goal or opportunity gets created (Sarasvathy and Dew, 2005). The committing stakeholders

affect the new venture in two different ways (Sarasvathy and Dew, 2005; Wiltbank et al., 2006). Firstly, the stakeholders are contributing new resources, thus increasing the set of means, illustrated in Figure 2.1 as the expanding cycle of resources. Secondly, the growing network of stakeholders is guiding the venture towards specific goals, represented in Figure 2.1 as the converging cycle of constraints on goals. This process continues until "there is no more room for negotiating and maneuvering the shape of what will be created, and path dependency takes over" (Wilbank et al, 2006, p. 992). At this point, the entrepreneurs will turn away from effectual behavior and towards more causal behavior, as the new venture is turning into an established firm.

It is important to note that entrepreneurs usually will practice a mixture of both effectual and causal processes while building their new venture (Sarasvathy, 2008a; Sarasvathy and Dew, 2008). Through quantitative research on product development in small firms, Berends et al. (2014) found indications that effectual thinking was dominating especially at early development stages, whereas causal thinking was more important and mostly used in later stages. Besides, effectuation is not claimed to be a better process than causation when it comes to creating new ventures (Sarasvathy, 2001). However, Sarasvathy indicates that in situations where a clear goal does not exist, and resources are scarce, the effectual approach should be considered over the causal one (ibid.). As previously mentioned, Knight (1921) would declare such situations as uncertain, while a causal approach would be more appropriate in what he described as a situation of risk.

2.4 Entrepreneurial Learning

When trying to explain and examine the learning processes taking place in new ventures, researchers have traditionally looked to the established literature on organizational learning (Franco and Haase, 2009). In general, literature on organizational learning supports the proposal that accumulation and processing of knowledge is vital in organizations, and even more so in the development of new firms (Penrose, 1959; Spender and Grant, 1996). Popta (2002) states that entrepreneurs who become highly successful are often characterized by their ability to learn. Successful entrepreneurs are described as "exceptional learners", learning from everything and everyone, and being especially efficient to reflect upon failures and learn from them (Kirzner, 1973; Smilor, 1997). The academic community has yet to present a single unified theory on organizational learning, however studies have emphasized

the positive effects of organizational learning on the performance of a company in general (Fiol and Lyles, 1985), on financial returns (Slater and Narver, 1995), on productivity (Levinthal and March, 1993) and on innovation ability (Dodgson, 1993).

The process of learning starts with entrepreneurs and business managers scanning the environment in which the venture is operating. Scanning is being defined as intentional information seeking in order to understand events and relationship in the external environment (Fahey and King, 1977). Information is then processed and interpreted in order to form new understanding. This understanding then forms the basis for decision making, which is improved as uncertainty is reduced. Bottom line: If state uncertainty is due to the lack of information, collecting more information should by definition reduce said uncertainty (Downey and Slocum, 1975; Milliken, 1987).

According to Milliken (1987), there are two main categories of scanning: general scanning and issue-specific scanning. Sund (2015) states that both these categories of scanning lead to more certainty and thus more precise predictions by the decision maker. Daft and Weick (1984) further suggest that learning about aspects of the environment might again lead to further scanning in order to monitor the effects of actions taken by the entrepreneur. Uncertainty by itself, on the other hand, does not necessarily lead to scanning, according to Daft et al. (1988). So paradoxically, rather than uncertainty itself leading to scanning, decision makers might not attempt to mitigate uncertainty unless they have already begun addressing the issue, because they must deem it important first.

After scanning the environment, an organization needs to make sense of the new learning it has acquired. The process of organizational interpretation can be defined as giving meaning to acquired data or transforming information gathered from scanning the environment into actionable understanding (Sund, 2015). The mechanisms of how organizations are interpreting gathered information is lacking in literature. Moreover, so is how interpretations influence further scanning and actions (Nag and Gioia, 2012), which we know little about (Sund, 2015; Nag and Gioia, 2012). These interpretations in turn produce the foundation for new organizational actions. At this point, information that has been scanned, interpreted and transformed into new actions is what Daft and Weick (1984) labeled “learning”. Minniti and Bygrave (2001) model entrepreneurial learning as a decision cycle. In this cycle the entrepreneur iteratively and continually decides whether to trust knowledge previously

gained, or to acquire new knowledge to support decision making. This creates a learning loop as described in the subchapter on single-loop and double-loop learning (Chapter 2.4.2).

The field of organizational learning is large, but two main categories of organizational learning described as vicarious and experiential learning (Mansoori, 2017) will be examined further to explain the learning processes happening in new venture creation.

2.4.1 Vicarious and Experiential Learning

Vicarious Learning

Vicarious learning means learning through the behavior of others. People are able to learn from hugely complicated behavior through this type of learning (Nadler et al., 2003). There is a strong focus on sharing experiences and knowledge in entrepreneurial communities when it comes to entrepreneurship and new ventures, for instance through the use of incubators, accelerators, mentorships, advisory boards and stakeholders brought on board to provide certain skills or know-how for the firm. Vicarious learning also includes learning through acquiring information from actors within the industry, and by talking to people with domain knowledge and professional experience. These various types of vicarious learning save a lot of resources for entrepreneurs (Kim and Miner, 2007). When dealing with situations of high uncertainty, vicarious learning is more advantageous than learning from direct experience according to Holcomb (2009).

Experiential Learning

Experiential learning can be described as turning experiences into knowledge and happens when existing knowledge is interacting with new experience (Kolb, 1984). Such experience is gathered through interacting with potential customers and stakeholders and through performing operations and actions relevant for running and developing the venture. Internalization of new experiential learning is a gradual process (Landa, 1998), that develops over time. This type of deeper learning only happens when new experiences have been reviewed and reflected upon, resulting in altered beliefs of and behavior by entrepreneurs (Fiol and Lyles, 1985).

There are different opinions among researchers as to what type of learning, vicarious or experiential, is the most dominant type of learning in entrepreneurial settings. Many

researchers claim that entrepreneurial learning mainly consists of "learning by doing" (Smilor, 1997), making mistakes and receiving feedback (Gibb, 1997). Hence it is experiential in nature (Kakouris and Akritidis, 2012). However, Minniti and Bygrave (2001) suggest that in some specific entrepreneurial settings, vicarious learning is to be considered the most important type of learning. Mansoori (2017, p. 22) states:

> *"Contrary to the prevailing understanding that most of the learning in entrepreneurial settings is experiential in nature (...) vicarious learning often precedes and informs pro-active experiential learning."*

2.4.2 Single-loop and double-loop learning

Experiential learning can be further categorized into single-loop and double-loop learning. This is described by Argyris and Schön (1978), who view organizations as learning entities. Firms detect errors in established action strategies to make corrections in these strategies or in the variables used to design those strategies. This may involve increasing the efficiency of current processes or making adjustments to the structure or the overall goals of the organization. The two respective types of organizational learning are called single-loop and double-loop learning (Figure 2.2).

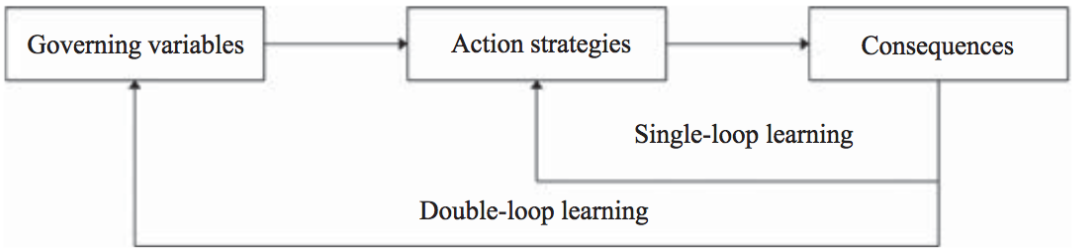

Figure 2.2 - Single- and double-loop learning (Mansoori, 2017, p. 815)

Single-loop learning

Single-loop learning constitutes corrections only to the action strategy already in place. The organization exploits errors and mistakes taken from experience to extrapolate to, and correct, future strategies. However, if we are to view organizations as "living brains" (Morgan, 1997), effectivising procedures within the firm do not constitute any change in the organization's state of mind, it only alters tactics to carry out current strategies. Single-loop learning is most important in stable environments where strategies are easy to form.

Double-loop learning

In double-loop learning, error detection and correcting actions involve altering the firm's underlying norms, policies and/or goals (Argyris and Schön, 1978). These alterations may compromise the action strategies themselves, but also the governing variables defining how the action strategies are formed. Double-loop learning is the most important form of learning when the environment of the organization is complex, unpredictable, dynamic and overall turbulent (Popta, 2002).

Both experiential and vicarious learning interact to affect the entrepreneur's theory of action (Popta, 2002). The illustration below (Figure 2.3) describes how the cumulative output of both modes of learning, vicarious and experiential, transform the entrepreneurs' theory of action (Weick, 1969).

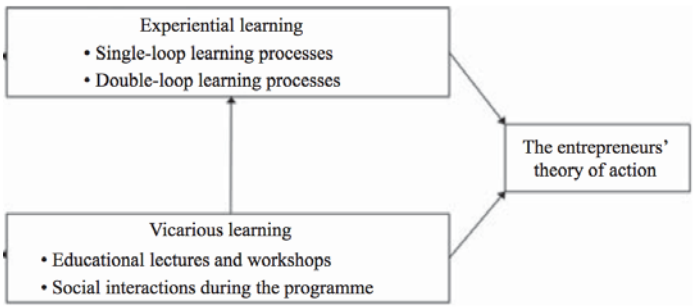

Figure 2.3 - Vicarious and experiential learning in entrepreneurship (Popta, 2002, p. 19)

2.4.3 Experimenting to Mitigate Uncertainty

One way for entrepreneurs to acquire experiential single-loop and double-loop learning quickly is through experimentation. Literature within the field of entrepreneurship has recently emphasized the importance of learning through experimenting with business models and products when ventures are in a situation of high uncertainty (Anderson, 1995). Andries et al. (2013, p. 1) claim that "experimenting with a variety of business models appears crucial under uncertainty." Furthermore, Gilbert and Eyring (2010) argue that the entrepreneurs that early on in their venture identify and mitigate risks in the right order, are far more likely to build a successful business. They also suggest that cost-efficient experimentation is an

efficient way to uncover and eliminate risk (Gilbert and Eyring, 2010). Startups need to learn as fast as possible in order to reduce uncertainty, and they will achieve the best learning by testing versions of their products through experiments (Moogk, 2012).

During the last decade, contributions on entrepreneurial approaches from outside of academia have reached a widespread audience of entrepreneurs (Mansoori, 2017). One of the most popular among these contributions is The Lean Startup Method (henceforth; LSM) (Blank, 2013) by successful entrepreneur Eric Ries (2011). LSM serves as a framework for hypothesis-driven business model testing, all the way from the ideation phase to the establishing and scaling of a business (Eisenmann et al., 2013). By learning through the use of a Minimum Viable Product (henceforth; MVP), entrepreneurs can potentially "develop products that are tailored to target markets" (Moogk, 2012, p. 25) and thus avoid the risk of building a product no one wants (Ries, 2011). An MVP can be described as the fastest way for entrepreneurs to start testing their hypothesis, with the minimum amount of effort (Ries, 2011).

In the original article on effectuation Sarasvathy (2001) states that "effectuation processes allow the economy to experiment with more numbers of new ideas at lower costs" (Sarasvathy, 2001, p. 260). Chandler et al. (2011, p. 380) pick up on this, suggesting that "the effectuation process may be viewed as a series of experiments to identify a business model that works." Experimentation through an MVP (Ries, 2011) adheres to the effectual principle of affordable loss, letting the entrepreneur mitigate the amount of means tied up to the entrepreneurial opportunity. Fredriksen and Brem (2016) take it further and suggest that Ries' (2011) LSM and Sarasvathy's (2001) effectuation are so closely matched that the former can be considered a practical implementation of the latter. Although finding similarities between the two theories, Mansoori (2017) suggests that effectuation is more suitable in the unstructured learning phase early on in the venture, whilst LSM is a better fit later, when the venture needs more structured learning, "organized through testing of hypotheses" (Mansoori, 2017, p. 21).

Building on Ries's (2011) work on the LSM, Ash Maurya developed the Lean Canvas (Maurya, 2012). This canvas is based on the Business Model Canvas from the book *Business Model Generation* (Osterwalder & Pigneur, 2013). Both canvases are systematic tools designed to assist entrepreneurs in mitigating risk in new business development, but the Lean

Canvas is most relevant to new startups (Borseman et al., 2016). The Lean Canvas deconstructs the hypothetical business model of new venture into nine distinct building blocks. The seven relevant blocks regarding business model uncertainty are explained below (Table 2.3 and Table 2.4). These nine components are to be addressed one by one, mitigating uncertainty in a systematic fashion. The purpose of the canvas was to make it as actionable as possible to work with for entrepreneurs (Borseman et al., 2016).

Market Uncertainty	
Problem	Uncertainty about whether the problem being addressed is worth solving
Customer Segments	Uncertainty about whether the customer segment is worth targeting
Channels	Uncertainty about viable paths for reaching customers
Revenue Streams	Uncertainty about how revenues can be generated

Table 2.3 - Lean Canvas Market Uncertainty Blocks (Maurya, 2012)

Product Uncertainty	
Solution	Uncertainty about whether the solution is a viable one for solving the identified problem
Unique Value Proposition	Uncertainty about the value delivered to customers through products and services
Cost Structure	Uncertainty about costs involved in creating the solution and delivering value

Table 2.4 - Lean Canvas Product Uncertainty Blocks (Maurya, 2012)

Each of the business model blocks is used to make hypotheses that are then methodically tested through running experiments. As LMS is a methodical framework for reaching product-market fit (Ries, 2011), the uncertainties addressed in the canvas have been categorized as “Market Uncertainty” or “Product Uncertainty.”

2.5 Theoretical Framework

The literature presented above is in this subchapter encapsulated in a theoretical framework, illustrated in Figure 2.4 below. This framework describes how entrepreneurs combine entrepreneurial opportunities Knight's (1921) and their initial means (Sarasvathy, 2001; 2008b) into opportunity beliefs (McMullen and Shepherd, 2006). In addition, it illustrates how they are moving on from one situation to the next, each time learning through both effectual and causal behavior in order to cope with the uncertainty within the new venture creation process. By doing so, the new venture is supposed to move away from uncertain situations and towards situations of more manageable risk. The elements in the figure are described in greater detail below.

