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**EFFECTUATION IN AN
ENTREPRENEURIAL
CREATION SETTING
AN ACTION CASE STUDY**



UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ SCHOOL OF BUSINESS AND ECONOMICS

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Effectuation in an entrepreneurial creation setting. An action case study.	
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<p>Entrepreneurial effectuation, a concept presented by Saras Sarasvathy (2001), is currently among the hot topics of entrepreneurship research and discussion. Being a relatively new concept, the research approaches and methodological choices have been relatively limited in number and focus. Furthermore, the small and medium-sized enterprise (SME) context, especially the small businesses have not been addressed despite their apparent crucial role in new product and venture creation processes.</p> <p>This qualitative case study focuses on a single creation process of a potential new product in an entrepreneurial small business setting. Through the conventions of action research, the aim is to understand the manifestation of the effectual construct and its dimensions within the creation process. The researcher is a part of an entrepreneurial team working as a part the creation process and simultaneously analyzing the process from the perspective of effectuation.</p> <p>This thesis was constructed through observing discussions, decisions and actions of the focal entrepreneur and stakeholders, and by actively participating in the creation process as a stakeholder. The data was collected from those events observed and from interviews, which aimed at potentially confirming some of the observations. Analysis of the data was conducted by comparing and contrasting the original five dimensions of the theoretical effectual construct to the observed events and characteristics of the creation process.</p> <p>The results of the action research setting provide insight into how this particular, unique creation process includes effectual characteristics and features. Furthermore, the research presents a perspective on observing effectual action and creation processes in an action research setting and its methodological conventions. The research concludes that it is possible to observe and analyze effectual entrepreneurial creation processes other than those solely focused on new venture creation, and that action research settings can help in providing new, in-depth and detailed understanding on effectual processes.</p>	
Effectuation, causation, creation process, new product creation, entrepreneurial behavior	
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1 INTRODUCTION

1.1 Creation processes and effectuation

Once upon a time there was an entrepreneur with an idea. The entrepreneur wished to pursue this idea and turn it into a business opportunity. He got funding and gathered an entrepreneurial team, and together they created a successful company that still exists today. The company continues to create new products and service models, thus adapting to the changes in its environment.

Most people within the academic context of entrepreneurship are familiar with this type of simplified success stories on different companies. These stories mostly concentrate either on the actions of the entrepreneur or the successful development of a company. However, the idea, which transforms into a new venture, service, product or innovation, does not do so automatically. The process is ambiguous and most often characterized by contingencies, subjectivity, misfortune and sheer luck, relationships between different people, and, above all, uncertainty.

When I was introduced to the notion of effectuation in 2011, I was impressed by the way the logic was able to reflect and characterize behavior in situations of uncertainty. Having witnessed entrepreneurs mold seemingly coincidental events into meaningful creations I understood that this was truly one of the most important features of entrepreneurship research for me to analyze. Because I was also able to see features of the effectual logic in everyday human action and behavior, I was inspired by the realization that life can be viewed from the perspective of that logic – and that life includes also entrepreneurship which is a far more complex and multi-faceted subject than I had even understood before.

It is possible that effectuation represents a potential shift in the entrepreneurship paradigm. Traditionally, business and entrepreneurship have employed causal reasoning and approaches in both research and teaching (Sarasvathy 2001a). The complexity of human reasoning, combined with the need of holistically analyzing the creation of economic artifacts, set demanding aims for

studying entrepreneurial action. Effectuation seems to provide useful tools for analysis and expanding our understanding on human action and its logic.

The concept of effectuation was developed in search of understanding the entrepreneurial process of creating something new - a new venture, a new product or service, a new technology, a new innovation, or a new market need (Sarasvathy 1997). Since its development in the turn of the new millennium it has been tested on expert entrepreneurs and on different ventures across various industries. Its different characteristics have been analyzed and examined. However, recognizing effectual characteristics within an existing venture and its creative processes has received relatively little attention despite the ambiguity within entrepreneurs, entrepreneurial teams, and ventures.

1.2 The context, aim, and structure of this research

In 2011, 99,8 percent of all Finnish active ventures were small or medium-sized enterprises, or SMEs (Statistics Finland 2011). This figure provides understanding of the enterprise structure in Finland, and also illustrates that effectual entrepreneurship research cannot be solely targeted towards those larger companies that represent the 0,2 percent. Furthermore, effectuation research must be able to focus on other than publicly listed companies on the stock market.

The increased appreciation of entrepreneurship and entrepreneurial behavior has been evidently visible in the Finnish media and public discourse for the past two years. Entrepreneurship education and facilitation has changed in terms of visibility, accessibility and respect, as successful entrepreneurs are regarded heroes or even mavericks. I believe that effectuation research could significantly contribute to the Finnish entrepreneurship education, and also to the public discussion and understanding of entrepreneurship in general. Furthermore, my view is that Finnish SMEs could benefit from the theoretical construct of effectuation in their entrepreneurial creation processes.

The goal of this research is to witness and observe effectuation and causation in a real-life creation setting of a small business. Because of the crucial role of the process rather than only the end product, it is reasonable to analyze the process from the perspective of effectuation. Furthermore, identifying effectual characteristics in entrepreneurial action can help in developing the concept of effectuation further, as it will thus continue its shift from pure theory into concrete actions and decision in reality. This way the teachable and learnable principles of effectuation can be more easily taught, illustrated, and facilitated. The following research question was formulated based on the aims of this study:

Research question: *How were the dimensions of the effectual construct manifested in the actions, events and practicalities of the observed creation process?*

The company context in which the creation process is studied and analyzed is that of an Eastern-Finnish heavy machinery industry (hydraulics) company. The company specializes in planning, designing and repairing hydraulic

components and systems for different types of industry clients, such as factories, process and power plants, and agricultural facilities. During its two-decade lifespan, the entrepreneurial company has been able to develop its functions and services to meet its own goals and its clients' requirements. This has also led to new technical solutions and innovations in terms of discovery and creation. When developing a solution to a client's problem, the focal entrepreneur realized that a potential product could be created from that initial solution.

When I witnessed the first steps of the product creation idea and process in a small business setting, around which the case study is constructed, I realized that some characteristics of the process reflected and followed the core principles of effectuation (Sarasvathy 2001a). This was highly intriguing and pushed me forward in analyzing the aspects of the ongoing process in search for patterns and features that might reflect the effectual construct. What first were observations merely based on general interest in the subject eventually transformed into detailed analysis of the construct and its features occurring in this scenario. Being able to participate in the process was the final step towards creating a research setting and exploration of the phenomenon.

The single-case research has been conducted as an action study. This methodological choice was made in order to get the most accurate and in-depth knowledge and understanding of the product creation process. As the aim was to recognize effectuation and effectual characteristics within the process, action study appeared to be a way of getting closer to it and providing multiple perspectives. It also enabled learning for the entrepreneur in charge and other actors within the process, as I was able to share my analysis with them after its completion and sometimes even during the process. Furthermore, because of my continued involvement in the company as a mechanic, engineer, and later a subcontractor with multiple fields of expertise, it was reasonable to be involved in the product creation process as well.

The thesis, after this introduction, is organized in the following way. First, main theoretical foundations and concepts will be explained along with previous relevant studies. These contain the development of effectuation, the studies testing or validating the construct, and causation and its development. Second, the methodology of the study is explained. This section includes the research method, the introduction of the research subject, data collection, interpretation and reporting, and the evaluation of research validity and reliability. Third, the process will be analyzed according to the methodological guidelines given in the previous section. Fourth, the findings of the observed and analyze creation process, along with the ideas and insights gained through the research process, are discussed. Finally, the action research setting is evaluated before concluding the thesis.