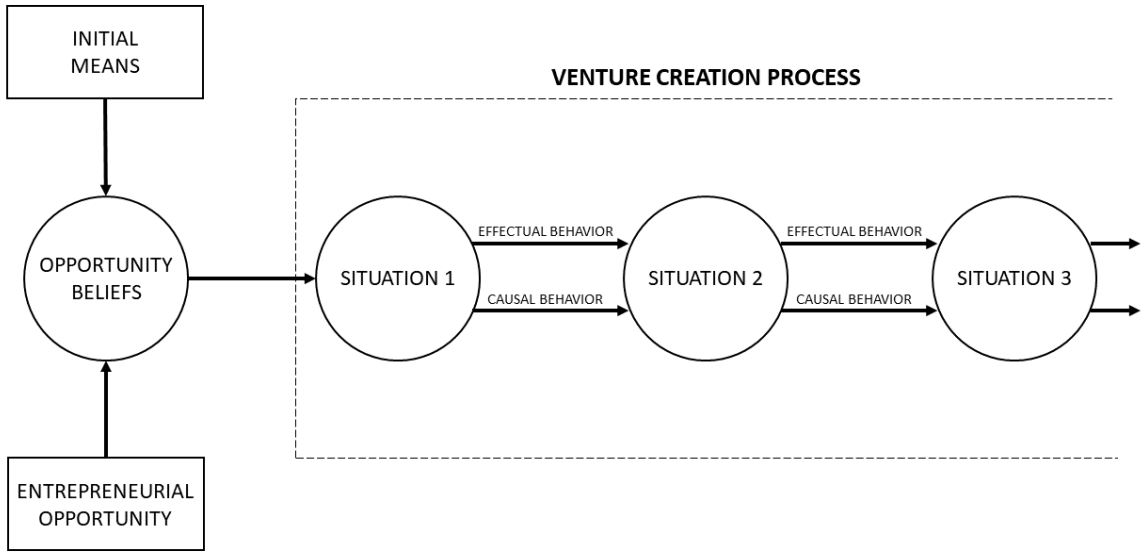

Figure 2.4 - Conceptual framework

Initial Means

Effectual entrepreneurs identify an entrepreneurial opportunity, then focus on the means at their hand and find possible goals (Read et al., 2016). In other words, the entrepreneurs' initial means are suggested to be instrumental to the effectual process, and thus, according to the literature, lack of relevant means would lead to a causal process, not an effectual one. As mentioned earlier, initial means can be described as the entrepreneur's past education, experience and knowledge, and his or her personal and professional network (Sarasvathy, 2008b). In this thesis the authors have chosen to subcategorize the different initial means into

domain knowledge, domain network and product competency. Domain knowledge comprises the level of relevant knowledge about the industry and market, domain network the entrepreneurs' relevant network. Product competency encompasses all types of relevant initial competencies the entrepreneur possesses to start building the product they are aiming to deliver.

Entrepreneurial Opportunity

The type of economic opportunity as an objective entrepreneurial opportunity existing for anyone to pursue. This is based on Knight's (1921) categorization of entrepreneurial opportunity; opportunity recognition, discovery and creation. These categories suggest something about the degree of "objective" uncertainty involved in pursuing this entrepreneurial opportunity.

Opportunity Beliefs

According to McMullen and Shepherd (2006), opportunity beliefs are formed on the basis of two elements: the entrepreneurial opportunity and the entrepreneur's initial means. Firstly, the opportunity is recognised as an "objective" opportunity (Knight 1921), and then beliefs on whether this opportunity is worth pursuing are formed. Whether an opportunity is worth pursuing or not, depends on the means the entrepreneur disposes of and on the way they comply with the opportunity at hand. These means may comprise professional experience or formal entrepreneurship education the entrepreneur might have, as well as diverse skills, abilities, network and so on. It is these opportunity beliefs that then initiate entrepreneurial action, sparking off the venture creation process

Situation 1, 2 & 3

Entrepreneurs pursuing an entrepreneurial opportunity are facing a situation of extreme uncertainty (Ries, 2011). Each situation 1, 2, and 3 represents different stages in the very beginning of the venture creation process and is defined by different amounts of perceived uncertainty (Milliken, 1987). This due to the lack of knowledge by the entrepreneur, meaning learning acquired between each stage should reduce uncertainty. The behavior displayed by entrepreneurs between each situation may change this perceived uncertainty, as well as opportunity beliefs held by entrepreneurs.

Effectual and Causal Behavior

How entrepreneurs cope with the status of the venture's environment, either uncertain, risky, or a combination, can be identified through their behavior. The literature suggests that entrepreneurs will use a combination of effectual and causal behavior. However, it is argued that a high degree of effectual behavior is suitable in a highly uncertain situation (Chandler et al., 2013). Based on the research questions, the authors have defined six behaviors rooted in the theory of effectuation and causation (Table 2.5).

Effectual Behavior	**Causal Behavior**
Utilizing Initial Means	Focus on Goals
Developing New Means	Lack of Execution
Involve in Partnerships	Competitive Analysis

Table 2.5 - Effectual and causal behaviors considered in this thesis

3 Methodology

Much like the journey of most successful entrepreneurs, writing this thesis has not been a straightforward process. Being entrepreneurs themselves, the authors found it fascinating how other successful entrepreneurs were advocating the use of hypothesis-driven product testing in order to quickly validate their business model. They wanted to get a better understanding of the Lean Startup Method, which was introduced by successful tech-entrepreneur Eric Ries (2011). In January, the authors therefore set out to investigate how novice entrepreneurs used experimental learning through product testing in order to reduce the uncertainty of their venture. After conducting multiple interviews in a longitudinal study, the authors realized they did not have sufficient data to answer the original research questions. They did, however, see an opportunity to investigate how student entrepreneurs display effectual and causal behaviors in a situation of uncertainty, and how learning and initial means play a role in such situations. More surprisingly, they found that the Lean Startup Method (Ries, 2011) that they had been immensely fascinated by six months prior, perhaps was not as effective as they first thought.

3.1 Research Design

3.1.1 Qualitative Longitudinal Study

Deciding on a qualitative study was natural as the purpose of this thesis was to investigate how student entrepreneurs behave in a situation of uncertainty. According to Yin (2014) a qualitative case study is the appropriate choice when researching how something happens. This approach also gives more depth to the research and allows the authors to dive deeper into the subject matter than a quantitative study would permit them to (Flick, 2015). Furthermore, a longitudinal case study was chosen to ensure the possibility to track and assess both the student entrepreneurs' behavior, and changes in uncertainty, over time. There are no set rules with regard to how many data points that are needed to constitute a good longitudinal study (Åhlström & Karlsson, 2009), but in this thesis, three separate interviews with intervals of one month have been used. Longitudinal studies are useful when alternative explanations than the ones suggested by the researchers may be found (Rindfleisch et al., 2008), a situation the authors assumed might occur when studying what kind of

entrepreneurial behavior is taking place among student entrepreneurs. Also, longitudinal studies are very suitable if one is to examine causality: why and how things happen.

3.1.2 Multiple Case Study

The authors chose to conduct a multiple case study as “the analytical benefits from having two (or more) cases may be substantial” Yin (2003, p. 53). Yin (2003) further argues that criticism around the findings will decrease as the number of cases increases. The authors therefore decided on having four case firms in their longitudinal case study. Being inexperienced with both longitudinal studies and case studies, it seemed reasonable to the authors not to increase the number of case firms any further.

3.1.3 Selection of Case Firms

In order to find the right case firms for the data acquisition process, the following selection criteria for the case firms were chosen:

- Early phase student startups
- Startups planning user involved testing of the product they are developing
- Startups developing software or service product

As the purpose was to investigate student entrepreneurs, it became natural to make early phase student startups one of the selection criteria. The time span of the data acquisition process was set to be two months, which meant there was a limited time frame for the potential case firms to show progress in their venture. In addition to this, the original purpose of this thesis was to investigate the use of user-involved, experimental product testing. These two factors made it natural to look at startups developing software or service products, as these products are usually easier to build and test during a short period of time compared to physical products.

After the selection criteria were set, it was time to find relevant candidate firms. As both authors were students attending a Venture Creation Program where students start working on new startup projects every January, it was natural to consider these startups as case firm candidates. All of the startups matched the first selection criterion. First, the authors studied a list provided by the VCP faculty, describing all the new startup projects among the students. Next, they eliminated all startups that did not aim to develop a software or service product.

Also, they left out some bigger, more technology-heavy business-to-business cases. The authors assumed that these cases would need more long-term internal development and that they most probably would not conduct any user-involved tests during the set data acquisition time frame. Lastly, the authors had a short meeting with all the relevant candidates, asking them if they were planning on performing any user-involved testing. Here, the authors were careful with their wording, trying to receive genuine answers without leading on the candidates. The candidates were also questioned if they would be interested in participating in the study and were informed about what would be expected of them. After this process, the authors discussed among themselves, evaluating the case firm candidates against one another, before settling on four startups. The case firms are in this thesis assigned pseudonyms for anonymity: Alpha, Bravo, Charlie, and Delta.

3.2 Data Acquisition

3.2.1 Interview Scheduling

At the end of January, when the team had decided upon the case firms, each startup was contacted so the authors could get a final confirmation that they were still interested in participating in the study. When all four startups had agreed to participate, the authors used the online tool Doodle to suggest different dates and meeting times at the end of February for the first series of interviews. This process was also used for the two following interviews, which were set to March and April. As all members of the different startups were fellow-students of the authors, they used Facebook Messenger as a communication channel.

Since the original purpose of the study was to focus on the experimental testing of the product, the authors found it reasonable to interview the CEO of the startup and one team member involved in product development and testing (typically CTO). The authors also found it important that the same team members participated on all three interviews in order to secure as consistent data as possible, and they informed the teams about this. However, team Charlie had not yet assigned any distinct roles within the team. Charlie therefore decided to have the two team members mainly involved in user testing to participate as interviewees. In addition to this, team Bravo only had the CEO available for case interviews, and therefore all of the interviews of Bravo were conducted with only one team member present.

3.2.2 Gathering Data

During each of the case interviews, two main pieces of data were gathered. The first one was the digital recording of the interview, which was recorded on a dedicated audio recorder. In addition, every interview was recorded on a smartphone for redundancy purposes. These audio files were later transcribed and coded by the authors. The second data point was the Lean Canvas (Figure 3.1), which the case firms were given 15 minutes to fill in at the beginning of each interview session. All data were labelled with the name of the respective case firm, dated, and then uploaded to the case study database on Google Drive, as well as on Microsoft OneDrive for redundancy purposes.

<table>
<tr>
<td rowspan="2">Problem

Top 3 customer problems

Existing solutions

How these problems are solved today</td>
<td>Solution

Top 3 product features</td>
<td rowspan="2">Unique Value Proposition

Single, clear, compelling message that resonates with customers

High-level concept

Concept analogy</td>
<td>Unfair Advantage

Something that can’t be easily copied or bought</td>
<td rowspan="2">Customer Segments

Target customers and users

Early adopters

Characteristics of the ideal customer</td>
</tr>
<tr>
<td>Key metrics

Key activities being measured</td>
<td>Channels

How to reach customers</td>
</tr>
<tr>
<td colspan="3">Cost Structure

All fixed and variable costs</td>
<td colspan="2">Revenue Streams

All sources of revenue</td>
</tr>
</table>

Figure 3.1 - Lean Canvas (Maurya, 2012)

All of the interview sessions in February and March lasted around 45 minutes, and each of the final interviews in April lasted around 60 minutes. Every interview session started with a brief introduction to the Lean Canvas, before the interviewees were given 15 minutes to fill in the canvas based on the current status of their startup. This time limit was chosen based on Maurya’s (2012) directions on filling in the Lean Canvas. While the interviewees filled in the canvas, the authors left the room as they wanted to make sure their presence did not interfere with the process. The authors set a timer and returned to the interviewees when the time was

up. The canvas was used to generate talking points during the interview, but also as a source of data when analyzing the progress of the case firms.

After the case firms had finished the canvas, the remainder of the session was used on a semi-structured interview. During the interviews the authors followed an interview guide that was structured in three different sections, with relevant questions within each section (Table 3.1). Apart from Section 1, this interview guide stayed consistent during the first two rounds of interviews. In the last round of interviews, however, the authors changed both the sequence of sections and the contents of the last section of the interview guide. This was necessary as the purpose of the thesis had been changed based on the findings from the first two interview rounds. The interview guide in the last round of interviews was also adjusted to each individual case firm, based on the findings in the prior interviews.

	Interview I February	**Interview II March**	**Interview III April**
Section 1	Work methodology and milestones	Update on the progress over the last month	Lean Canvas discussion
Section 2	Lean Canvas discussion	Lean Canvas discussion	Update on the progress over the last month
Section 3	Status on MVP and product development	Status on MVP and product development	Discussing concrete events related to effectuation, lean startup and MVP

Table 3.1 - Structure of the interview guides

Both authors were present at all interviews, apart from three interviews in February where one of the authors was unable to participate due to illness. In comparison with the sessions with only one interviewer, the authors found that when both of them were present, it was easier to make sure both that the questions in the interview guide were answered, and that thorough follow-up questions were asked when necessary. In the interviews in March and April, one of the authors became responsible for making sure the interview guide was used. The other author was more focused on being an active listener, asking follow-up questions to enhance the data. No notes were taken during the interviews, as everything was digitally recorded.

3.4 Data Analysis

3.4.1 Coding of the Data

After transcribing the interviews, the authors printed the transcriptions and read through them once more to have a better overview of the data. They then started to take notes of relevant topics that proved relevant to the research questions and structured them according to three main components on the theoretical level: causal behavior, effectual behavior, and uncertainty. The transcribed interviews were then imported into NVivo 12 where both authors coded the interviews, using 30 different coding categories describing certain behaviors and situations of uncertainty (Appendix A). These coding categories were useful to make sure the authors stayed consistent when coding the data. Finally, after all of the interviews were coded, the authors printed a full report from the coding, structured in accordance with the tree in Appendix A. This report was used when writing the case presentations (Chapter 4) and performing the cross-case analysis (Chapter 5).

3.4.2 Cross-Case Analysis

In order to avoid the unnecessary repetition of case data, the authors decided rather to write more comprehensive case presentations instead of writing within-case analysis. The analysis chapter in this thesis is therefore only focusing on a cross-case analysis of the cases. By conducting a cross-case analysis the authors made it possible to see the data in many different ways, avoiding jumping to conclusions just by investigating the cases one by one (Eisenhardt, 1989). This analysis focused on finding differences and similarities across the four case firms. The analysis was done by selecting categories, as suggested by Eisenhardt (1989), where the case firms were compared according to the key elements of the research questions. These were: initial means, entrepreneurial opportunity, uncertainty, expanding on initial means, and effectual and causal behavior. When analyzing, the authors found they got a better overview giving them scores on a three-level scale; low, medium, and high. The scores have been given based on the relative evaluation of the cases. In other words, even though a case firm has received low as a score, this score is relative to the other cases, and not comparable to the perceived uncertainty by e.g. other entrepreneurs or executive managers.

3.5 Reflections and limitations

To conduct a case study research in an appropriate manner is in itself difficult (Yin, 2014). Neither of the authors had performed semi-structured interviews or conducted an academic longitudinal case study prior to this thesis. Before starting to work on their thesis, the authors attended university classes on both academic research in general and case study research specifically. Additionally, guidance from their supervisor has been an important contribution to strengthen the case study. Also, test interviews with two different startups from the VCP were carried out, after which questions and interview format was reviewed and adjusted where necessary.