2 LITERATURE REVIEW

This literature review has been constructed as follows. First, the background and development of the concept of effectuation is addressed. Second, the terms and processes central to this thesis are defined and connected to other relevant constructs and entities. Third, the current state of effectuation research is analyzed along with elaborating the perspective used in this particular thesis.

Effectuation (Sarasvathy, Simon and Lave, 1998; Sarasvathy, 2001a) is a relatively new construct in the paradigm of entrepreneurship research. Because of this, there are academic sources that include recent literature reviews on the subject, such as Read, Song and Smit (2009) and an extensive one by Perry, Chandler and Markova (2011). These reviews (among other theoretical background illustrations on the subject) obviously provided a useful resource and a point of comparison for this thesis, and I feel that should be explicitly acknowledged here.

2.1 The development of the effectual construct

Effectuation is a logic for practicing entrepreneurship as a method and studying it as a science of the artificial (Sarasvathy 2008: 183)

The theory of effectuation was initially developed in order to better explain the creation of new firms. Sarasvathy (2001a) argued that most economic scholars regarded the existence of firms and markets as assumed and given by default and that this was reflected in entrepreneurship education as well. She wanted to understand the creation processes of ventures in the absence of existing markets and expand the theoretical perspectives of entrepreneurship.

Sarasvathy began developing the notion of effectuation while conducting empirical research on entrepreneurial expertise for her doctoral dissertation (Sarasvathy 2003). In this research, which is illustrated in detail in Sarasvathy's book *Effectuation: Elements of Entrepreneurial Expertise* (2008) the main goal was

to understand the potential common characteristics in the problem-solving processes of expert entrepreneurs¹ under uncertainty (Sarasvathy 2003).

The research methods used in the above-mentioned study were those of cognitive scientists who have been studying different forms of expertise in fields other than entrepreneurship (Dew, Read, Sarasvathy and Wiltbank 2009). In order to study the problem-solving processes Sarasvathy (2003: 205) created a "17-page problem set consisting of 10 typical decision problems that occur in transforming an idea into a successful firm." The theme and aim of this problem set was to identify or create a market for an imaginary educational entrepreneurship-themed computer game called Venturing (Sarasvathy 2008: 23). This problem set was then given to a group of 45 entrepreneurs who agreed to participate in the study (Sarasvathy 2008: 22).

The selected research method was to use think-aloud verbal protocols from which semantic chunks were selected for qualitative and qualitative analysis. In other words, the subjects solved the decision problems by thinking aloud and this output was recorded for later examination. Sarasvathy had used the same method in a previous study on risk-analysis and management differences between entrepreneurs and bankers (Sarasvathy, Simon and Lave, 1998) and argues that it is suitable for studying entrepreneurial decision-making processes (Sarasvathy 2008: 21).

The first finding from the data was the expert entrepreneurs' systematic negative view on market research. Sarasvathy, when qualitatively analyzing the data, eventually began to realize that there are other behavioral patterns as well. These patterns were then inducted from the analysis and later served as the basis for the model of effectual logic (Sarasvathy 2008: 33). The theoretical foundations and detailed definitions of effectuation, causation, and other relevant terms are located in the following section.

2.2 Effectuation and causation

Causation approaches view the world as a place where markets exist and firms seek out opportunities, within the markets in which they compete, to perpetuate themselves. Effectuation approaches view the world as a place where firms plant, nurture and harvest in markets that are artificially created by themselves and the actions of other firms. Chandler et al. 2011: 388

Here the constructs of effectuation and causation are presented in the same section because of their inherent interconnected nature; it is simply easier and clearer to illustrate the constructs by contrasting their dimensions. First, the theoretical underpinnings of effectuation are provided. Then, the constructs of effectuation and causation are defined, explained and compared in order to illuminate the terms and to form the theoretical foundations of this thesis. The

¹ Sarasvathy's definition of an expert entrepreneur is addressed later in this section of the thesis, as is the definition used in this research.

dynamic process model of effectuation is also explained. In the latter section, other terms relevant to this research are defined.

In her seminal article on effectuation, Sarasvathy (2001a) argues that effectuation offers an alternative logic, a new perspective from which human behavior can be analyzed. She posits the view that business education is characterized by the emphasis on prediction, or causal logic, despite the fact that authentic human behavior also seems to reflect characteristics related to an inverted, different logic, the logic of control (Sarasvathy 2008: 38).

According to Sarasvathy (2003: 204) the antecedents of the effectuation theory are "in Knight's formulation of true uncertainty (Knight, 1921), Weick's conceptualization of enactment (Weick, 1979), and March's technology of foolishness (March, 1982)." Mintzberg's (1991, 1994) research on the controversial role of prediction and planning in decision-making was also used when defining the model of effectual reasoning (Sarasvathy 2001a). Sarasvathy wished to understand entrepreneurial decision-making processes in situations and environments with high levels of uncertainty and risk. This can mean, for example, complete absence of markets, little or no chance of predicting future events, or contingencies rising out of the blue (Sarasvathy 2001a).

Sarasvathy (2008: 70) uses the antecedents in constructing the problem space of effectuation. Technology of foolishness refers to the actors' indecisiveness of their own preferences and ultimate goals regarding their behavior. Enactment is related to the challenges regarding the practicalities of rationally selecting among the perspectives and points of focus in complex environments. Knightian uncertainty means the complete unpredictability of future events and consequences, which is compensated by entrepreneurial profit (Niittykangas 2011: 20-21).

Drawing from the comparison between rational decision models and the bounded rationality of decision makers which are both manifested in actual behavior, Sarasvathy (2001a) sees that decision makers act differently depending on whether they are dealing with a predictable or an unpredictable future. Thus, their underlying logic² can be recognized by analyzing the decision makers' beliefs and views of the world, the future, and future events. For example, entrepreneurs using effectual logic view companies and markets not as monuments but as artifacts created by human beings, and the world of entrepreneurial action full of opportunities to be created, recognized and discovered (Sarasvathy 2008: 17).

Perhaps one of the most easily grasped examples of effectuation and causation processes is that provided by Sarasvathy (2001a). In this example, the characteristics of the two processes are compared to decisions made by someone cooking dinner. If this person were to demonstrate behavior associated to causation he or she would first select a meal of his liking, get the required ingredients, and prepare said meal. If the person's actions were those associated to effectuation, however, he or she would start by examining what ingredients

² Sarasvathy's (2008: 18) definition for *logic* is "an internally consistent set of ideas that forms a clear basis for action upon the world."

are already at his or her disposal. Then the person would select and prepare a meal based on said ingredients. Chandler, DeTienne and Mumford (2007) further extend this analogy by having the person's friends bring some additional ingredients of their own and using these ingredients in the cooking process as well, potentially affecting the outcome.

Sarasvathy (2008: 73) provides another example of the differences between causation and effectuation processes. She compares causal behavior to the expansive subjugations and conquests carried out by great generals of the past. These conquests had achievable goals and predetermined aspirations. Effectual behavior is comparable to that of explorers' voyages and adventures into uncharted territories. These types of adventures often begin with the hope of discovering something, whatever that something may be.

Sarasvathy (2001a: 245, *cursive added*) defines the fundamental difference between causation and effectuation processes as follows: Whereas causation processes "take a particular *effect* as given and focus on selecting between means to create that effect", effectuation processes "take a set of *means* as given and focus on selecting between possible effects that can be created with that set of means". In other words, causation processes use selection between existing means or creation of new means to achieve wanted, preselected effects; effectuation processes begin with given means and use non-predictive strategies to create new effects (Sarasvathy 2008: 16). Wiltbank, Dew, Read and Sarasvathy (2006) further elaborate causal processes stating that they use existing opportunities within a certain given problem space; the effectuation processes are about redrawing the problem space and turning existing realities into new opportunities. Read, Song and Smit (2009: 576) describe effectual reasoning as a set of "strategies that combine available means with unanticipated contingencies to construct a series of stakeholder commitments".

Both causation and effectuation processes are quite obviously manifested in human behavior, but as Sarasvathy (2001a: 25) puts it, "human life abounds in contingencies that cannot easily be analyzed and predicted but can only be seized and exploited", and therefore it might be reasonable to emphasize (effectual) processes that deal with these surprising events and uncertainties of everyday life. Sarasvathy (2008: 16) also views that the approaches and their characteristics can be contrasted theoretically in order to illustrate the differences and to understand them better.

2.3 The core principles of effectuation

As stated in the previous section of this thesis, clear behavioral patterns began to emerge from the seminal research Sarasvathy conducted for her dissertation. These were eventually incorporated into the core principles of effectual behavior. Sarasvathy (2001a: 252) first listed these four principles in her seminal article and contrasted them with counterparts from causal behavior: 1) affordable loss rather than expected returns, 2) strategic alliances rather than competitive analyses, 3) exploitation of contingencies rather than exploitation of

preexisting knowledge, and 4) controlling an unpredictable future rather than predicting an uncertain one. One more feature characterized by starting with available means (knowledge, networks and entrepreneur's own traits) rather than desired end effects, was also included as a principle, and has been related to the theoretical foundations from the beginning of the notion's development.

Aspect	Causation	Effectuation
Starting point	Given goal or effect Imagined end point or goal Means, strategies selected accordingly	Set of means Who am I? What and whom do I know? Answering these creates several potential goals
Focus	Expected returns Calculating and maximizing Focus on upside potential	Affordable loss Experimenting and terminating early Limiting downside risk
View of external environment	Competitive analysis Understanding competition, the market Guidelines for acquiring stakeholders	Alliances and stakeholder precommitments Reducing risk and uncertainty Co-creating and shaping the future
Attitude towards contingencies	Avoiding Exploiting knowledge Prediction and planning	Leveraging Exploited for creating novelty Transforming into opportunities
View of the future	Predicting the future "To the extent we can predict the uncertain future, we can control it"	Controlling the future "To the extent we can control the unpredictable future, we do not need to predict it"

Table 1: Differences between causation and effectuation. Adapted from Sarasvathy (2001a).

The five principles, also called sub-constructs of effectuation (Sarasvathy 2001a), have usually been presented and contrasted with similarly categorized principles of causation in order to demonstrate their theoretical antecedents and backgrounds, and to better illustrate their different characteristics. Here, each of the principles is explained more extensively, since the principles are one of the cornerstones in the foundation of the research setting of this thesis. I will also provide a concrete example of each of the principles in an entrepreneurial SME setting, since that is the context of my research. (See Table 1 for a summary of the central features of the principles.)

2.3.1 A given goal or a set of means as a starting point

This principle, also known as *the bird-in-hand principle* (after the saying "a bird in the hand is better than two in the bush"), is illustrated in the example about the person making dinner. In case of effectuation, the ingredients that the person already possesses are the starting point of the process. These ingredients determine the potential alternatives for the actual meal. When applied to the scenario of entrepreneurial action, these ingredients become the set of means the entrepreneur has. Sarasvathy (2008: 78) divided these means into three categories in the think-aloud protocol study: the identity, the knowledge base, and the social networks of the entrepreneur - or who I am, what I know and whom I know.

In cases of unpredictable outcomes and ambiguous preferences Sarasvathy (2008: 79-80) views that the identity of an entrepreneur can guide the entrepreneurial process by being the source and guide of decisive action. This is because identity is related to "particular processes and ways of living and deciding rather than for particular consequences" and can, therefore, offer a starting point and a guide for experimentation and for managing preferences. In other words, a person's identity can affect and guide behavior in uncertain situations where goals are unclear.

The knowledge base and social networks are quite self-explanatory as concepts. Everything and everyone an entrepreneur has learned to know during one's lifetime can be assigned in these categories. The knowledge can be derived from experience or learning, lessons acquired at school or traits learned through work. Social networks can include, for example, other entrepreneurs, business partners, clients, friends, acquaintances and relatives.

Sarasvathy (2008: 80-81) underlines that it is important to remember that all three categories of means are interconnected rather than independent. Changes in any of the categories affect the other two as well. The amalgamation of the categories also determines the current resources and the circumstances of an entrepreneur. When using means as a starting point, entrepreneurs are able to create different effects with the same set of means, depending on their own choices and aspirations.

In causation, the starting point is the imagined end point, the goal of the process (Sarasvathy 2001a). The desired outcome is selected first and then means to achieve that outcome are either selected from given ones or new ones are acquired (Dew et al. 2009). When using the dinner example, the outcome (effect) is the desired meal for which certain ingredients (means) are needed. According to Sarasvathy (2008: 74) effectual action can more likely lead to novel solutions and outcomes than causal action. Causation, however, can provide the optimal solution "in cases in which a particular effect has been preselected by the decision maker" since this enables choosing "the best, the fastest, the most efficient, or the most economical method to achieve the chosen effect" (Sarasvathy 2001a: 250).

When taken to the context of SMEs, an example of this principle could be the aspirations of an entrepreneur working in sports gear retail. He is also a passionate fisherman on his free time and has been making his own lures for years. That expertise, combined with the fact that he knows quite a few things about fishing and that he has several fisherman friends (who also like his lures) could result in a combination of means that could be used in creating various effects. For example, he could design some lures to be sold exclusively in his own retail shop, ask his friends to give feedback on enhancing the lures' features, find resellers for his lures through his friends, or simply attend a fishing competition and employ his expertise, among others.

2.3.2 Focus on expected returns or affordable loss

This principle is related to risk management and the perspectives on decision-making. Effectual processes are characterized by affordable loss. Before

committing to any aspirations that might arise from the combination of given means, an entrepreneur predetermines how much he or she can afford to lose if a process does not go as planned. The focus is in experimentation by using those given means to achieve several ends (Sarasvathy 2001a).

The affordable loss principle enables an entrepreneur to experiment with different options and alternatives. This creates new options in the future rather than quick or maximum returns in the present (Sarasvathy 2001a). It also eliminates or reduces the need of predicting an uncertain future; an entrepreneur can use his or her limited means to commit to different processes without having to worry about too much information or predictions since the focus is on the processes themselves, not their expected returns (Sarasvathy 2008: 80, 88). Read et al. (2009) define this as limiting downside risk rather than focusing on upside opportunity potential.

Whereas processes characterized by affordable loss can generate multiple new ends and unexpected outcomes, causal models are more often characterized by determining expected returns for a preselected end point or effect. This is done by selecting the optimal strategies for achieving that goal (Sarasvathy 2001a). Estimating expected returns requires prediction, calculations regarding future events, and gathering the resources that are needed to meet those expectations (Sarasvathy 2008: 81).