A semi-structured interview approach always implies a risk of bias from the authors in the interview process. This can for example be confirmation bias with regard to the theory they have reviewed and their wish to find meaningful data to relate to this theory. The authors were aware of this risk and made sure to correct each other and the questioning after each interview session. As performing a longitudinal case study implies trying tracking changes over time, the Lean Canvas (Maurya, 2012) was used during each interview to track changes in status of each case. However, there was a risk that the student entrepreneurs who were interviewed might not be familiar with this tool and with the theoretical concepts involved. To mitigate this risk, all case firms were offered an introduction to the Lean Canvas by the authors. Even though most of the case firms stated that they understood the terminology used on the canvas, the authors question whether this was actually the case, given the final result of their study. This was mainly in regard to the components “Key Metrics” and “Unfair Advantage,” which seemed to have been somewhat misunderstood. However, these components have not played a significant role in the analysis of the case firms.

There are also some limitations regarding the case firms. One of the most notable limitations is in regard to the authors’ ‘position in the field’ (Anteby, 2008), referring to the relationship between the author and the research objects. Since the case firms were selected from startup projects at the VCP where the authors themselves students are, there might have been friendly relations and potential bias that could have impacted on the objectiveness of the research process. On the other hand, friendly relations might sometimes be an advantage as the interview objects may feel comfortable to share information in the interview situation. The most potent weakness of positioning in the field (Anteby, 2008) might rather be the

interviewers holding pre-existing knowledge about the interview objects and their cases. This pre-existing knowledge could make them hold assumptions that should have been mapped through a formal interview, and in retrospect a more thorough walkthrough of each case's background would have been preferable.

The case firms consisted of students starting their own startups as part of their educational program. Therefore, the venture launch process may have been more organized than in comparison to startups founded outside a VCP environment of this format. Yet there were differences also within the VCP format as to how the student startups were formed. Two of the case firms were formed prior to the regular launch process at the VCP, while the other two were created in accordance with the VCP process. This fact will be discussed to some degree throughout the analysis and may possibly have greater implications for venture development than assumed. In retrospect, this should possibly have been a more important factor in the case selection process.

Lastly, as previously mentioned, the purpose and research questions of the thesis were changed after the interview sessions had started. This was done because the authors realized that the data they were collecting were insufficient to properly address the initial research questions. Hence, the interview guides from two out of the three rounds of interviews were not specifically designed to gather data for answering the new purpose and research questions. This is probably the greatest weakness of the data collection process. However, since the need/wish to alter the research questions came as a result of analyzing the data from the two first interview rounds, most of these data is assumed relevant for the new scope of the study.

4 Case Studies

This chapter will cover the case studies. In each case presentation, some short background information will be presented first, followed by a structured presentation of relevant findings according to the purpose and research questions of the thesis, covering opportunity beliefs, uncertainty, effectual behavior, causal behavior, and learning processes.

4.1 Alpha

Alpha was founded by three fourth-year students at the VCP; A1, A2, and A3. First A1 and A2 decided to work together on the case, whilst A3 came in right after. A1 states: *"When the team was founded, it was only A2 and me to start with, and then A3 joined after we decided on this project."* The business case was based on a feasibility study performed by students at the VCP during the fall semester. The team was aiming to develop a software solution that would both be sold to and used by consumers. However, between the interview sessions in March and April, the team decided to terminate the venture.

4.1.1 Uncertainty

Product Uncertainty

In February, team Alpha indicated that they had a very vague idea of what problems they were going to solve for the customer. After presenting four different problems and four different solutions, A1 stated that gradually as they were working with the venture they hoped to eventually identify that *"this is the big problem, and this is what we mainly need to solve."*

A2 followed up by stating that they were not sure if solving one of the problems would be sufficient in itself, as there already exists solutions in the market for solving some of these problems. These solutions consisted of physical products such as deck of cards and books. A2 added: *"we do not know if we may need to offer a sort of 'package deal' in order to make it a good enough experience."* The team emphasizes that they obviously cannot develop a thousand different solutions and that they therefore need to identify a customer segment having a common interest for one solution. The team also appeared to be uncertain about the value their product would bring. A1 questioned *"can we get in contact with enough*

customers that are willing to buy [our] service and pay money to have these problems solved?"

One month later, in March, the team members still appeared to be uncertain about their product. A1 explained: *"We do agree in a way, but we still do not have a steady course."* Additionally, after learning that potential customers were more interested in having a slightly different problem solved, the team questioned one of their initial solutions. First stating that this implied there might no longer be a reason to solve one of these problems, A1 and A2 quickly agreed that it may still be valid solution if they adapt it to the new problem.

In April, as the team had decided to split up, they reflected upon the product uncertainty. The team had made little progress in the venture and admitted that most of the product uncertainty they described in the previous interviews was still present. When reflecting, A1 stated that the product they envisioned could be relevant for extremely many different people, meaning they would get extremely different input from potential users. A1 further suggested that this is the reason they ended up with four different problems and four different solutions that *"in a way is the same product."* They further suggested that one of the challenges might have been that having four sets of problems and solutions gave them too many things to handle at once, since none of them proved to be the most important one. On the other side, they argued that if they would have implemented all four solutions in the product, they would most likely provide a greater value to each user. A2 thought that the fact that they did not have a clear product definition from the start might have made it challenging for them to develop the product. A2 suggested that the product uncertainty would interfere too much with the developing process, as new input would constantly change the product definition.

Market Uncertainty

As indicated in the subchapter above, in February, the Alpha team appeared to be uncertain about who their customers were. They presented a specific hypothesis on what their current customer segment was. A1 emphasized the uncertainty by stating that they were going to contact people in this segment and find out if they actually are potential customers and find out if they experience these problems and wanted this type of solution. When talking about future customer acquisition, they also appeared to be uncertain about what channels to use to reach their customers. A1 stated: *"we are discussing potentially marketing through social media, but we have some uncertainties and discussions we need to have [in regard to that],"*

adding that it might not correlate with what they wanted to achieve. A2 was adding to this, stating that he was not sure how they would reach out and get paying customers. This was also reflected when they discussed future revenue streams, explaining they were aware of other competitors with similar value propositions that have managed to obtain user masses, but struggle to get paying customers. At this point, A1 was almost considering revenue streams to be the most uncertain element of their business model.

Getting to March, team Alpha had made little progress on the market uncertainty they indicated one month prior. The customer segment still appeared very much similar to the past month, without any specific reason. A2 said he believed there were many questions the team needed to find an answer to, specifically suggesting identifying their most relevant customer segment to be one of them. However, he quickly added; *"but that may not be something we necessarily will find a distinct answer to, but something that will change depending on how we present the product."* When discussing their channels, the team stated that they would try to reach their customers through Facebook groups for users fitting their customer segment, arguing that these groups have very active users. However, this channel seemed far from certain, as A1 explained: *"we will see if we really can get any traction when we actually have anything to show,"* arguing that without a product to display they would not get any relevant connections with potential customers.

The month between the second and last interview, the team made little progress in reducing the venture's uncertainties. In April, still stating very similar customer segment as most relevant, A1 stated that they did have an unexplored customer segment: *"This segment is also a potential direction to take, but we do not know enough about this segment."* During the interview, A2 suggested that perhaps their customers should be people who show an interest in this space, but do not know how to do it, making Alpha's solution the perfect tool for them. A2 further argued that when the goal is to create something that does not previously exists, one will not necessarily decide upon the right market until the product is finished enough for the customers to see its value. A1 also addressed this fact when talking about revenue streams: *"when the product is not even close to existing, then pricing is guesswork. You have really no clue."* A1 further explained they decided on the current price point to have something concrete to work with, adding that they did not test the price towards customers, arguing that the uncertainty of the solution would make this data irrelevant. When questioned about why they removed partnership as a possible channel to reach customers, A1

explained that: *"it is so far away that we have not prioritized or focused on it. We have no prerequisite to really say anything [about it]."* Furthermore, the entrepreneurs still indicated marketing channels to be very uncertain. A1 explained that marketing on Facebook would still not be excluded as an option for marketing, however adding: *"if I was to continue with this venture, I would not have been thinking 'yes, I know [Facebook marketing] is the way to go'."*

4.1.2 Effectual Behavior

Means

When discussing the team composition in Alpha, the entrepreneurs stated that, expect for A3 that joined last, the members previous experience was contributing factor when founding the team. A1 recalled: *"we talked about working together because we like so different things and that we have different competence."* Having experience with both marketing and management, A1 added that it was very natural to handle the market side of the venture. Having a technology heavy background, A2 had the technological responsibility, as according to A1: *"A1 has more expertise towards actually prototype solutions."*

Early on in the venture, the team recalled using their personal network to get information from potential customers. A1 explained that they addressed three fellow students they previously learned were familiar with the problems and current solutions. Through these conversations they were able learn more about their potential customers and obtained contact information for relevant people for further interviews.

4.1.3 Causal Behavior

Goals

When the authors met the team for the first time in February, they stated a few goals for the future of the venture. One of these was to get involve a fourth person with *"more knowledge than us in database programming,"* as A2 put it, to help them with the software development. Secondly, they stated that they at one point wanted to have an MVP ready for user testing. They had also learned that similar services often had advertisement as one of their revenue streams, and A2 said *"we do not wish to go in that direction,"* which can indicate that they had a goal of being an advertisement-free platform.

Planning

The Alpha team stated that they very early on in the venture decided on assigning roles to every team member. They said they did this in December, adding that it was a very quick assignment of roles. A2 explains: *"It was certain things that felt a little given or felt like 'this naturally fits best'."* As previously mentioned, A1 had a leadership role (later stated to mean CEO) in addition to being responsible for the market, while A2 was assigned to be responsible for the technical and graphical aspects. They explained that when A3 joined, they had a discussion regarding what role he should be assigned, and they decided that he would be responsible for the financials, in addition to competitive analysis. However, A2 added that what roles they eventually end up with will become more apparent when they have more time to work solely with the venture, arguing that university assignments were currently blurring the lines between the current roles. This was supported by A1: *"we have not tested our roles that much yet."*

When reflecting on the roles assignments after the team split in April, the entrepreneurs appeared to have a different perspective. *"It is something about not assigning roles before you know what you want to do and what resources are lacking in the team,"* A2 suggested, continuing by challenging how A1 was assigned the CEO role but was becoming distracted by work outside of the venture. *"I think that is not suitable for an organization,"* he stated, something A1 agreed with. A2 further suggested that the team should have considered keeping the CEO position unassigned, and rather found a more suitable candidate from outside of the team. Both A1 and A2 agreed that this could have been a good idea, but that it would possibly be challenging finding the right candidate.

During the lifetime of the venture, the team has appeared to be very focused on the competitors in the market. As presented above, A3 was early on in the venture assigned the responsibility to perform competitive analysis. A1 explained his role besides the venture's financials: *"he is studying the competitors and seeing how we will differentiate ourselves."* By doing research on the competitors, A3 found that many of their competitors were attending, an annual industry conference, in North America. A3 attended this conference in February, and A1 explained that one of the main reasons for this was to get in contact with competitors they could not reach over the phone, but also to discover new once. They found around 30 different companies they referred to as either competitors or substitutes. When questioned on what they learned from the conference, A1 replied: *"it was good to find*

competitors that were doing similar things, that we have not manage to find before," and A2 added: *"we may have a bigger need now to figure out what we will do uniquely."*

In April, A2 argued that one of the reasons they were still focused on the four sets of problems and solutions was the fact that none of their competitors had this exact combination, implicitly stating that this made them unique in the market. Specifically, one solution was added partly as a result of A3 considering this as one of the weaknesses of the competitors after attending the conference. Other parts of their business model also appeared to be a result from competitive analysis. The suggested sales price of the product was mainly set through benchmarking with competing solutions, and the consideration of involving in a partnership with an established actor was also inspired by the fact that some of their competitors are in also in partnerships with established industry actors.

In February, the Alpha team was at the time just finished working on an action plan for the venture, and A2 stated: *"the process with the action plan was perhaps the best process we had as far as predictability on what we will do, how long time we should use, and what the result will be."* In order to reduce the uncertainty, A1 explained that they would talk to the potential customer segments, specifically stating that they wanted to speak to *"at least a handful more people"* to clarify the potential segments. They hoped that this would help them find a single customer segment to focus on, and to get *"requirement specifications"* so they could make a *"simple prototype based on these requirements,"* A2 explained. Furthermore, they explained that they would like to develop an MVP instead of focusing on the final product, saying it would be *"a continuous process to let users test the prototype and get feedback from them."* In March the team again emphasized this by saying they considered presenting their potential customer segment with a solution to understand if they really are interested in the solution. A2 continued explaining how he wanted to work by testing multiple solutions to multiple different customer segments: *"you can change what you offer a customer segment, and then you can go to another segment and change it again,"* suggesting that they then would find the right solution and customer segment.

Although laying plans on how to reduce the uncertainty of the venture, the entrepreneurs appeared to take little action. In February, A1 stated that the team has worked very little with their venture, arguing that all of their available time has been spent on university assignments. Later, in March, A1 again stated they had little progress in the venture, again

explaining that this was due to spending much of their time on deliverables for their master's program. When discussing changes in their business model from the prior month, A1 stated: *"we are still writing the same things, but I am now saying 'we need to investigate some more',"* as if realizing the lack of progress. A2 agreed, saying that much of their business model is identical to last time, and felt it was challenging to handle the combination of deliverables and startup, due to how they are intersecting with each other. Lastly, A1 explained having reflected on the lack of progress, and admitted this is because of prioritizing a part-time job at another company, instead of focusing on the startup.

When showing minimal progress on their business model in April, the entrepreneurs were questioned if they had confirmed any of the customers' problems they had listed, in which A1 replied that they had not. When questioned about how they have tried to verify what problem is the most important to the customer, A1 explained that *"we have done a few customer interviews, but we have not done enough of them,"* arguing that this is due to the fact that the team has split up. After reaching out to potential customers by posting in a relevant Facebook group, a few people commented on their post encouraging them on their business idea. *"We could of course have contacted them and asked them if they wanted to speak with us, but we did not do this."* An administrator of another, more relevant, Facebook group also gave them permission to use the group to reach out to potential customer, but they never acted on this. However, when asked about making progress on the business model, A1 states that *"it is not necessarily very time consuming, but it requires own efforts to go out and find someone, talk to them and get that information."* A1 admitted to not having put in enough efforts to get the venture up and running, explaining putting the venture last when prioritizing between the startup, deliverables and her part-time job.

4.1.4 Learning

Possibly due to the low amount of action they have taken, the team has not indicated gaining much knowledge in regard to their startup, outside of competitive analysis. When A3 visited the conference in North America, some of what they learned was that many people were interested in having a slightly different problem solved than team Alpha initially thought. A1 also explained that they did some customer interviews in January. First, they spoke to retirees, but found that this segment was not technology savvy and would perhaps not embrace their solution. Then they decided to speak with people their own age, who according

to A1 always referred them to their parents, which made the team settle on 40 - 60 years old as their customer segment. They also contacted one woman who showed interest after the team posted a request in a relevant Norwegian group on Facebook in March. Through an hour-long conversation, it turned out that this woman had a hobby suitable for Alpha's solution. From this, A1 learned about the possibility to further narrow down their customer segment.