Sarasvathy (2008: 82) gives an example of the processes by imagining an aspiring entrepreneur who is thinking about quitting a job and starting a business. If this entrepreneur were to employ causal processes, one would have to acquire information that is out of the entrepreneur's control and effect-dependent, such as information about the market and funding. In effectual processes, this person would see more than just the exogenous opportunity determined by the market; the person's own traits, resources and networks could be seen as a starting point and the worst-case scenario in starting one's own business would be losing some (not all) money while the experimentation with available means could lead to a multitude of positive outcomes.

Another example that illustrates the difference between the two approaches is a research and development (R&D) setting in a company. If this particular R&D process had its roots in causation, it might be compromised in its early stages if the potential expected returns were found insufficient. If the process would begin according to effectual guidelines, the returns would not be speculated but the possible downside (i.e. the affordable loss) of experimentation would be determined. It is quite straightforward to understand the fundamental difference between the work of a researcher who is struggling to generate an effect, which will maximize the expected returns, and a researcher who experiments with different means without certainty that any of those efforts lead to any success at all.

2.3.3 Competitive analysis or alliances and precommitments

The underlying idea of this principle is closely connected to the initial findings of Sarasvathy's (2001a) research where she witnessed how expert entrepreneurs expressed dissatisfaction towards systematic market research. This

reaction is also reflected in stakeholder selection and interaction. Rather than performing detailed competitive analysis, effectual entrepreneurs work towards forming strategic alliances and acquiring stakeholder precommitments. These commitments are a way of eliminating uncertainty and erecting entry barriers to the market.

Those stakeholders who commit to the venture are able to actively shape it according to their own objectives and aspirations (Sarasvathy 2001a). As with affordable loss and starting with available means, emphasizing alliances and precommitments is a way of reducing risk and uncertainty. When stakeholders commit to the venture and start acting according to that commitment, the venture is affected and eventually shaped by those actions. Therefore, the future of the venture is co-created by the entrepreneur and the stakeholders or partners (Sarasvathy 2008: 89).

Read et al. (2009) provide a useful distinction between this principle and the bird-in-hand one. Their view on alliances and precommitments is associated with risk and reward, whereas the networks of an entrepreneur (“whom I know”) that enable access to other means and opportunities are associated with means rather than stakeholder partnerships.

Competitive analysis, which is connected to the causal approach, emphasizes the need for understanding the environment and possible competition before advancing with the creation of a new venture. This speculated competition is analyzed in order to predict and perceive the actual market. The perceived market then sets the guidelines for acquiring stakeholders who support the entrepreneur's vision, which is affected by the competitive analysis. This way, the entrepreneur must be able to discover a potential market, develop plans, share them with potential targeted stakeholders, and hope that some of them will support those plans (Sarasvathy 2008: 88-89; 104).

The effectual approach, also called *the crazy-quilt principle*, demonstrates a scenario where the entrepreneur deliberately allows committed stakeholders (“fabric patches”) to affect the characteristics of a venture (“a quilt made out of patches”) in creation (Sarasvathy 2008: 106). The causal equivalent of the quilt is, according to Sarasvathy (2003), a jigsaw puzzle where the end result is already in the pieces that need to be assembled so that it becomes visible. The quilt, on the other hand, can turn out in various different ways and adding different types of patches can change its appearance dramatically.

The stakeholders that commit to the effectual venture can be existing or potential customers, partners in business or other areas of life, all sorts of individuals or groups who provide something extraordinary that can be used in the creation process. That way, those who commit to the process reshape it in different ways. The elements of uncertainty are eliminated because the commitments ensure the continuation of the process despite the absence of a definitive imagined end state (Sarasvathy 2001a). As Sarasvathy (2008: 88-89) puts it:

Effectual entrepreneurs focus their efforts on the image of the future coalescing out of a dynamic series of stakeholder interactions rather than crafting a vision up front and then attempting to force it or ‘sell’ it to targeted stakeholders.

An example that illustrates both approaches by contrasting them is a simplified scenario where an aspiring entrepreneur has come up with a product idea and a prototype. As this idea has initially appeared to have some commercial potential due to its unique nature, the entrepreneur narrows the next steps down to two alternatives. The first is to conduct market analysis for similar products and potential competitors. This causation-related approach could lead to finding a potential market for the product and the results of the analysis would thus shape the process of acquiring stakeholders. The second, effectuation-related alternative is to skip the market analysis and present the idea to people who might be interested in it, perhaps not even in the commercial sense but generally. Some of these people might be able to generate new ideas or features for the product, have some new information regarding potential markets and customers, or even want to invest their time and other resources in the development process. If they provide their input, the product and the possible venture further evolves, reshaped by all committed parties.

2.3.4 Exploiting knowledge or leveraging contingencies

The saying “when life gives you lemons, make lemonade” has provided a name for this principle (*the lemon principle*) (Sarasvathy 2008: 90). Effectual entrepreneurs embrace and accept unexpected turns of events and total uncertainty about what might potentially happen in the future. This is because they are equipped with a mindset that allows them to leverage and exploit these contingencies rather than let them function as unwelcome restrictions. In other words, the new, changed circumstances provide an opportunity to affect and control them rather than be negatively affected by them (Sarasvathy 2001a). When put into the context of preparing dinner, these types of contingencies could be, for example, multiple interacting chefs and additional dinner quests (Sarasvathy 2008: 74), a fire alarm that goes off by accident, or perhaps an ingredient that is past its due date. All these events can either be seen as nuisances or opportunities.

As utilizing existing means and getting stakeholder commitments that shape the venture and its goals, leveraging contingencies is also related to the incremental nature of the effectual process (Sarasvathy 2008: 90). Whatever contingencies may arise, they are viewed as resources and opportunities for action and change. As the contingencies can be plentiful, each of them can affect and change the characteristics of a venture as it is created. Thus, a multitude of effects can be created from the original idea through exploiting unexpected situations (Sarasvathy 2001a).

Effectual leveraging of contingencies is contrasted by causal exploitation of existing knowledge. As leveraging contingencies is related to uncertainty and unknown environments, exploiting knowledge can be useful in environments where, for example, the competitive advantage is achieved through expertise or information about the market (Sarasvathy 2001a). In causal thinking the knowledge aspect is utilized in order to avoid contingencies through planning, goal setting and prediction (Dew et al. 2009). Should contingencies arise, causal

processes aim at achieving predetermined goals despite them (Sarasvathy 2008: 89).

Examples of leveraging contingencies in the creation of something new are relatively trivial to come up with since many successful ventures have began from ideas and notions caused by inconvenience or unexpected events. Let us say that the fishing enthusiast in the example on the first effectual principle decided to start a venture that specializes on manufacturing custom, high-class fishing lures. These lures would require certain materials, one of which is currently scarce (and therefore very expensive) worldwide according to the entrepreneur's supplier. If the entrepreneur were to act in an effectual way he could exploit this unexpected situation by, for example, choosing another material, which could result in new types of lures. These lures could prove to be less expensive to manufacture, thus increasing profits.

2.3.5 Predicting or controlling the future

The fifth principle (*the pilot-in-the-plane principle*) of effectuation is related to controlling the unpredictable future (Sarasvathy 2001a). Entrepreneurs seek to control the future to their benefit by making different types of choices and acting in certain ways in order to achieve success for their ventures. Both causal and effectual approaches seek to control the future on some level but the approaches differ in ways of achieving this control (Sarasvathy 2008: 91).

The name of this principle is derived from the idea of a human agent behind the creation of opportunities and the future, like a pilot controlling a plane is in control of its destination (Sarasvathy 2008: 16). Effectual logic views the future as something that can be affected and controlled by the entrepreneur and self-selected stakeholders because the future is partly formed by the consequences of their choices, decision-making and behavior (Sarasvathy 2003). This eliminates the need for prediction and forms the underlying logic for the effectual choice process: "to the extent we can control future, we do not need to predict it" (Sarasvathy 2001a: 251).

As demonstrated in other principles, effectual logic seeks to eliminate the need for prediction and adaptation by minimizing the downside of potential failure and getting precommitments from people who shape the venture according to their own aspirations and ideas (Sarasvathy 2001a). These result in search of controlling aspects of the unpredictable future by shaping it through human action, deliberately disregarding and avoiding predictive information (Wiltbank et al. 2006).

Causal logic emphasizes prediction as a requirement for achieving control. According to the logic, the future is seen as a continuation of the past, and thus can be predicted to some extent (Dew et al. 2009). Focusing on these predictable aspects of an uncertain future defines the underlying logic of causation as follows: "to the extent we can predict future, we can control it" (Sarasvathy 2001a: 251).

This principle can be seen as one of the most important and clearest distinctions between causal and effectual logics because all of the other principles reflect its view towards control, and in the effectual case, non-predictive control

(Sarasvathy 2008: 91). Causal logic views the market as something that already exists independently of the entrepreneur's venture. In contrast, according to effectual logic the market is created through human action within the venture and its stakeholder partnerships and precommitments (Sarasvathy 2001a).

An example that illustrates this principle is again that of the fisherman entrepreneur. Using a causal approach he could do extensive market research, try to predict next fishing season's trends and weather, and forecast his venture's position among other manufacturers. Then he would act according to these predictions. The effectual approach would result in behavior such as teaming up with fishing enthusiast friends who could be the first customers and even partners if they wish to help in new product development.

The effectual entrepreneur could then, for example, gradually expand his customer base by having his friends take the products to fishing competitions and events. All this can be done without prediction since existing means are used to generate new effects, downside potential is minimized, self-selected stakeholders commit to the development of the venture, and contingencies are welcomed rather than avoided.

2.4 The effectuation process

Effectuation begins with a given set of means and contingent human aspirations to select from a set of possible effects imagined by the effectuator(s). Both means and aspirations change over time. The particular effect selected is a function of the level of loss or risk acceptable to the effectuator(s), as well as the degree of control over the future that the effectuator(s) achieves through strategic partnerships along the way.
Sarasvathy 2001a: 253

In this section the effectuation process is explained in detail. The process is explicated in order to illustrate its dynamic nature, continuity, and interconnectedness of its different phases. This is crucial for comparing the characteristics of the model to the conventions of the research setting in the later sections of this thesis. Understanding the process enables the empirical observation of potential real-life events that resemble the phases and principles of effectual action.

The effectuation process includes the five principles of effectuation manifested in actual behavior and is characterized by the creation of economic artifacts as a result of effectual action (Sarasvathy 2001a). The process is visually represented in Figure 1 in order to illustrate its characteristics (adapted from Sarasvathy 2008: 101). The goal of illustrating the process is the explanation of the creation of economic artifacts, such as new products, new ventures, and new markets through effectual action (Sarasvathy 2001a).

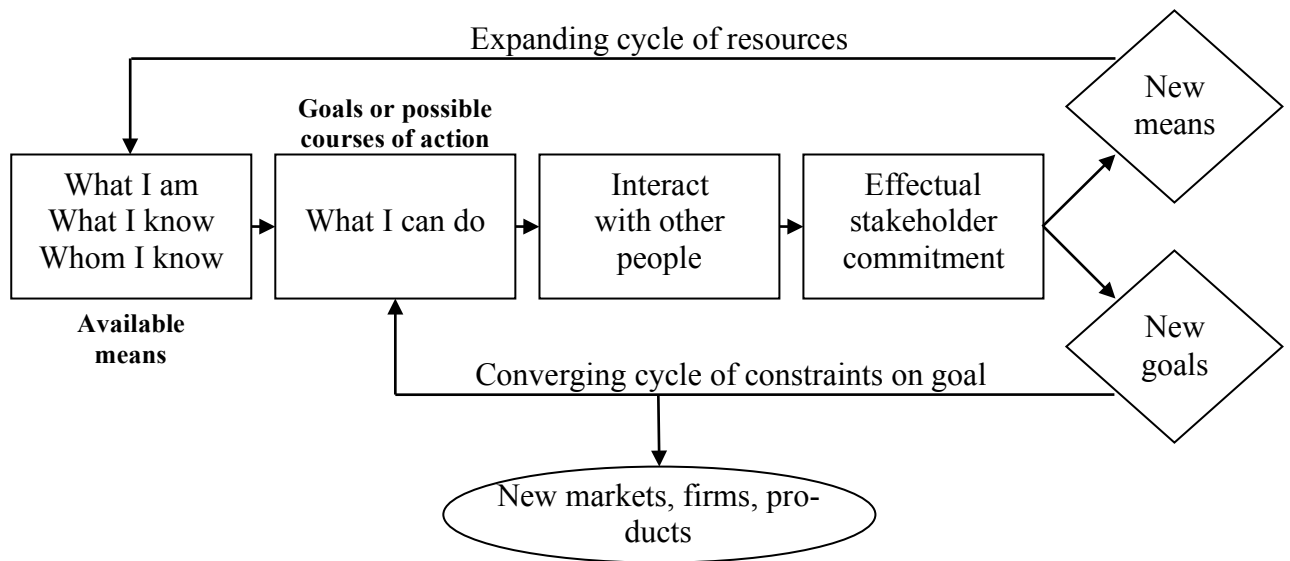


Figure 1: The effectuation process. Adapted from Sarasvathy (2008: 109) and Wiltbank et al. (2006)

An effectual entrepreneurial actor starts the process with general aspirations of creating a new venture (Sarasvathy 2003). The origins of these aspirations are in the means that the entrepreneur has in his disposal (Sarasvathy 2001a). The entrepreneur makes decisions, observes their consequences and reacts to the different potential opportunities that the results of the decisions bring along (Chandler et al. 2011).

Effectual entrepreneurs form networks through stakeholder precommitments. Each stakeholder commits to the process according to the affordable loss principle. The stakeholder precommitments result in two types of outcomes and effects to the process (Sarasvathy 2008: 109). One outcome is that the resources available in the process are increased as new stakeholders provide new means (who I am – what I know – whom I know) that become available to the process. The other effect is that the stakeholders also affect the goals of the process as they shape the venture through their precommitments. These effects result in an expanding cycle of resources as well as the amalgamation of stakeholder goals into the characteristics of the effectual artifacts that are possibly created in the process.

The effectual model enables exploration and trying different approaches because the actors limit their potential losses and restrain from calculating potential expected returns. Potential contingencies that may arise during the process are exploited and leveraged by focusing on the controllable aspects of the unpredictable future (Sarasvathy 2001a). Chandler et al. (2011) view that this

flexibility in reacting and exploration is what enables the successful development of effectual new ventures.

According to Sarasvathy (2008: 109), the essence of the effectuation process is characterized by the “*transformation* of existing realities into new alternatives” rather than selection between alternative ends or means. This is related to the fundamental differences between prediction and control in causal and effectual approaches. Textbook causation processes begin by defining the market, then using prediction in segmentation, targeting and positioning (Sarasvathy 2003). Effectuation processes emphasize control, which reduces the need for this type of predictive information.