4.2 Bravo

Bravo was founded by one fourth year student at the VCP, B1, together with an established company within a similar industry. B1, being the founder and CEO, has a background from computer science as well as having been involved with an organization promoting innovation and entrepreneurship. Bravo want to assist companies in being compliant with an upcoming legislation, and in the long-term the team wants to automate this service. In order to develop this solution, Bravo was operating as a consultancy to acquire knowledge of customer problems, while simultaneously implementing this knowledge into the development of the automated solution.

4.2.1 Uncertainty

Product Uncertainty

In February, B1 was juggling between if Bravo either should develop an automated digital solution to assist companies or rather become a platform for connecting these companies with independent advisors. Later, Bravo decided to opt for the former. B1 explained in March that Bravo provided a consultancy service, which was done on the basis of an estimate of how many hours were necessary to supply each individual customer. There was still uncertainty of how much help each customer need and what value is essential to provide through a software product. Also, B1 stated that Bravo was in need of more input from international companies, as the learning they had acquired so far exclusively stemmed from Norwegian companies.

Market Uncertainty

The largest factor of market uncertainty appeared to be in the problem itself. The legislation was a massive focus for many large companies, but there was a lot of uncertainty related to how it would play out when the laws are implemented, and Bravo's product was based on assisting firms with becoming compliant to these new laws. B1 stated that it was very hard to

tell how both international and national authorities would enforce the legislation. This uncertainty was present throughout the interview series. In April, B1 stated: *"while some companies are taking this legislation seriously, there are still a lot who do not."*

B1 stated that Bravo has begun planning how to reach customers through inbound marketing efforts, but none such efforts were taken during the interview period and no concrete plan for customer acquisition explained. All customers at the time were acquired through network.

There were clear indications of uncertainty regarding the business model of the software solution to be developed. B1 stated intentions of testing different revenue models but has not been able to test anything or gain any reliable information regarding this. A1 stated in *April: "We have not been able to test a SaaS model, form sales, subscriptions and all that."*

In February, B1 stated that what customer segments to target was still undecided. The team showed progress in March, as B1 stated that Bravo had mostly been working with startups and that this is the current customer segment of choice, but also added that startups are difficult to work with and supply low willingness to pay. In April, B1 explained that Bravo wanted to work with startups because they are the most motivating customers to work with, even though their willingness to pay is low:

> *"It is a stupid segment to start with, because they pay the least. They have the least cash and they care the least [about the challenges regarding this legislation]. But therefore, it is also fun [to work with them]".*

4.2.2 Effectual Behavior

Means

B1 indicated having utilized personal and professional network to a large degree. This has been done both to acquire knowledge and feedback, but also in order to acquire new customers: *"We have found all our customers up until now through our own network."* Some financial resources have been secured through partnering up with an established organization within the advisory industry. In addition to this, the partnerships provide necessary competency that is vital when providing consultancy for customers. The remaining financial resources have come through the use of personal finances from B1.

Partnership

Partnering with an established organization is without a doubt the most important relationship the venture maintains. B1 has also mentioned having plans to develop partnerships with independent consultants as well as pilot customers, but none such relationships have yet materialized.

4.2.3 Causal Behavior

Goals

In February, B1 stated ambitions of acquiring ten new customers by the end of April, arguing that this was to guide action towards customer acquisition for the next few months. Even though the venture is targeting small and medium-sized enterprises (SME) as customers, B1 stated they also have ambitions of working with large enterprises in the future. By the end of the interview sessions in April, the single most important goal was identified to be launching an MVP of the digital version of the service later that year. However, it was added that this depended on sufficient work being put in during the summer.

For purpose of resources needed for Bravo to succeed, B1 stated in February the goal of adding a team member to be in charge of technology. In addition, they were looking for one or two people responsible for product development, and someone to be in charge of administrative duties. In March, Bravo was still searching for more people, with tech lead (CTO) being first priority. In April, Bravo stated that a recruiting process for summer interns had been initiated. The main goal was to acquire more manpower during the summer, but also to create an arena to test employees for the purpose of full time recruitment.

Planning

In February, B1 stated intentions of arranging seminars and workshops with potential customers in March, in order to build awareness of the company's services. Self-employed advisors were targeted as potential partners for the venture. B1 explained that Bravo was planning to build a portfolio of relevant domain knowledge about their field. Supposedly, this would aid the team in structuring knowledge acquired through the consultancy work, making them able to develop software products that match customer needs.

Of specific tools and frameworks for venture creation, B1 mentioned performing design sprints both in February and March with regards to product development. However, none were carried out. B1 also mentioned utilizing lean startup (Ries, 2011) as a framework for business development, stating: *"We don't follow any particular recipe, it is more like common sense [lean startup]"*. In February, B1 mentioned developing an MVP through utilizing existing software services, such as Typeform. This MVP was, however, not finished during the time of the interviews.

In the lack of other team members, B1 stated in February having all responsibilities within the venture but being in need of someone in charge of technology. In March, B1 recognized the need for more roles to be filled by new team member. B1 only barely mentioned examining competitors and learning from them, and what they do, in the final interview in April.

After holding their first seminar successfully, a lot of questions about the problem and implications for SMEs were raised. However, even though B1 said receiving these questions from potential customers were understanding customer problems, this information was not documented after the event. As of April, no action had been taken towards partnering with independent advisors, and B1 argued this was due to lack of resources.

B1 has stated that Bravo initially (February) had planned to develop a prototype very quickly, building one feature at a time. The initial plan also included involving pilot customers to co-create the product with and perform close user testing along the way. One part of this product testing would include testing what sort of business model would be most viable; a licensing fee or single purchases, a price dependent on number of employees or amount of usage etc. In March, the focus was somewhat changed, with B1 stating that delivering to customers and learning from those interactions was more important right now. In April, new plans were stated for creating an MVP in the autumn.

Predictions

B1 stated that targeting SME and especially startups as customers could be very difficult, but also that this market could be less challenging when the new laws have been put into effect. For the purpose of creating an MVP, B1 stated that approximately 50 standard answers customized for different customer input would have to be created in order to provide

sufficient value. B1 also stated in February that many startups do not take the coming legislation very seriously, even though they should. In March, B1 stated that customer deliveries were the most important thing for developing the venture. In the last interview in April, Bravo appeared to have multiple other predictions. Firstly, B1 suggested putting effort in marketing would not be worth attempting, arguing these efforts would certainly be fruitless and a waste of resources for Bravo. Furthermore, even though B1 stated referrals from the official Norwegian authority within Bravo's field would be advantageous as a channel for reaching customers, B1 was certain that whether this will happen or not is impossible for Bravo to influence. Lastly, it was claimed that it would be impossible to recognize how the new legislation would change the market in the future.

4.2.4 Learning

In March, B1 indicated that through working as a consultancy for customers, Bravo has learned that it is vital that customers understand what kind of information they are supposed to supply (March). This is due to the general lack of knowledge about privacy rights by customers; they tend to not understand what kind of sensitive information they might be in control of. B1 also indicated increased certainty about the problem after talking to experts and making personal reflections. Especially the overall uncertainty among experts about the impacts of the new legislation has made B1 more certain of the problem. In April, B1 explained that Bravo had begun structuring their acquired knowledge in an Excel sheet, so that it would be easier to utilize it later. B1 also stated receiving input from other startups as a way to guide how to operate the venture, as well as from pitch competitions and similar. Furthermore, it was indicated that Bravo leveraged personal and professional network to a large degree when seeking new input on how to develop the venture.

Experimenting

B1 stated initially (February) that experimenting with a different MVPs would be main priority. In April, B1 states that Bravo has been doing little testing, and this testing has yet to prove useful for product development purposes. So, the focus has been lowered, with a functional prototype yet to be developed.

4.3 Charlie

Charlie was founded by four fourth year students at the VCP; C1, C2, C3, C4. The team wanted to create a new platform to facilitate transactions between companies and consumers. Students at the VCP performed a feasibility study on the business idea in the fall, followed by C3 winning a pitching competition with this idea. The cash prize provided Charlie with starting capital, and after this C3 brought together the team. None of the team members have any software development experience of significance, or any technical knowledge relevant for their business case. Also, neither possessed domain knowledge concerning the targeted industry. The startup was terminated before the end of the interview sessions in April.

4.3.1 Uncertainty

Product Uncertainty

Initially, in February, Charlie stated intentions of their product being a mobile application, but also suggested that this choice was not certain. According to the team, they had also considered a web solution or a web plugin. The team had created a number of hypotheses regarding technological possibilities, but still had to do a lot of verifications as none of the team members appeared to have sufficient technical knowledge. In March, uncertainty within the team was still significant: *"The solution [to the problem we want to solve] is just as vague [as in February]."* In April, C1 and C2 gave the impression that the uncertainty surrounding technical possibilities, as well as what a viable product would look like, was as significant as when the team started out in February. The team also stated that it was very uncertain how data extraction from different APIs would work after the new laws had been implemented, which also contributed to the product uncertainty.

Throughout the process, the team struggled to identify what value propositions would be sufficient for users. Their proposed reward in order to incentivize users to use their platform was rejected after user testing. In March, Charlie suggested alternative value propositions to what they initially started with. In April, they were still uncertain about what value would be viable to reach users, but only regarding the use of a mobile application. They had not changed course in order to examine the other solutions (web application, web browser plugin) or value propositions they presented. C2 emphasized their product uncertainty: *"The concept [of what the service really is] is still very vague"*.

Charlie never got to do much research about what the cost of creating their product would be. Probably because they were so uncertain about the product itself. Suggested costs were generic costs of running a software company; development, maintenance, servers, salaries etc. The team also predicted marketing costs to be very high initially. By April, the team had acquired some feedback regarding the returns they could expect with their solution. These estimations massively outweighed the team's initial predictions.

Market Uncertainty

In February, team Charlie clearly stated the user problem they had identified. However, the team was aware from the very start that this was not a problem experienced by many: *"The problem here is that many people are not aware of this problem yet (...)."* It became evident that this uncertainty affected everything the team was trying to do, and they continuously displayed the same uncertainty about the problem they were trying to solve. In March, C3 explained their frustrations:

> *"We have tried to work with this from the problem side, but it is not an actual problem. Then we tried to push out a solution (...)."*

The team discussed a number of different business models in February, spanning everything from pay-per-use, to subscription and freemium models. In March, Charlie had made attempts to calculate the potential value of each individual user, but estimates were far below predicted value. This difference was emphasized by C2 in April:

> *"The generated revenue per person would have to be tenfold what we have estimated in order to be a viable business model."*

C1 and C2 stated that lack of both economic potential and product-market fit were two of the main reasons the project was terminated.

4.3.2 Effectual Behavior

Means

The only relevant initial means that could be identified for Charlie would have to be the cash prize they won in a pitching competition before founding the team. Some funds have been spent on user testing, but otherwise it has not been utilized to great extent.

Partnership

In February, Charlie established a partnership with two data scientists who just had started their own venture to within the same field. The deal involved Charlie working with maintaining customer relations for the scientists, since they were targeting the same industry. In return, Charlie would get the possibility of using the data analysis tools the data scientists had developed. C3 explained that this partnership started out very undefined, and it appeared to never develop into anything substantial. It seemed Charlie did not manage to develop close relations with the data scientists, as explained by C2 in March: *"[this scientist] is not part of our venture, he has his own company."* So C3 ended up just being part of another project, and never got around to integrate this partnership as a resource of value for Charlie, as stated by C2 in April: *"It is an entirely different project, really, it is not part of our project."* Charlie also acquired a partnership with two students of computer engineering to develop a prototype of their mobile application. These partnerships lasted on and off for some time, without the students being fully adopted into the team.

4.3.3 Causal Behavior

Goals

Charlie stated in February that their first objective would be to set up a pilot project with a potential customer, without elaborating on how they planned to reach this goal. A specific deadline was set to launch *"some sort of beta version of the app"*, with and stated they also had a soft deadline some weeks prior. The soft deadline was set to the implementation date of the legislation. The team believed that through successfully onboarding 50-100 users, they would have sufficient proof of concept to start talking to investors. In March, the team set another precise deadline to verify all the hypotheses formulated at the alumni workshop. They stated that by then, they intended to *"have their business concept figured out"* as the team had agreed to end their *"market analysis phase"* by then. The reason for this was that they had a business plan to hand in for a university assignment the following week.

Initially in February, Charlie stated very clearly what team resources they intended to acquire; one guy for back-end development, one for front-end development and one user interface designer. When interviewed in March, the team reflected upon the two students they had managed to recruit, but not managed to integrate into the core team, and admitted to have failed to acquire the competency they needed.

Planning

With foundation in the goals set by the start of the interview sessions, the team planned for the spring semester to be a market analysis phase where a course would be set to guide the product development. The team started out with a simple Gantt-diagram to guide which processes would be implemented and when.

C3 was given responsibility for mapping out the industry value chain to identify where Charlie could be positioning itself. This resulted in the team finding a possible position they chose to focus on. The team was also active with competitive analysis. In February, three substitute mobile applications had already been identified, and they were all user tested by the team. By March, two direct competitors were identified, and it became clear to the team that there existed some large actors working on the same problem as themselves: "people have been working with this [problem] for 5-6 years, but little has happened". In April, the team was more disillusioned, stating: *"some of [the competitors] are much more well suited to do this (...) It is a case for someone, but not us."* The team had by then also identified a large corporation in their neighbor country that was working on a similar product as Charlie.

Being the largest team of all the interview cases, Charlie appeared in February to be careful to allocate specific team roles to each team member. C1 and C4 were responsible for the technical aspect of the product, C2 was responsible for understanding the user perspective and C3 for customers. Role distribution were renewed after the alumni workshop, with C3 being delegated the role as team leader for a test period of 8 weeks. It seemed like the work responsibility within the team were very discrete, leaving the individual team members to work very much on their own at times. This was emphasized by C2 in April: *"I actually do not know what the two others are doing."*

The team stated in March that they spent a lot of time waiting for their newly involved developer to finish what they referred to as a *"Minimum Viable Product."* Without this MVP they argued they could not commence user testing. One month later, the team stated not having the developer as part of the core team as a challenge. However, they did not state why efforts to have the developer more involved, or finding other ways to acquire this competency, had not been pursued with more determination. The team had also stated that they intended to create three distinct MVPs with three distinct value propositions and test these concepts through the use of landing pages and Facebook ads. This was never acted

upon, as the team argued they were too focused on reaching the set deadline for their business concept. The team also mentioned attempting to recruit students to test and give feedback on the existing substitute solutions they had found but failed to involve any students. C1 states that it was at this point the team became very uncertain whether their suggested value proposition really was worth pursuing at all, or whether they should alter the direction of the venture.

From the first interview in February, the team has stated that user testing and iterated product development would be a major focus for them. By doing this, they argued they could start working with the most critical aspects of their hypotheses, both by reaching out to potential users and creating designated focus groups.

Predictions

Some unjustified predictions and statements were made by the team during the interview sessions. For instance, during the interview in February, they suggested that onboarding 50-100 users would be sufficient to get interest from investors, without explaining why. They also set a goal on entering a specific part of the value chain based on the market analysis. However, this was without evaluating technical feasibility, customer needs, or market potential in against other entrepreneurial opportunities in the industry. In April, the team was very certain that launching such a technical complicated venture with four non-technical business developers was a born dead undertaking. They stated having ended up arguing a lot about which direction the venture should take, without the team really having enough information or competence to make sound decisions: *"Looking back, I am very surprised that the VCP allows you to start a venture with four students."* Also, the team ended up disregarding the user problem they had been addressing with their new venture:

> *"The problem we all based [the venture] on is not a problem. It is not a problem for the average Joe."*

4.3.4 Learning

Charlie has withheld a strongly learning-based focus from the very start of the interview sessions. They quickly discovered from talking to potential users the wide range of skepticism they might encounter upon acquiring a user base for their app. In March, they stated that users they tested the concept on were typically skeptical when they understood

what being a user required from them. It seemed awareness about the problem Charlie intended to solve for the users actually was raised when the users were confronted: *"[Users] find it strange to be earning money on something they did not know they were in possession of."* Charlie also stated that in March that feedback from the tests was varying a lot, indicating that they struggled to get any clear and actionable feedback. They also learned that their initial proposal as user incentives might have been insufficient, as even users who signed up did not care to collect their reward. By April, the team had sent out a questionnaire, collecting a few hundred responses. This survey was intended to map out people's awareness regarding the problem Charlie was trying to solve. About half of respondents confirmed they were willing to use the proposed service, but users' expectations of incentives varied greatly, indicating that respondents had little understanding on the topic. The analysis C3 performed of value chain positioning proved to be influential in deciding what customer segments would be hypothesized and targeted with testing. The team stated they had been focused on identifying the key value proposition they could deliver to customers, but that they did not manage to do so, even though being dedicated and systematic in their process.

Except from internal discussions, analysis and hypothesizing within the team itself, Charlie states a number of other sources to how they went about developing their business model. Firstly, the team sat down with the VCP's alumni for a workshop session arranged in March. The learning derived from this event mainly involved many hard questions guiding further user testing and market analysis. Also, the team had been inquiring to some degree with data scientists in order to achieve some technical understanding of the industry Charlie wanted to enter. Mostly, the team has been utilizing the closest available learning resources. These were university faculty, mentors assigned by the VCP, as well as incubators for tech startups in the region. It appears as there has been a lack in learning in regard to the technology itself: the challenges involved in creating viable products, and what technical resources are needed to accomplish this.

Experimenting

Charlie have been very focused on continuous experimenting with users to develop their product. C1 was assigned main responsibility for user testing, and has been documenting learning, and iterated MVP mockups together with C2 from February. This has resulted in 5 different mockups having been made and tested. C1 learned to use the software Figma and later Adobe XD in order to design mockups. Initial versions were only user tested with a few

people. After having talked to experienced user testers and design students, the team started expanding from user testing with just a few people to students all over campus, and they started testing more systematically. Testing gave the team feedback on what features users expected, on the design and interface, as well as the importance of giving the impression of credibility to earn users' trust. Customer segmentation was also developed as a result of the feedback they received through user testing. After the team received mentoring from the VCP's alumni, they constructed a number of hypotheses that the team would work towards proving or disproving with their ongoing user testing. The team was sometimes uncertain on how to approach user testing due to the varying types of feedback they received from talking to experienced actors: *"We get so much different input from people with and without competence all the time."* Soon after the alumni workshop in March, the team got in touch with two computer engineering students that were to program further mockups. Thereafter, C1 and C2 started user testing on a larger scale. Also, C1 contacted a design company in order to create more well-designed mockups to use in customer meetings and investor pitches. Towards the end of the interview sessions, the team had started contemplating the possibility of creating a web browser plugin instead of an app, as they had suggested in the very first interview in February. They held a *"technical workshop"* together with the two computer engineer student in order to assess different possible technical solutions, but never got around to start developing or testing anything further. C1 did thorough work to keep documenting results of experiments. However, even though focus on experimentation was dedicated within the team, it still seems that they were influenced more by outside learning sources than the actual results they received from experimenting.

4.4 Delta

Delta was founded by one student at the VCP, D1, together with two other students at a different study program at the university; D2, and D3. Through conversations with professionals in his network, D1 identified multiple problems that D1 and D2 set out to solve by developing a software tool.

4.4.1 Uncertainty

Product Uncertainty

As stated in the case introduction, the team decided to pursue an opportunity they discovered through finding problems within the industry. This has perhaps made the product uncertainty

for the team lower than in other cases. However, in February, D1 stated that even though they had become confident that the problems they are worth solving, he added:

> *"we have relatively good control on the problems within our current customer segments, but this can possibly be different when we later change customer segments."*

Later, in March, the team displayed some uncertainty in regard to their value propositions, stating that they currently were most suitable for the domestic market. D3 also expressed some concern in regard to one of their value propositions on making customers processes compliant with an upcoming legislation: *"When the deadline for the legislation is over, I do not think that is a unique problem we solve anymore."* This was something D1 disagreed with, as D1 was not expecting all companies had become compliant within this deadline.

After deciding to also have a new user segment register profiles with their system, the team appeared to be uncertain about how this would impact their future product. When thinking of how they could use this data to create another revenue stream, D1 said:

> *"When we have many of these users on our platform, we can look at the opportunities to create a business model from this user mass."*

However, D3 further emphasized how uncertain they were about this part of their business: "I believe the main focus will be to give our customers functionality, and then see how the new user side of it develops." They also addressed some concern about creating a two-sided (and possible three-sided) platform, and the challenges it comes with, realizing that they now are dependent on multiple different segments in order to bring value.

Market Uncertainty

Appearing to be certain about their initial customer segments, Delta was in February mostly uncertain in regard to what their next customer segment should be, as D1 explained:

> *"we have already tested some new industries, but this far we see that there are the three segments we already focus on that suits our product best. At least right now."*

They further explained how their tool could possibly be relevant for every company, arguing that their solution is something all companies need. However, they argue that they want to find the right customers:

> *"We can call almost anyone, and they will say 'yes, we need that tool,' but it is not certain that they are the right customer for us. At least in the early phase."*

Lastly, they stated that they hoped working closely with the customers they already have, they would get an epiphany and realize: "of course, we should enter this industry." In March, after having received new customer leads through a partnership with a student organization at the university, the team seemed eager to explore another customer segment:

> *"This customer segment is starting to focus more on the space we are in, so this is an exciting segment to look into."*

In April, the market uncertainty was still mainly related to customer segments. D1 explained how they were struggling to book meetings with one of their initial customer segments: "They are a little challenging, because they are working so much. They never have time." D3 emphasized the uncertainty about this segment compared to other customer segments:

> *"It might be that these companies do not see the benefit of the solution we provide, while it seems like our other customer segments see this benefit."*

The team's uncertainty about customer segments is also reflected in how they in April had removed the segment they found in March as a possible segment and added a new suggestion. They explained: *"we have tried selling to this new segment that focusing on the space we are in. They appear to have a lower threshold to test our services."*

4.4.2 Effectual Behavior

Means

From the very beginning of the new venture, team Delta has effectively leveraged their personal and professional network. D1 recalled how they early on got some initial validation regarding their business idea:

> *"I contacted people I knew from [my previous study program], sat down with them, made a list with questions that would answer what type of system they use, and such."*

The team has continued to be very focused on using their connections, and already in February D1 stated that *"now we are seeing that we are starting to push the limits on at least our closest network,"* explaining that using their network makes it *"much easier to get inside the organizations to get the first [sales] meeting."* They state that their network in relevance to the business case stems from internship positions at several different organizations within their customer segments, as well as previously involvement in a volunteer organization.

This involvement is also one of their previous experience they consider as beneficial to their venture. Regarding their unfair advantages, D3 states:

> *"There are two main things: the domain specific knowledge through the volunteer organization, that all of us have been involved with, and that we are students with experience from various internships."*

In addition to this, all of the three entrepreneurs are taking degrees in computer science, which they also argued to be one of their main advantages. In February, D1 summed it up based on their current situation:

> *"We do not really have anything super unique product-wise, but I think that the combination between having insight in the industry, having a large network, and the ability to code ourselves, are giving us a good advantage."*

Partnership

Besides working closely with their first customers, Delta has also stated that they have engaged in two specific partnerships. First of all, through the entrepreneurs' previous roles at the volunteer organization, they managed to get a partnership deal. D1 explains the decision to engage in the partnership: *"we just saw the opportunity to reach many [customers] with few touchpoints."* D3 added that it was easy to get a partnership with the organization, as all parties are gaining. In the end of March, the entrepreneurs said that thus far the partnership had resulted in many companies signing up to use Delta's software solution. In addition to this partnership, D1 said in March that they were cooperating with another organization in order to make their software compliant with new regulations.

4.4.3 Causal Behavior

Goals

After identifying problems in the industry, Delta appears to have quickly decided to solve these problems by creating a software solution, which is similar to the three other cases. This decision can be considered as a clear goal in itself. Besides this, they had a short-term goal to deliver on the requirements of a prospective customer by the end of February. In March, Delta set another clear goal, which this time was to apply for an accelerator program. However, in April, D1 presented perhaps the most relevant goal since deciding to create a software solution: *"We wish to become a platform, and we are going via the current solution*

we have that attracts both side of the user we want to serve." The team appeared to have clearly set a goal for the new direction they wanted to take their venture.

Planning

Already in February, Delta stated they had planned to make bigger changes to their software over the summer months: *"A lot will happen [around summer] to improve the technical parts."* In March, as the team had received new customer leads through partnerships, D1 had tried contacting some leads to arrange a meeting: *"They did not understand why I was calling."* D3 explained further: *"We found out we should contact them around August."* In regard to their plans for the summer, D1 also told that they had planned to create a demo video that would be used to explain the users how the system works and how they can register.

In the process of further developing the service, the team said they made agreements with some of their customers that let them arrange workshops together to further develop the software. *"We want a closer dialogue, be more user centered in a way,"* D3 explained. In April, D1 stated that they would use one week to prepare for the workshops, and then use the following week to run these workshops with both customers and prospective customers to find out how to enhance their service. D1 continued to explain their plans for the workshops: *"we are going to use large sheets of paper, do some paper prototyping, and get some good feedback on what really works."* D3 also emphasized again that they planned for massive changes to the software during the summer: *"some parts [of the software] will be discarded and rebuilt in another way."*

Even though Delta has not appeared to be very focused on their competitors, they have indicated being aware of the other companies in their industry. In February, when discussing possible revenue models, D1 mentioned they had been looking at other international competitors: *"they have more transparent pricing models, with three different subscription models."* After making the decision of including volunteer organizations in their service, in March, they also discussed possible revenue streams. D1 again mentioned having noticed what competitors were doing: *"we saw a company in the US is selling information about these volunteer organizations in the US, after coming up with the idea ourselves."* Lastly, in April, the team told they compared their solution to other competitors when trying to explain their uniqueness in their application for the accelerator: *"There are a lot of competitors and*

services doing some of the same as we do. Perhaps not all the modules we have combined, but in each their application."

Predictions

Delta has appeared to be very careful about making predictions in regard to their new venture. However, in February, the team stated they thought a particular value proposition was the most important aspect of their solution, suggesting: *"we think this is the direction the industry is going, and the direction it needs to go in the future."* In April, the team also appeared to make some assumptions without having a clear reason to back it up. When questioned with how they would onboard their new user segment to their platform, D1 replied: *"The companies attract these users, and the companies want our solution as we have the necessary tools they need."* They were also asked about the customer centered, iterative building of the software, and if this caused their solution to have too many features, in which D3 stated: *"I do not believe we have created too many functions. I do not believe we have any function that is not being used. I think."*

4.4.4 Learning

As previously mentioned, Delta started by interviewing prospective customers within their own network, and they have appeared to maintain the focus on learning about their customers. In a meeting with a company, D1 recalled the company representative stating that the monthly fee they were currently paying for similar software solutions as Delta's. *"We decided to base our price on this, and we have spoken to a lot of customers saying we are charging the same monthly fee."* The company representative later got back to them saying they gave them the wrong price, and that they only paid around a quarter of what he originally stated for a similar service. This resulted in Delta giving customers quotes four times higher than their competitors: *"some customers have replied 'it is a great service, but it costs three times more than what we use today,' and that becomes a challenge,"* D1 stated. In March, D3 emphasized how important the team considers it is to learn from their customers: *"We have domain knowledge on the one side of this space, but we have gotten knowledge from the other side by learning through interviews."*

By having a working solution in the market, Delta stated that both customers and themselves have spotted some challenges with the software. One thing the team realized in April was the

opportunity they were missing out on by not having access to the data of user profiles; *"We have found out that currently, the value of the platform does not increase for each new registered user, because this data is stored with our customers, not with us,"* D1 stated. D1 added that this was an opportunity their customer also advised them to look into. D3 continued by saying they viewed this as a practical problem. Since the users needed to register identical information with each company, he argued that the users would stop leaving information when realizing they needed to do it multiple times. Therefore, D3 argued that letting users have their own account on the platform *"was a natural development when we started to get customers and seeing that this became a problem."*

The team also appears to learn from input from other sources than their customers. During the workshop with alumni from the VCP in March, Delta received input that they should consider narrowing their focus, and rather specialize on certain user segments. D3 explains: *"we got some guidance and good advices that made us discuss it further in an internal meeting we had together and found out that it was a good strategy."* They were also recommended by the alumni to remember to follow up with the customers after onboarding them to the software, as D1 explained: *"make the customer feel like it is a more well thought out customer journey. We try to focus on this."* Also, Delta's decision to apply to the accelerator program came from a recommendation from one of the faculty members at the VCP: *"he just name dropped it a one month ago,"* D1 told in March, continuing*: "we looked into it and believe it can be a very good opportunity."* After applying to the program, the team was turned down after a phone interview. However, in April, the team claimed the application process made them do important changes to their business model, as D1 stated: *"Many of the [questions in the application] were focusing on 'what is unique?', (...) and we were struggling to answer them."* When explaining their process, the team made it sound like a jigsaw puzzle where the pieces were slowly falling into place. They first found that after adding volunteering organizations, it was smart to have information about them in their service. Then they realized that users needed to have their own accounts in the service, so they could share and update their personal information. Adding in their current software solution, D3 explained that they realized something:

> *"suddenly we sat there with three post-it notes in their respective corners and thinking: 'this is actually a platform.' It was maybe then we realized that the software in the end is the intermediary [between the three user segments]."*

Delta therefore stated in April that they had decided to develop a platform between these three parties. When questioned about what outside of input from customers that made them change direction, D1 summed it up: *"I would say it was the alumni that first made us say 'specializing in this user segment is exactly what we do,' and the accelerator application made us say 'it is a platform.'"*

Experimenting

The Delta team started developing their software early on in the venture process. *"We try to resolve much of the uncertainty in the market we are in by with a closer cooperation with our first customers,"* D1 explained, adding that they focused on customer feedback and user testing. Right after conducting their first round of customer interviews, D1 recalls they started developing the solution:

> *"We started [developing] right after the customer interviews, and then we had one and a half month of development, then we met with companies, got feedback, then met with them again one month later, and then we started closing in on their requirements."*

In February, D3 emphasized the challenge in building such a large software solution in this short amount of time, saying it is naturally that there are parts of the code that is necessary to correct and change when you start to get customers. He stated: *"Right now the focus is on making the solution more stable, building it more solid and saleable."* They explained that they had been developing the software in an iterative manner, and that when adding new parts to the code *"it is not necessarily perfect the first time, but we think 'now we have a working solution,' then we publish it, and rather iterate on it."* In April, they talked about the challenges of building the software in an iterative and user centered manner, by how they often had responded to customers feature requests by just starting to implement the feature. D1 compared the software to a quilt, and D3 explained the concern with adding features in this way: *"we do not know how this will contribute to our software on a larger level than just solving the problem for this particular customer."* D3 reflected on the process*; "we have had a slight MVP mindset. We build 'this' and 'that' function by customers' request, and what we see as relevant to our customers."*

5 Cross-Case Analysis and Discussion

This part of the thesis will focus on analyzing the case firms in order to answer the research questions. The analysis will be done according to the conceptual framework presented in chapter 2.4 (Figure 5.1).