In the effectual creation process the entrepreneur and the committed stakeholders *co-create* the future by transforming their means into new effects (Sarasvathy 2001a). Rather than selecting between given alternatives, the alternatives themselves are designed and created, and their qualities are evaluated collectively (Sarasvathy 2003). Thus, the future depends on the actions of these people as their decisions and goals affect the outcome (Sarasvathy and Dew 2005).

As an effectual entrepreneur gets commitments from people who can create the future through their decisions and actions while embracing potential surprises along the way, the need for predicting the future is eliminated (Sarasvathy 2003). The cyclical, dynamic nature of the process is visible in the construction of multiple stakeholder commitments and in the way each of these commitments gradually generates new resources and shapes the goals of the venture (Read et al. 2009).

The effectuation process is characterized by growth and expansion in the sense of increasing opportunities, resources and goals. Sarasvathy (2003: 208) sees that effectual processes “seek to expand the choice set from a narrow sliver of highly localized possibilities to increasingly complex and enduring opportunities fabricated in a contingent fashion over time”. By beginning from available means, leveraging contingencies and enabling precommitments, new opportunities become available.

Sarasvathy (2003) also practically illustrates the notion of localized possibilities within the dynamic model of effectuation. She suggests that the effectual process advocates searching initial customers and partners at a local level, such as personal networks and existing contacts. These initial customers and partners then form segments according to their characteristics, and the number of segments increases through contingencies and other events over time. Ultimately the different segments formed throughout the process help defining the market for the venture or product. According to Sarasvathy (2001a), effectual logic is more visible in the venture creation process and that causal logic is employed when the company matures and faces situations and environments with less uncertainty.

Dew et al. (2009) note that the principles of effectuation are all connected because of the human element, which is the most important factor behind all action according to the principles. This is also clearly visible in the dynamic model of effectuation portraying the effectuation process. Human actors generate new effects from the means available to them while limiting their downside

risks and accepting the uncertainty of the future by seeking to control it. This leads to transforming existing realities into new opportunities that may eventually become new product, new ventures, and new markets (Sarasvathy 2001a).

To conclude this section it is important to remember that, as Sarasvathy (2001a: 245) puts it: "causation and effectuation are integral parts of human reasoning that can occur simultaneously, overlapping and intertwining over different contexts of decisions and actions". Both constructs should therefore be taken into account when analyzing entrepreneurial behavior from this perspective.

Effectuation processes can be ambiguous, unclear, and the different phases can overlap and occur in a myriad of different ways in various real-life settings. The principles of the constructs provide a useful guide for recognizing and analyzing the different aspects of the processes. How this is done in this research setting is illustrated in the methodology section.

2.5 The development and current state of effectuation research

In addition to its novelty, effectuation is an intriguing theme within the entrepreneurship paradigm also because of the relatively low amount of research that has further advanced the development of its concepts and dimensions. Since Sarasvathy's (1998, 2001a) seminal research that resulted in the emergence of the effectual construct, over a decade has passed. Even though effectuation provides alternative perspectives on the entrepreneurial creation processes, its full potential to entrepreneurship education and understanding entrepreneurial (and other human) action is yet to be utilized.

In their review of effectuation studies and articles Perry et al. (2011) make a useful division between conceptual and empirical peer-reviewed effectuation literature in order to illustrate the development of the research stream. As mentioned earlier, their article provides an excellent point of comparison for this literature review as well, and I employed the division to conceptual and empirical articles when analyzing the development of effectuation research. This division aptly illustrates both the significant share of conceptual articles that develop the theoretical dimensions of effectuation and the relatively small amount of effectuation research in total.

When considering and analyzing the empirical research on effectuation, my aim is to illustrate the different research directions. Furthermore, since this research is also classified as empirical effectuation research, I see that it is crucial to justify the choices that have been made based on previous research, its findings and the questions it has presented.

2.5.1 Conceptual research

The conceptual effectuation research articles that refer to Sarasvathy's (2001a) article, which introduced the concept of effectuation, address the emergence of the effectual construct and its theoretical dimensions and relations to

existing theories and constructs. The authors of these articles have evaluated the concept of effectuation, linked it to other concepts within entrepreneurship and other research, and aimed at further developing it from a theoretical perspective. The principles and dimensions of effectuation have been analyzed in order to increase understanding of their characteristics and occurrence.

Conceptual effectuation research has expanded the context of effectuation so that it can be applied in research settings such as the one in this thesis. Wiltbank et al. (2006) did this by diversifying the application of effectual construct from new firms to existing firms and their decision-making as well, thus enabling the analysis of various different creation processes. This is an example of theoretically developing the construct so that it enables more diverse empirical research in the future.

Conceptual articles have also enabled the discussion between the pioneers of effectuation research and those who wish to add to the existing research or challenge it in any way. For example, Goel and Karri (2006, 2008) addressed the notion of over-trust in effectual entrepreneurial action, and Sarasvathy and Dew (2008a) responded to their arguments by clarifying the concept of effectuation.

Another example of discussion on the concept of effectuation is the instance when Chiles, Bluedorn and Gupta (2007) proposed a connection between effectuation and characteristics in Ludwig Lachmann's approaches to entrepreneurship. Sarasvathy and Dew (2008b) then illustrated the differences between the constructs. In both cases the effectual construct was further refined by challenging it and by demanding detailed definitions to its dimensions.

Sarasvathy herself, quite understandably, has been the co-author in majority of conceptual effectuation research: when introducing a new paradigm and defining its dimensions it leaves less room for speculation if the developer continuously and actively challenges and refines the theoretical dimensions of said paradigm. Some of the writings (for example Sarasvathy 2001a; Wiltbank et al. 2006) include several imaginary examples of effectual action, which the authors use to illustrate the manifestation of the construct.

2.5.2 Empirical research

It can be argued that empirical research on the topic of effectuation is still taking its early steps towards more systematic and quantitative testing and research. Perry et al. (2011) distinguish empirical research from conceptual through research data, which is not presented in conceptual research. Empirical research is, quite obviously, a prerequisite for both confirming the existence of a phenomenon and for understanding the nature of its occurrence and its dimensions.

There are several different research streams in empirical effectuation research. Perry et al. (2011: 4) make a classification of empirical research strategies into experimental studies and field studies with either primary or secondary data. This classification is apt as it still manages to capture the scope of current effectuation research and its methodology. Therefore, I will employ a similar

classification as I see it as a good way of clearly illustrating the development of empirical effectuation research.

Most of the experimental effectuation studies either aim at confirming the existence of effectual logic (and contrasting it to causal logic) or seeing it being manifested and employed in different contexts. Sarasvathy (1998) first analyzed how entrepreneurs and non-entrepreneurs deal with risks in their decision-making. This research was conducted, as mentioned at the beginning of this literature review, through think-aloud verbal protocol analysis and an imaginary product that is used as a context for decision-making and analysis.

This think-aloud verbal protocol analysis method was also used by Sarasvathy et al. (1998), Sarasvathy and Dew (2005), Dew, Read et al. (2008) and Read, Dew et al. (2009). These studies used different problem solving exercises and sample sizes but all aimed at understanding effectuation as a form of entrepreneurial expertise and action, and its relationship to causation.

The results of using these experimental research methods have been able to demonstrate that there can be differences in how experts and novices (or entrepreneurs and non-entrepreneurs) process risks and how their solutions differ in problem solving and decision-making in situations characterized by uncertainty. Perry et al. (2011: 7) also share this view. Furthermore, the results of these studies relate the use of effectual logic to superior performance. Therefore, the authors view that effectuation is connected to entrepreneurial expertise in the face of uncertainty, and causal logic is connected to inferior performance in similar contexts.