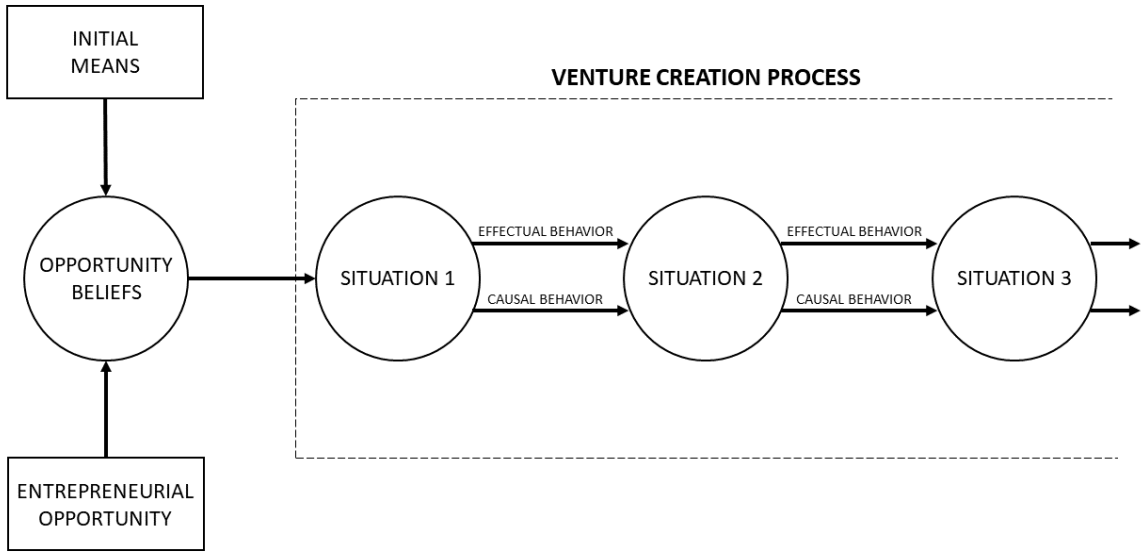

Figure 5.1 - Conceptual framework for the thesis

First, the opportunity beliefs of the entrepreneurs will be addressed. These beliefs are constituted of the entrepreneurs' initial means and the entrepreneurial opportunity. Following, the development of the situation of uncertainty will be analyzed, represented in the framework as the three situation circles. Next, the analysis will focus on how the entrepreneurs have developed their initial means, and what effectual and causal behavior they have displayed. Lastly, the research questions will be addressed with the relevant findings from the analysis.

5.1 Opportunity Beliefs

5.1.1 Initial Means

This subchapter will evaluate the case firms' prerequisites to pursue their entrepreneurial opportunity. The evaluation of the prerequisites is based on Sarasvathy's definition of means: who you are, what you know, and whom you know (Sarasvathy, 2001; 2008b). Each of the means presented is case specific, in other words, the analysis is only concerned with previous knowledge and network that is actually relevant for each of the business cases. The means are divided into three categories: domain knowledge, domain network, and product competency. As presented at the end of the literature review, domain knowledge and domain network are addressing the level of knowledge about the industry and market, and the entrepreneurs' relevant network. Product competency addresses the entrepreneurs' competency in regard to starting building their solution. The evaluation is summed up at the end of this subchapter (Table 5.1).

Two of the cases, Alpha and Charlie, are evaluated as having a low amount of appropriate means concerning the business case they pursued. None of the teams appear to have any experience from the industry they aimed to enter, and none have indicated having much relevant network to leverage. The one thing separating them is that one of the founders of Alpha, A1, has experience as a software developer, thus giving the team a higher score on product competency. However, as the team early on was looking for a back-end developer, they indicated that this might not have been sufficient for them to start building the product.

Bravo and Delta are both on the other end of the spectrum. In both of these cases, the entrepreneurs have indicated having a high level of domain knowledge of the industries they have entered. B1 in Bravo has knowledge and experience in regard to the field and a strong network of potential customers which the team proves to utilize. Both initial founders of Delta have experience from a relevant volunteer organization. In addition to this, D1 and D2 also have experience from internships in various companies. These are companies that now are within their customer segments and are providing a strong professional network. However, although one of the founders of Bravo has a background from Information Technology, the team does not prove to be as equipped as necessary to develop the product

themselves. Delta, on the other hand, are already developing their product in-house, proving to utilize their initial product competency.

According to Fisher (2012), effectual entrepreneurs will exploit their initial means to generate goals to guide the direction their venture should take. Yet, Alpha and Charlie have set clear goals for their venture from the start, describing what industry to enter and what product to create. It may well be possible that these two case firms have not investigated their means well enough, or that they simply have ignored them. From a theoretical standpoint, having little relevant means to work with might have made it more challenging for the teams to initiate the effectual process (Wiltbank et al., 2006). The scarcity of domain-specific knowledge and network makes it difficult to know where to focus and whom to contact in order to develop appropriate means further and to help shape the goal of the venture (Sarasvathy and Dew, 2005). Thus, from an effectual theory point of view, both teams are starting off with a mainly causal approach (Sarasvathy, 2001).

	Alpha	**Bravo**	**Charlie**	**Delta**
Domain Knowledge	Low	High	Low	High
Domain Network	Low	High	Low	High
Product Competency	Medium	Medium	Low	High
Initial Means	Low	High	Low	High

Table 5.1 - Initial means in the case firms

Bravo and Delta, on the other hand, are more in line with the effectual process. Both teams appear to have used what and whom they know to develop initial goals for their ventures. Therefore, they are better set than Alpha and Charlie to leverage their pre-existing knowledge and network in order to follow the effectual process (Wiltbank et al., 2006). According to McMullen and Shepherd (2006), domain-specific knowledge as Bravo and Delta have displayed is making novice entrepreneurs more equipped to acquire new information and to test feasibility. This finding is supported by Shane (2000). Nonetheless, this part of the analysis is merely describing the means at the initial starting point of the ventures. To get a better understanding of how the initial means affected the behavior, the following subchapters will investigate how the teams further developed these means during the research period.

5.1.2 Entrepreneurial Opportunity

The purpose of this section is to categorize each of the four cases in terms of what kind of entrepreneurial opportunity they represent (Knight, 1921). This is done in order to say something about the challenges involved and the degree of uncertainty the entrepreneurs are facing. The categorization of the different entrepreneurial opportunities are summarized at the end of the subchapter (Table 5.2).

All four case firms are quite different, not only with respect to what kind of entrepreneurial opportunity they have chosen, but also with respect to how these opportunities may be classified. Delta is targeting the most well-established opportunity, as there already exists a large number of competing solutions and the demand for such tools is quite stable and high. Charlie intends to become a new type of supplier in an existing market. So, their type of supply is new (though in competition with a number of really large actors), while demand is well established. Bravo is making a calculated risk that the need for compliance to an upcoming legislation in the future will create a demand for help among businesses, and that this help can be provided by an automated software solution. Alpha wants to address consumers with a software solution that will replace already existing physical products. All cases except Delta have gone through validation through feasibility studies done at the VCP, forming the basis for the opportunity beliefs of the student entrepreneurs. Bravo is the only case where opportunity beliefs were formed prior to the student entrepreneur starting at the VCP. Delta formed opportunity beliefs through scanning their network and publishing surveys in parallel to studying at the VCP. Charlie might have been influenced by the fact that C3 won a pitch competition with their idea prior to the team launching the venture.

	Alpha	**Bravo**	**Charlie**	**Delta**
Supply	Relatively new	New	New	Established
Demand	Established	Projected	Established	Established
Entrepreneurial Opportunity	Discovery	Creation	Discovery	Recognition

Table 5.2 - Classification of entrepreneurial opportunity

5.3 Entrepreneurial Uncertainty

This section is intended to make a suggested categorization of the four cases in terms of the kind of perceived uncertainty they are facing (Milliken, 1987; Maurya, 2012). This is done in order to determine to what degree they can be said to be in a situation of uncertainty (subjectively). First, the two uncertainty categories are analyzed in a cross-case manner. Then the states described as Situation 1 (February) and Situation 3 (April) are analyzed with respect to perceived uncertainty by the student entrepreneurs of each case. Situation 2 (March) is left out due to the fact that changes in uncertainty from Situation 1 to Situation 2 were very small and difficult to measure.

Market Uncertainty

According to Maurya (2012), the first uncertainties that should be addressed in the business model of a startup, are the customer problem that should be solved and the identification of the customer segments that need this problem solved the most. The four cases we analyzed differ somewhat with regard to these two uncertainties. Alpha has identified a number of relevant customer problems but has not received any validation on viable customer segments, and as such the venture has never progressed further in order to address other uncertainties. An indicator of this might be that Alpha's lean canvas has stayed unaltered throughout the interview series. Bravo was experiencing some validation through the increased focus on the new legislation among many companies, but the effect uncertainty of the new legislation yet to be implemented is really dominating the efforts of Bravo to validate the problem. The customer segment has been somewhat narrowed down, though not significantly, and seemingly only based on personal preferences by the founder. Charlie started with a very rough hypothesis regarding what problems their potential customers experienced, and worked dedicatedly towards validating it. But Charlie never managed to actually validate the customer problem, and this is reflected in their sudden changes in target customer segment. They also made some calculations of profitability per user and investigated what cut users expected, but never found any reasonable match, and this lack of results undermined their opportunity beliefs. Delta quickly got validation of the problem they wanted address through customer interactions and interviews, and therefore had better defined customer segments than the other cases. They were the only case to address the next set of uncertainties (Maurya, 2012), namely what channels are the most effective ones to reach customers through, and how to create sustainable sources of revenue.

Product Uncertainty

According to Maurya (2012), uncertainty about the solution should be addressed in response to how defined and validated the problem is. However, it also happens quite often that the product is not defined at all to begin with. Instead, and the entrepreneur tries to find a problem to solve with some new technology or product (so-called tech-push cases). Alpha had made some concrete hypotheses to answer the problems they had identified. But as with the identified problems, the uncertainty of suggested solutions has stayed mainly unaltered. Throughout the series, Bravo was working on learning about how to deliver value to customers through working as a consultancy. It is hard to say how much impact this has had on reducing product uncertainty, as no prototype utilizing this information has yet been tested, but the defined solution in the canvas has stayed unaltered, suggesting that there has not been any information weakening the hypothesis. Charlie suggested a number of solutions but stayed very put with their mobile application solution even though they were acquiring very little validation. Their suggested value proposition has been altered several times, but only as to what can be delivered through a mobile application. Delta is the only case generating customers with their actual solution, getting validation of the value proposition they are delivering and of how it is delivered. None of the cases have made any progress in validating a cost structure.

The perceived product and market uncertainty are presented in Table 5.3 (February) and Table 5.4 (April), followed by a further analysis below the tables.

	Alpha	**Bravo**	**Charlie**	**Delta**
Product Uncertainty	High	Medium	Medium	Low
Market Uncertainty	Medium	High	Medium	Low
Perceived Uncertainty	High	Medium	Medium	Low

Table 5.3 - Longitudinal evolution of perceived uncertainty (February)

	Alpha	Bravo	Charlie	Delta
Product Uncertainty	High	Medium	High	Medium
Market Uncertainty	Medium	High	High	Low
Perceived Uncertainty	High	Medium	High	Low

Table 5.4 - Longitudinal evolution of perceived uncertainty (April)

There are a number of interesting discoveries that can be made from this evolution of uncertainty. Both Alpha and Bravo are unable to reduce uncertainty significantly from February to April, even though Bravo is more active than Alpha in interacting with customers. Alpha is crippled by response uncertainty, not knowing how to address the uncertainties they are facing, despite having higher product competency than Charlie. This is consistent with Daft and Weick's (1984) suggestion that uncertainty itself does not necessarily lead to scanning. Given the effect uncertainty involved for Bravo, it is really hard to say how much they could have been able to actually reduce market uncertainty, although their product uncertainty certainly could have been addressed through user testing, at least to some degree. As Charlie acquired more knowledge about the industry and interacted with potential users, their market uncertainty was actually increased, with results being far away from expectations. Consequentially, they realized how unfit they were with their current means to find and create a viable solution and their perceived product uncertainty was actually increased as well: "It is an [entrepreneurial] opportunity for someone, but not for us" (C2, April). This is contradictory to the traditional understanding of learning as a linear reduction of perceived uncertainty; collecting more information does not necessarily reduce perceived uncertainty, as is suggested in the existing literature (Downey and Slocum, 1975; Milliken, 1987). Delta did also experience a surprising increase in their product uncertainty. Initially they had recognized an entrepreneurial opportunity with low perceived environmental uncertainty, yet by April they had realized that they should rather build a platform than a regular web software. So new goals were set, and one could argue that the opportunity had shifted from recognition to discovery (a new type of supply).

5.4 Expanding Means

5.4.1 Utilizing Initial Means

Alpha had relevant initial means in form of product competency within software development. However, they never truly used this knowledge for what it was worth, due to their lack of execution. This indicates they were following a causal process, focusing on planning how to reach their set goals (Fisher, 2012). Bravo had both domain knowledge and network, which were utilized to some degree. Lastly, Delta has appeared to be using both their previous experience within software development and their professional network actively. The approach taken by both Charly and Bravo appears to conform quite well to the effectual process as described by Wiltbank et al. (2006). Charlie, on the other hand, did not have a lot of relevant means to start with at all, and therefore, naturally, they did not have much to utilize. However, they appeared much more focused on taking action instead of planning, leaving their approach in an interesting intersection between the proposed effectual and causal process (Wilbank et al., 2006; Fisher, 2012).

5.4.2 Expansion of Means Through Learning

This section is intended to suggest a categorization of each of the four cases in terms of what different kinds of learning they have made use of throughout the interview sessions. This is done in order to determine to what degree they can be said to have undergone learning processes that have actively influenced the course of action taken by the student entrepreneurs.

Vicarious learning

The amount of vicarious learning varies from case to case. In the case of Alpha it is evident that they performed very little scanning for information in general, and the anecdotal input they received was not enough to shape their theory of action (Popta, 2002). Alpha's lack of learning might be connected to their response uncertainty. Since they lacked momentum needed to generate learning, no new frames for guiding action were created either, and since they displayed very causal behavior, they were unable to plan with so little domain knowledge. Alpha's most significant source of learning stemmed from participating at a conference in North America, and of a competitive analysis of the actors that were attending.

This harmonizes well with a causal approach, as planning over action, and competitive analysis, are both considered causal behaviors (Sarasvathy, 2001; 2008b).

Bravo described talking to people in their network on a regular basis in order to get feedback, for instance industry experts. B1 characterized the uncertainty among industry experts regarding the impending legislation as a confirmation of opportunity beliefs. Also, looking to other startups to learn how they operate had been a source of influence, B1 stated. This emphasizes how Bravo was learning by utilizing its network to build on the initial means, thus demonstrating effectual behavior (Wiltbank et al., 2006).

Charlie had one person (C3) dedicated to industry research and competitive analysis. Given the fact that the team experienced so much uncertainty within the space in which they were operating, it could be questioned whether this was too little resources invested (with two persons dedicated to product experimentation), as Holcomb (2009) argues that vicarious learning is more important than experiential learning in situations of high uncertainty. Some learning about the technological possibilities came from interacting with two data scientists and two computer engineer students, but mostly it seems that learning about market specific issues such as value chain positioning and customer segments came from the research done by C3.

Delta's most significant vicarious learning process took place prior to the interview series, as they had been talking to relevant people in their network to get validation for their opportunity beliefs. Delta also mentioned that they had been using research on competitors for pricing strategy, but that much of this information actually came through talking to customers. So, one could say that most of Delta's vicarious learning was based on interactions with relevant people within the space, and not unilateral research. As with Bravo, it appears that Delta had been learning mostly by using contacts in their network, hence indicating the same effectual behavior (Wiltbank et al., 2006).

All the student entrepreneurs participated in an alumni workshop session arranged by the VCP in March, and this workshop seemed to have influenced the entrepreneurs to a significant degree. Bravo, Charlie and Delta indicated having altered their planned course of action as a result of this session. Bravo stated having started to structure knowledge about customer needs, Charlie stated having set up a number of business model hypotheses that

would then be tested through experimentation, and Delta stated having narrowed their scope by deciding to specialize in parts of the market. Alpha stated that the input they received from this session was more directed towards what they actually wanted to do in terms of starting a venture, making them question their opportunity beliefs and whether the business case they had chosen really was right for them.

Experiential learning

Alpha never got to do much experiential learning, as they never got to test anything with customers. B1 acquired significant experiential learning through working with the customer, gaining knowledge about the customer value Bravo wanted to deliver. However, little was done with regard to building or testing an actual product at this stage. B1 stated through the interviews that an MVP was to be built and tested according to the Lean Startup framework (Ries, 2011), but little or none product testing was actually performed. So, Bravo maintained a focus on double-loop experiential learning (Mansoori, 2017), focusing on acquiring knowledge to be able to set the governing variables for Bravo's product strategy. One could question whether Bravo could have been more focused on single-loop learning (e.g. through MVP testing), given that the addressed customer problem had been much more validated than Charlie's, and that they were generating customers at the same rate as Delta. Being focused on experiential learning through customers, Bravo proved to use its network to achieve committing stakeholders (customers) who helped them learn more about how to shape the product. Again, this chain of behaviors is very much in line with the description Wiltbank et al. (2016) give of the effectual process. However, the team also appeared to show a lack of execution on actually utilizing this input, which indicates a more causal approach (Sarasvathy, 2001; 2008b).

Charlie based almost all their learning on experiential learning, putting a lot of effort and resources into testing a product with customers. Even though facing significant uncertainty with regard to the industry they wanted to enter, they were still certain that a mobile application could be a viable entrepreneurial opportunity. They did discuss different technical solutions initially, but even though they worked systematically and repeatedly failed to acquire validation for their mobile application solution, this learning was never accounted for or internalized (Landa, 1998). As stated by Charlie with regards to user testing: "Some [users] find it strange to be earning money on something they did not know they were in possession of." It seems Charlie remained somewhat stuck on single-loop learning

(Mansoori, 2017), having chosen a set of strategy variables (mobile application, users have identified the problem), even though their foundation for choosing those variables was only low domain knowledge. Although the way Charlie was learning through experimentation can be directly linked to effectual behavior (Chandler et al., 2011; Fredriksen and Brem, 2016), their approach in itself can be described as causal behavior, as the team had set a distinct goal and were desperately trying to find a way forward (Sarasvathy, 2001; 2008b).

Again, Delta was the only case firm having customers pay for their actual product and stated having iterated and updated features along the way as a result of customer feedback. This gave them a platform from which to achieve great experiential single-loop learning, testing their hypotheses with real customers. They indicated that double-loop learning had occurred after experiences had been matched against previous knowledge (and resulted in changed course of action), which is in compliance with Fiol and Lyles (1985). Delta stated carrying out scheduled product and strategy workshops every now and then to reflect upon learning and shape new action strategies, thereby giving themselves a platform for internalizing new knowledge (Landa, 1998). The fact that Delta changed their Lean Canvas (from interview to interview) more frequently and radically than the other cases might be due to them being quick to internalize learning and set new action strategies. The relative evaluation of entrepreneurial learning by the respective case firms are presented in Table 5.1.

	Alpha	**Bravo**	**Charlie**	**Delta**
Vicarious learning	Low	Medium	Medium	Medium
Experiential learning	Low	Medium	High	High
Entrepreneurial Learning	Low	Medium	Medium	High

Table 5.5 - Entrepreneurial learning in the case firms

5.4.3 Expansion of Means Through Partnerships

The effectual theory is stressing the importance of partnerships when building a venture in a situation of uncertainty (Sarasvathy, 2001; 2008b). Read et al. (2016) emphasize that ‘partners’ can be anyone willing to make commitments to the project, expanding the initial means and help set the direction of the venture, i.e. its goals (Wilbank et al., 2006). Thus, ‘partners’ are not only organizations, but can also be customers, or even employees (Read et al., 2016; Sarasvathy, 2001). However, Read et al. (2009, p. 583) argue that in order to count

as a partnership, “both parties must share in the risk and the gain from venture success.” Thus, Bravo and Delta’s dealing with actual customers would be considered partnerships, as the customer is taking risk through financial commitment. Charlie’s contact with potential customers, however, would not be considered a partnership, as the potential customers would not be acknowledged as committed to the project, nor sharing its risk or gain. Although, the authors would argue, such actions are effectively resulting in an increase of the entrepreneurs’ domain knowledge, hence an expansion of the entrepreneurs’ initial means. This type of experiential learning therefore appears to fall between two stools, being neither strictly effectual, nor strictly causal.

However, there are some instances of what can be considered to be more in line with effectual partnerships, and Bravo and Delta proved to be significantly better than the two other case firms in establishing these. For instance, B1 had the established actor come along as a co-founder when Bravo was officially established as a company. According to B1, this gave the venture new means in form of necessary industry knowledge (domain knowledge) and additional professional network (domain network). This is again in line with the effectual process presented by Wiltbank et al. (2006). Delta’s involvement of a volunteer organization, and their active use of experiential learning from their first customers, are other examples of a team utilizing their means to acquire commitment from other stakeholders in order to expand their initial means. However, Charlie’s attempt to onboard two software developers to expand their product competency, appears to not have been as successful. The developers appeared to be far from truly committed to the venture, and the expansion of means can therefore be considered insufficient. The same was the case for the attempt of involving the two data scientists. Lastly, Alpha, although mentioning partnerships on multiple occasions as a possible product channel, never initiated any partnerships.

5.5 Effectual and Causal Behaviors

Based on the findings presented above, all of the case firms have been evaluated on their effectual (Table 5.6) and causal behaviors (Table 5.7).

	Alpha	Bravo	Charlie	Delta
Focus on Means	Low	High	Low	High
Developing New Means	Low	Medium	Medium	High
Involve in Partnerships	Low	High	Medium	High
Effectual Behavior	Low	High	Medium	High

Table 5.6 - Rating of effectual behaviors among the case firms

	Alpha	Bravo	Charlie	Delta
Focus on Goals	High	Medium	High	Low
Lack of Execution	High	Medium	Low	Low
Competitive Analysis	High	Low	Medium	Low
Causal Behavior	High	Medium	Medium	Low

Table 5.7 - Rating of causal behaviors among the case firms

Another interesting factor to investigate is how the processes in the case firms match with the effectual theory. Alpha, as already mentioned, started with a clear goal in mind. They then mostly planned how to proceed to achieve this goal but showed little signs of action. This is in line with the description of causal behavior (Sarasvathy, 2001; 2008b). A simplified model of this process is illustrated below (Figure 5.2).

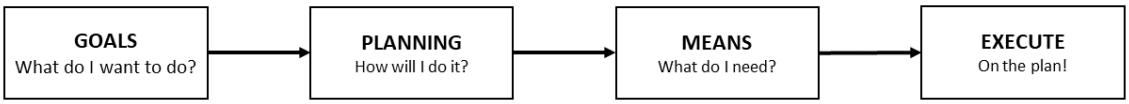

Figure 5.2 - The Causal Process, simplified model based on Sarasvathy (2001; 2008b)

Both Bravo and Delta showed clear indications of having most effectual behavior. The teams appear to have started looking at their means, and used these to develop goals for what they would create. They then used their network to gain both partnerships and new means, and especially Delta proved to be highly effectual and also adjusted their goals based on input (Sarasvathy, 2001; 2008b). Yet overall, even if Bravo showed to be a little bit more causal behaviour, their processes suited best with the effectual process (Wiltbank et al., 2006). The figure below (Figure 5.3) illustrates a simplified model of this process.

Figure 5.3 - The Effectual Process, simplified model based on Wiltbank et al. (2006)

Lastly, and most interestingly, Charlie appeared to have taken a slightly different approach than the three other teams. While starting off in the same situation as Alpha and ignoring their means, they started by setting a goal of developing a mobile application as the main part of their solution. Starting off with the lowest amount of relevant means of all the case firms, ie. little to no domain knowledge and domain network, and no product competency, they appeared determined to build their means by taking an effectual approach. The team spent much of their time testing mockups of their product idea with potential customers, trying to learn what product to create by running hypothesis driven experiments (Eisenmann, 2012; Ries, 2011), a method which is closely linked to effectual behavior (Fredriksen and Brem, 2016). Thus, they took more action than team Bravo. However, the team seemed mostly concerned about building the means necessary to make decisions on their predetermined goal, the mobile application. They did not show much willingness to change the goal itself based on input, indicating causal behavior (Sarasvathy, 2001; 2008b). They thus seemed to have developed a hybrid approach, consisting of both effectual and causal behaviors (Figure 5.4).

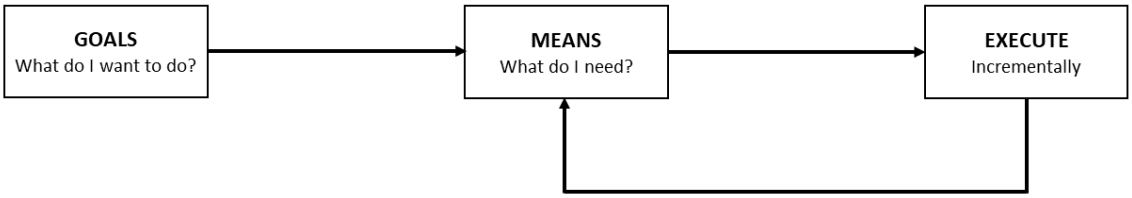

Figure 5.4 - Hybrid approach, inspired by effectual and causal behaviors (Sarasvathy, 2001; 2008b)

5.6 Summary of the Findings

In the following subchapters, the research questions will be addressed one by one, and answered according to the findings in the study.

5.5.1 Research Question I

How do initial means affect the behavior of student entrepreneurs in a situation of uncertainty?

An important reminder is that the description of means has in this study been limited to the entrepreneurs' domain knowledge, domain network, and product competency. Alpha and Charlie proved to have little to no appropriate means available, while Bravo and Delta showed a strong set of initial means. The data imply that starting with a low amount of suitable means make it more challenging to take action to reduce the venture's uncertainty. According to the literature, this is expected when starting out with a predetermined goal that does not suit the entrepreneurs' means, resulting in causal behavior such as detailed planning to uncover what means are needed to reach this goal (Sarasvathy, 2001; 2008b; Read et al., 2009). This is displayed in Alpha, which appears to be at a standstill in comparison to Delta, the team with the strongest set of initial means. However, on the contrary, the findings also indicate that having a high amount of initial means do not automatically make it easier to take the correct and necessary actions. While the literature would argue that having appropriate means would make the entrepreneurs more rapidly expand on these means (Sarasvathy, 2001; 2008b), Charlie appeared to be expanding on its means just as well as Bravo. The literature stresses that entrepreneurs do not practice either strictly effectual or strictly causal behaviors (Sarasvathy and Dew, 2008; Berends et al., 2014), which may explain this observation of mixed types of behaviors.

Domain knowledge and network is stated to be especially important for novice entrepreneurs (McMullen and Shepherd, 2006; Shepherd and DeTienne, 2005; von Hippel, 1988). When looking at Bravo, Delta, and Charlie, the latter started with a completely different set of initial means than the two former. This did not hinder Charlie from getting input from both potential customers and industry experts, being comparably effectual to how Bravo and Delta received input from their existing network (Wiltbank et al., 2006). Hence, this challenges the advantage stressed in the literature in regard to how domain knowledge and network make novice entrepreneurs better capable of acquiring information (McMullen and Shepherd, 2006). Knowledge and network within your domain certainly will help the process of acquiring information, but Charlie exemplified that it is also possible to quickly gather information by actively reaching out to relevant people and organizations. However, what

contrasted them again was how Charlie apparently ignored to pursuit many of the other opportunities outside of their original goal, while Delta both spotted multiple opportunities, and appeared to frequently change direction. This is supported in existing literature, as Shepherd and DeTienne (2005) argue there is a direct link between the amount of prior knowledge of customer problems and the numbers of opportunities recognized by the entrepreneur. Although, this theory is conflicting with how Bravo did not mention discovering many new opportunities outside of their original goal, even though having high domain knowledge. An explanation might be that Bravo appeared to become more set to its goals during the interview sessions, possibly as they received validation through serving their value propositions as a consultancy.