Field studies on effectuation suggest similar results despite their different approaches on research design. Sarasvathy and Kotha (2001), Harmeling, Oberman, Venkataraman and Stevenson (2004), and Harting (2004) conducted case studies on companies and institutions that might have employed effectual logic in their actions and decisions. These studies used retrospective interview transcripts and text materials in order to determine if effectual logic was employed altogether (Sarasvathy and Kotha 2001), or if effectual reasoning was used more than causal reasoning (Harmeling et al. 2004; Harting 2004).

These three case studies, despite their retrospectively oriented methods of data collection, demonstrated that effectual elements and traits could be recognized and compared to their causal equivalents. Furthermore, they all used the five sub-constructs of effectuation as a theoretical background against which the real-life events were contrasted. As this is the research setting in this thesis as well, I wish to underline the potential this type of research could have in settings oriented towards *the present moment* rather than past events.

2.5.3 Current state of effectuation research

“From our review of the effectuation literature, we conclude that some of the reasons effectuation research has not grown more quickly relate to the following: the fact that effectuation represents a challenge to conventional, entrenched entrepreneurial strategy wisdom; the complexity associated with developing consistent, observable behavioral variables from a cognition-based theory; and the difficulty related to developing and validating effectuation (and causation) measures.” Perry et al. 2011:2

Perry et al. (2011) state that effectuation research is currently transitioning from nascent to an intermediate level. Their classification for this level of maturity is derived from Edmondson and McManus (2007) who posit the view that nascent level research is characterized by open-ended research questions, qualitative methods, and suggesting further expansion of newly presented theoretical constructs. Intermediate level research, as they see it, employs both qualitative and quantitative methods and seeks to develop the theories further by testing the constructs in new contexts.

The claim by Perry et al. (2011) is based on the fact that the recent research is about developing measures for effectuation and causation and testing the constructs with other variables, whereas the aims of the earlier research were those of establishing and examining the theoretical constructs and their characteristics. This claim is further supported by the subsequent study of Chandler, DeTienne, McKelvie and Mumford (2011) in which they aim to develop and validate measures and scales for both effectual and causal processes. They then test said measures in a quantitative way in order to discover what the empirical distinctions of causation and effectuation are, and whether their sub-constructs are theoretically sound.

The results of Chandler et al. (2011) suggest that effectuation and causation can be measured, even though the dimensions Sarasvathy (2001a) suggested might be, in their view, in need of revision (they see precommitments as a dimension of both causation *and* effectuation, whereas Sarasvathy associates it as a sub-construct of effectuation). Their ways of measuring effectuation will be further analyzed in the methodology section of this thesis, as I will examine their scales as a way of qualitatively determining the occurrence of causation and effectuation.

Effectuation research has currently addressed several empirical contexts in addition to new venture creation and marketing (Read et al. 2009). Earlier studies include themes such as investor behavior (Sarasvathy and Wiltbank 2002) and innovation (Dew and Sarasvathy 2001). Timely studies expand the field by comparing family-owned and non-family owned companies and their investment processes in the effectual context (Hayton, Chandler and DeTienne 2011); analyzing R&D processes (Brettel, Mauer, Engelen and Küpper 2012); examining effectual international new venture creation (Harms and Schiele 2012); connecting effectuation and entrepreneurial marketing (Mort, Weerawardena and Liesch 2012); studying the influence of the *effectual network* of an effectual entrepreneur (Faiez and Younes 2012); examining the logic and behavior of student entrepreneurs (Politis, Winborg and Dahlstrand 2012); and exploring the identity construction processes of effectual entrepreneurs (Nielsen and Lassen 2012), among others.

Researchers have also conducted recent theoretical examinations of effectuation, causation and other related constructs. Fisher (2012) compares the concepts of effectuation, causation and *bricolage* as emerging theories in the field of entrepreneurship. Svensrud and Åsvoll (2012) seek to develop a theory of effectual innovation in large corporations. Read and Sarasvathy (2012) examine the

common theoretical ground of *service-dominant logic* (Vargo and Lusch 2004) and effectuation from the perspective of co-creation.

Since this research is conducted within a Finnish SME and entrepreneurial context (not to mention its implications on Finnish entrepreneurship education and analysis of entrepreneurial action), the academic essay collection by Mäkimurto-Koivumaa (2012) must be mentioned as a part of timely effectuation research as well. It addresses the potential of effectuation in developing and improving entrepreneurship education, and takes a look at the effectual processes in some small Finnish companies.

In their literary review, Perry et al. (2011: 4) posit the view that effectuation represents a significant paradigm shift in entrepreneurship research and that such novel ideas take time to emerge and gain wide acceptance in a still relatively young and developing theoretic field with limited consensus. Overall, effectuation research has expanded in few recent years to cover relatively more of both theoretical and empirical contexts in entrepreneurship, marketing and entrepreneurship education. For me, this signals that the topic is regarded not only possible to develop further theoretically, but also applicable for various types of empirical research.

2.6 The point of view of this thesis

I see that it is crucial to underline the perspective on effectuation and entrepreneurial action employed in my own research. Furthermore, in order to critically examine the current research streams and develop the pragmatic aspects of effectuation in real-life working contexts, I must address certain characteristics related to the topic of effectuation and its research. The methodological choices and characteristics of this research and its deviations from existing effectuation research will be further elaborated in the following Methodology section.

First, in order to even study effectuation as a logic or even a notion, it is decisive to define the focal concept of *expert entrepreneur*. Sarasvathy's (2008:) definition involves founding one or more companies either as an individual or as part of a team, remaining with at least one of founded companies for more than ten years and taking the company public. This definition, along with listings of most successful entrepreneurs (Dew et al. 2009) was used in selecting the samples for initial research (e.g. Sarasvathy 1998, Dew et al. 2009), which either analyzes "expert" action or compares action between "experts" and "novices".

Obviously I understand the need of using the term expert entrepreneur in order to initially capture and underline the special nature of potential results of employing effectual logic in decision-making and action. I also understand that, initially, there must have been some characteristics, which were selected in order to capture the differences and the relative success of different types of actors (such as business students and seasoned entrepreneurs). However, in order

to develop and improve effectuation research and especially the use of effectual logic in real-life action (which involves a myriad of different actors), this strict division between experts and novices is too stark in my view.³

I base my argument on the context in which I am operating for the purposes of this research. The financial values, turnovers or the positions in the stock exchange cannot be obligatory, defining factors in analyzing entrepreneurial action from the perspective of effectuation. Therefore, I must concentrate on the actions in which I was initially able to distinguish at least some hints of either effectual or causal constructs. Whether or not the results of my analysis draw a picture of expert or novice actors is irrelevant – perceiving and confirming effectual action is what counts.

Perhaps the division between entrepreneurs and non-entrepreneurs used by Perry et al. (2011) is more fitting for various contexts than the division between experts and novices. However, in order to develop effectuation research in entrepreneurship education and other contexts, I see that effectual characteristics can be perceived in the actions of highly different individuals and groups of people. With this in mind I was able to begin seeing the logic being manifested in different (entrepreneurial) contexts, and it taught me something about its potential in entrepreneurship research.