Another interesting finding is how these initial means are seemingly making it easier for the entrepreneurs to build sustainable partnerships, which is described to an essential part of rapidly expanding ones means (Sarasvathy, 2001; 2008b; Wiltbank et al., 2006). Bravo, and especially Delta, manage to involve various stakeholders, and have them commit to their venture. The majority of these stakeholders appear to come from the two ventures' domain network, which is a textbook example of the effectual process (Wiltbank et al., 2006). On the other hand, Charlie makes multiple attempts on involving both individuals and organizations, in order to build their means from the ground up. However, they do not appear to achieve any strong commitments from these stakeholders. As previously mentioned, the literature does argue for such mixed use of effectual and causal approaches (Sarasvathy and Dew, 2008; Berends et al., 2014), but little is being said on how entrepreneurs with a causal starting point should adjust in order to e.g. build sustainable partnerships. Charlie's unsuccessful partnerships could be explained by their lack of domain network, but perhaps even their lack of domain knowledge and product competency are weakening their credibility among other actors in the field. In that case, ventures lacking these means initially should perhaps in the short-term ignore working towards partnerships, and rather focus on building means through vicarious learning from these stakeholders (Nadler et al., 2003). This is arguably the best form for learning for entrepreneurs in a situation of uncertainty (Holcomb, 2009). In the long-term, both the entrepreneurs' domain knowledge and domain network would evolve to a level were an effectual process might be applicable (Wiltbank et al., 2006), and they can then possibly turn these stakeholders into partners.

Although not completely addressing the research question, the elephant in the room is the direct correlation between low initial means and failure of the venture, and vice versa. It might be tempting to draw a conclusion on this, stating that entrepreneurs with a lack of initial means, in an uncertain situation, are doomed for failure. “It is an [entrepreneurial] opportunity for someone, but not us,” Charlie stated when they ended their venture, indicating they had realized their current means were not suitable for the opportunity at hand. However, in Alpha’s case, the split of their venture is observed to be highly team related, and not necessarily strictly the situation of the venture itself. The authors will therefore argue that the reasons for a venture’s success or failure is too complex to be handled in the scope of this study.

5.5.2 Research Question II

How are student entrepreneurs focusing on expanding their means through learning in order to reduce uncertainty?

The study of learning processes in this thesis has been based on established literature on vicarious and experiential learning, with an added focus to learning through experimentation. Some interesting findings have been made, both contradicting and supporting established literature. Both vicarious and experiential learning have been observed by the case subjects, in different situations of uncertainty and with different sets of initial means. So naturally, different learning focuses have applied. Learning through experimentation has been a stated focus by all cases, especially user involved testing of minimum viable products (Ries, 2011). However, observations have not matched these intentions in all cases. So why are the student entrepreneurs so focused on “Lean” methodology when they don’t actually use it? This is hard to answer but could be due to the influence of Lean methodology in current entrepreneurial education. If so, it should be questioned whether Lean is viable as a viable approach for early stage venture creation by student entrepreneurs. This has to be examined much closer, as the findings in this thesis are not conclusive.

Another interesting finding, which challenges established theory, is the lack of linear effect of learning upon reducing perceived uncertainty (Milliken, 1987). Even though learning in itself contributes to a better understanding of the environment, it seems this may also contribute to greater response uncertainty among student entrepreneurs. They seem to become more aware

of how weak their foundation for decision making is and how ill equipped they often are in terms of initial means to pursue the opportunity they have identified. For instance, learning about competitors has been observed to have a negative impact on the opportunity beliefs held by Alpha. This might be because they realize that the supply side of their entrepreneurial opportunity is more established than first realized. So, reduction of uncertainty has weakened entrepreneurial beliefs, and no doubt contributed to the team eventually breaking up. Another case is Charlie, where weak initial means and high focus on experiential single-loop learning (having set a clear strategic goal from the beginning) resulted in termination of the venture.

Much of the trending frameworks for business development like Lean Startup (Ries, 2011) are focused on a methodological process for reducing uncertainty systematically through experiential learning only. But findings from this study suggest that focus on acquiring a sufficient set of means in order to form better opportunity beliefs could be more favorable for student entrepreneurs early on. So, should student entrepreneurs rather focus on vicarious learning than experiential learning when in lack of appropriate means? Might be, but this might make it harder to set initial direction and opportunity beliefs might not be formed sufficiently to guide entrepreneurial action. So maybe would mainly include vicarious learning, but also double-loop learning through interacting with potential future customers. It is obvious for the authors that interactions with customers has been a vital factor for Delta for instance.

Another discovery was the lack of learning from some of the cases, even when given every incentive to acquire and utilize new learning. This is in accordance with the literature stating that uncertainty does not necessarily lead to scanning by itself (Daft et al., 1988), the mindset of the entrepreneur needs to be set on dealing with this uncertainty (Marshall and Ojiako, 2014). Observations suggest that when response uncertainty is too great, this may hamper entrepreneurial actions as in accordance with literature. Actions that are needed to acquire new learning in order to reduce these uncertainties. In other words, any ongoing initial actions are important in order to sustain momentum in the venture creation process. If not, the venture could be stuck with planning, not acquiring any actionable learning and eventually dying out like Alpha.

5.5.3 Research Question III

How are student entrepreneurs displaying effectual and causal behavior in a situation of uncertainty?

When looking at the findings on effectual and causal behavior, it becomes evident that the behavior displayed appear to have a relation to the entrepreneurs' perceived uncertainty. Alpha and Charlie are both evaluated to have the highest perceived uncertainty among the case firms at the beginning of the study. However, as team Charlie was vastly more effectual than Alpha, they managed to reduce their overall uncertainty, while Alpha still have a high level of uncertainty. This supports the literature, which suggests that effectual behavior is beneficial in a situation of high uncertainty (Sarasvathy, 2001; 2008b). Delta, having a low perceived uncertainty compared to the other cases, proved to have highly effectual and little causal behavior. The low amount of causal behavior might be linked to the low uncertainty, as both Bravo and Charlie appeared more causal with a higher degree of perceived uncertainty.

There are some interesting findings regarding the overall approach to venture creation when looking at the effectual and causal processes of the student entrepreneurs. Firstly, three of the cases are very much consistent with the existing theory on effectual behavior. Alpha, having minimal relevant means, spent seemingly most of the time on planning and finding ways to differentiate from their competitors. They also had a meager degree of execution on these plans. All of these behaviors are closely linked to what the literature refers to as a causal process (Sarasvathy, 2001; 2008b). This behavior may perhaps also be explained by the team appearing overwhelmed with state uncertainty, making them too uncertain on where to start. Bravo and Delta, each having a strong set of relevant means, already had paying customers by utilizing these means, and Delta had even used its means to build a version of their product. These are clear indications of an effectual process (Sarasvathy, 2001; 2008b; Read et al., 2006).

However, Charlie‘s process did not fit any of the described processes in the reviewed literature (Sarasvathy, 2001; 2008b; Wiltbank et al., 2006). Starting with a predetermined goal, not based on any of their initial means, described as a causal behavior (Sarasvathy, 2001; 2008b), they developed product hypothesis and started testing product ideas with

potential users. Their focus on learning through experiments appeared to resemble elements from The Lean Startup Method (Ries, 2011), which is considered an effectual behavior (Fredriksen and Brem, 2016). Taking this approach, the team appeared to desperately build all of their means from the ground up, even trying to engage in partnerships to speed up the process, recognized as a highly effectual process (Wiltbank et al., 2006). This turned out to become a hybrid approach between effectuation and causation. When looking at this process in comparison to Bravo and Delta, the authors would again suggest that new ventures should learn to walk before they run, in order to build a sustainable business case. In other words, building sufficient means, or already having these initially, appear to be crucial before taking on a more rapid-paced approach to reduce the uncertainty, e.g., through effectual behavior.

This is where it becomes challenging to apply effectual theory since the combination of causal and effectual behavior is varying in the real world (Sarasvathy, 2008a). Additionally, taking a causal approach is argued to be suitable in a predictable environment, a situation of risk, while effectuation is applicable in a situation of high uncertainty (Sarasvathy, 2001; 2008b). Thus, the authors do not believe Charlie's outcome would have been any better if taking the same approach as Alpha, focusing on a mainly causal behavior, such as predicting the future and laying detailed plans (Sarasvathy, 2001; 2008b; Read et al., 2009). According to the literature, causal approaches are mainly utilizing pre-existing knowledge, and do not focus much on learning (Sarasvathy, 2008b). Hence, there is little focus on expanding the means of the entrepreneurs. The authors would argue, however, that when little means are available, and uncertainty is high, the entrepreneur will need to start building necessary means through vicarious learning to move towards their goals successfully. If Charlie had spent even more resources on vicarious learning from stakeholders (customers, users, industry experts, etc.), the authors believe they would come to a point where their means would be at comparable level as the initial means of Bravo and Delta. From that point on they would be able to initiate the higher paced effectual process (Wiltbank et al., 2006). To sum up the analogy: Alpha barely took a step, Bravo and Delta could already walk and started running, while Charlie desperately tried to run without first learning how to walk.

6 Conclusion

The purpose of this thesis was to attempt to understand how student entrepreneurs in a VCP behave in a situation of uncertainty. A two months long longitudinal study of four new ventures founded by student entrepreneurs led to interesting findings, both confirming and challenging existing entrepreneurial theory.

Initial means, which in this study consist of domain knowledge, domain network, and product competency, do not appear to clearly affect how student entrepreneurs behave in a new venture. Both new ventures with weak and strong sets of means appeared to display varying balances of effectual and causal behavior. However, the study show that the initial means rather should affect the entrepreneurs' behavior, or entrepreneurs should adjust their behavior accordingly, as effectual behaviors do not appear to be suitable for new ventures with little applicable means.

Furthermore, the study shows that these entrepreneurs use both vicarious and experiential learning to expand their initial means. However, interestingly enough, increased knowledge appears to sometime actually increase the uncertainty, which contradicts existing literature. As optimistic (or naive) entrepreneurs with weak means are learning about their new domain, they may realize how challenging it will be to pursue their chosen entrepreneurial opportunity. This again may lead to lack of motivation and possibly giving up on the venture. Even worse than this, the study shows that response and effect uncertainty can become so great that the entrepreneurs do not find ways to acquire learning at all; hence, they cannot even try to reduce the uncertainty.

Lastly, it has become evident that effectual behavior is better than causal behavior in a situation of uncertainty, confirming the findings in existing literature. The study indicates that the stronger the means and the lower the uncertainty initially is, the more effectual the entrepreneurs should be. Interestingly, entrepreneurs with little applicable means might find it challenging taking an effectual approach. The existing literature does not explain well enough how entrepreneurs should behave in such situations. Focus on effectual approaches such as engaging in partnerships or using roadmaps such as the Lean Startup Method (Ries, 2011) may not be suitable ways to reduce the uncertainty when lacking initial means. However, causal behaviors like making plans and predictions are neither excellent alternatives. In these

situations, it appears better to instead focus on learning from others, such as customers and industry experts. Hence, the entrepreneurs should build up their means to a level where an effectual process becomes appropriate.

7 Implications

In this final chapter, the implications of this thesis will be presented. The implications are divided into three subchapters addressing: further research, Venture Creation Programs, and (student) entrepreneurs.

7.1 Implications for further research

The findings in this thesis have been very interesting in terms of examining the purposefulness of different aspects of entrepreneurial literature in relation to student entrepreneurs attending a Venture Creation Program at a university. Findings have both challenged and confirmed theory on how entrepreneurs behave and progress in a situation of extreme uncertainty. It is difficult to assess how anecdotal different conclusions have really been, as the theoretical subjects of reducing uncertainty, acquiring learning and displaying different types of cognitive logics are processes the authors would argue are better observed over longer periods of time. Given the interesting findings in this thesis, it would be very interesting to expand the scale of this study when pursuing further research.

For further studies, the authors suggest conducting another longitudinal case study of novice entrepreneurs, preferably within a VCP setting. Firstly, the authors recommend the case study should consist of 8-12 case firms due to the high chance of student ventures being dissolved in this early stage. Secondly, the longitudinal study is recommended to span a period of 6-12 months in order to acquire more high-quality data on the effect entrepreneurs' initial means and behaviors have on the ventures' uncertainty. Thirdly, cases should be screened more carefully in terms of the initial means they possess and how they themselves view the business idea they are pursuing. By doing so, the researcher can select case firms with different combination of initial means and perceived uncertainty, giving a better basis for cross-case comparison. Lastly, the researcher should consider gathering more data outside of monthly semi-structured interviews, e.g. observing team meetings, or have the entrepreneurs write bi-weekly journals observations. In retrospect, the authors believe such data would have

been a valuable addition in order to get a better understanding of the behaviors and progress in the case firms.

7.2 Implications for Venture Creation Programs

If you are part of the faculty of a Venture Creation Program, there are a few important notes to take from this study. First of all, understand the importance means play in a situation of uncertainty. If your student entrepreneurs are trying to pursue complex and radical business ideas without suitable means, they should perhaps be encouraged to build some first through vicarious learning. Secondly, rather than having your student ask themselves 'what do I want to create,' have them ask 'what do I know, and what can I create with this?' Lastly, it is essential to remind yourself that it does not exist a one-size-fits-all approach to entrepreneurship, and neither a recipe to reduce uncertainty in the venture creation process. Hence, when either teaching or assisting student entrepreneurs to reduce the uncertainty of their venture, you should try to understand what prerequisite they have to pursue their entrepreneurial opportunity. If they have a low amount of appropriate means at hand, they probably ought to spend some time building these up by learning from others. Only then they should start using their newly acquired means to make qualified decisions in an effectual process.

7.3 Implications for Student Entrepreneurs

There are some findings in this study that is directly applicable for student entrepreneurs, or possibly any other novice entrepreneur, pursuing an entrepreneurial opportunity. First off, if you want to move fast with your venture, it is recommended that you have some means you can start utilizing from day one. Having even just a basic understanding of the industry you are entering can make you better equipped to see more opportunities, and of course also make better decisions. This accounts for your personal and professional network, and your product competency as well. Ask yourself: do you know anyone who has experience in this industry, or anyone that potentially can be your customer? Do your team has the competency to build your product? It is not expected that entrepreneurs have all these resources available when the starting pistol fires but having some can make it easier for your venture to take its first steps. Secondly, you need a goal as it leads your venture to move in one direction. However, remember listening to the input you get along the way, and eventually use this information to

set new goals and alter the direction if necessary. Remember that extremely few ventures, if any at all, set the right goal from day one.

If you do not have suitable means, it does not imply you should not pursue the entrepreneurial opportunity. However, be aware that you need to acquire these means at some point, and your best option is building them yourself (learning, networking, etc.). In that case, take some time to build up parts of these means before being inspired by highly effectual approaches and following hypothesis-driven recipes like The Lean Startup Method (Ries, 2011) and Running Lean (Maurya, 2012). In other words, learn to walk before you start running.

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Appendix

Appendix A