Second, measuring effectuation and causation is highly problematic. Chandler et al. (2011: 381) develop ways of measuring the constructs and claim that “the degree to which one effectuates is an amalgamation of involvement in each of the sub-dimensions of effectuation”. While it is possible to generate scales and measures for effectuation and causation (and their sub-dimensions), the validity of these scales is variable depending on the context in which they are used. For example, quantitative analysis by using Likert-type scales with which entrepreneurs can assess the degree of effectuation and causation in their actions will result in different results depending on the type and age of the company, the characteristics of the industry, and even the preferences and views of those individuals who grade their own and their companies’ decisions and actions.

My view is that the manifestation of causal and effectual constructs must first be observed until their nature and characteristics can be analyzed, and even then this analysis must be done so that it is related to the context of the research setting. This obviously results in a highly qualitative (and individual) analysis and is dependent on the researcher, but this type of analysis can be more productive in terms of understanding the phenomena in different contexts.

Furthermore, does there truly ever exist a state of complete effectuation or causation in human action? Even Sarasvathy (2001a: 245) notes that both constructs can occur simultaneously in human reasoning and action. Having experience from several different industries in which companies operate I can say

³ I regard the entrepreneurial process that is being analyzed in this research as an “expert” project in some ways, even though the aim is also to demonstrate that effectual traits can manifest themselves in different contexts and that they can be at least understood and employed by “novices” as well.

that their processes can differ greatly in terms of execution, leadership, organizational structure and a myriad of other factors. Future research on effectuation could also find out whether there are differences between companies of different industries and the characteristics of their effectual processes. Chandler et al. (2011) also acknowledge this problem of generalizability because of diversity.

I feel that the Likert-type scales used in assessing the levels of effectuation or causation are able to catch only a limited part of both the entrepreneurial process and the potentially intertwined effectuation processes. In my view, discovering and witnessing elements of the effectual construct in a real-life setting without measuring their strength is more justified regarding the potential emergence of the elements in different contexts of entrepreneurship and entrepreneurial action.

Third, the issue of linking effectual behavior to superior performance is still under discussion by scholars. Despite Sarasvathy's (1998, 2001a, 2008) and others' (e.g. Dew et al. 2009) efforts and successes in linking expertise and effectuation, there exists no research that is able to point out that effectual behavior conclusively results in superior performance. This is also stated by Chandler et al. (2011). I am not arguing that effectuation research should aim at this goal (or that it is even possible due to its ambiguity), but rather at analyzing and finding commonalities in human behavior in different phases of different creation processes.

Baron (2009) considers the link between effectual logic and expert performance, and the dimensions and definitions of experience were also contemplated extensively when designing this research. As there are dozens of different definitions for expertise, and I feel that the one employed by Sarasvathy (2008: 21), and later by, for example, Chandler et al. (2011) in their measurement development studies for effectuation, is insufficient for multiple contexts, I am compelled to argue that there is a need for revising the definitions and terminology. However, what the dimensions of entrepreneurial expertise (or experience, for that matter) are or could be is highly beyond the limits of this study.

Effectuation enables exploration, failure, and changing course in a way that causal approaches cannot. In my view, attempts at understanding the relationship between effectuation and venture performance are important in terms of expanding our understanding of the theme. However, the potential of pragmatic utilization of effectual thinking in real-life contexts is even more significant.

I see that effectual logic is present in many aspects and areas of human action, not only in entrepreneurial action. My pragmatic perspective is that since effectual logic has been derived from analyzing decision-making, those studying entrepreneurship, aspiring entrepreneurs, seasoned entrepreneurs and even non-entrepreneurs would benefit from at least understanding the construct and its effects on behavior – not the successes or failures which might come later. I will further elaborate my views on the potential of effectuation in many areas in the discussion section of this thesis.

Finally, effectuation research has been partly relying on data, which may be subject to *retrospective bias*. When test subjects recall past events there exists a possibility for rationalizing, omitting or even making up information. This also makes confirming effectual or causal reasoning or action less reliable. Chandler et al. (2011) acknowledge this to be a problem in their validation study as well, and suggest longitudinal or experimental research designs to limit the possibility of retrospective bias.

Sarasvathy et al. (1998), Sarasvathy and Dew (2005), Dew et al. (2008), and Read et al. (2009) employ Sarasvathy's (1998) methods of verbal protocol analysis in a research setting which concentrates on creating and marketing an imaginary product. Even though this research setting enables the real-time observation of entrepreneurs' decision-making and reasoning, it obviously does not capture the full spectrum of entrepreneurial action. While that was not the aim of those studies, it does not change the fact that observing the phenomenon in authentic environments can generate new and more multifaceted information on the subject.

The aim of this study is to witness and observe effectuation and causation in a real-life creation setting of a small business. Furthermore, being part of the process can give researchers insight on its characteristics, peculiarities and effects. I also see that it is an important reminder of the fact that even though the phenomenon can be analyzed quantitatively, it will still need to be taught, learned and observed through qualitative examples and subjects.

3 METHODOLOGY

The methodology section of this thesis is constructed as follows. First, I will illustrate the different methodological aspects and choices employed in this research. Second, I will present the case subject in detail so that it can be connected to the theoretical and methodological constructs in the Analysis section of this thesis. Presenting the case subject is also a way of bridging the gap between conceptual methodological choices and the reality of the case research and its conventions. Third, the methods for collecting, interpreting, and reporting the data are illustrated. These are also more explanatory when connected to the real-life context of the case subject. Finally, I will address the characteristics and issues concerning the validity and reliability of this research.

3.1 Research method

In this section, the research paradigm and the methodological choices of this research are explained and validated. This socially constructivist, qualitative research can be classified as an action study with a single-case research subject.

3.1.1 View of the world

The perspective employed in this research is related to *constructionism*, and especially *social constructivism*. The underlying assumption of this approach is that reality is subjective and that individuals construct their own or a shared interpretation of it (Eriksson and Kovalainen 2008: 13). Eriksson and Kovalainen (2008: 14) further elaborate this view by describing reality for individuals as “an output of social and cognitive processes”. Reality is thus socially constructed between the actions and interactions of individuals, and no discoverable single truth about its nature exists.

In social constructivism, the unit of analysis can be an appropriately selected single phenomenon or a process, which is analyzed through a versatile selection of materials (Koskinen, Alasuutari and Peltonen 2005: 34). This way

the approach can result in generating new and even unexpected understanding of the study subject. This is fitting for the research setting of this thesis as well, since the outcomes and effects caused by the process could not be anticipated or predicted.

Selecting the constructivist approach enables researchers to construct a description of events and analyze phenomena from their own individual perspective. Furthermore, the approach accepts the meanings and interpretations of reality to be crafted and explicated both individually and through shared interactions and perceptions in different relationships, groups, and communities. This way, the ambiguity of perceptions does not hinder the interpretations but rather facilitates forming them.

In this research, the constructivist approach enables and accepts the highly subjective view of the researcher, who is often part of the phenomenon that is being researched (Koskinen et al. 2005: 34). The meanings and significance of the research subject and the processes related to it are formed through subjective interpretations. This justifies and emphasizes the role of the researcher as the main driver and tool of the analysis and interpretation of the findings.

3.1.2 Qualitative research

Having selected the constructivist view as the conceptual frame of perception on the study subject, its logical implication is that the methodological approach of this research is *qualitative*. Qualitative approaches aim at describing, interpreting and understanding the phenomenon that is being researched (Eriksson and Kovalainen 2008: 14). Furthermore, the approaches are often contrasted with quantitative approaches, which often aim at explaining, testing hypotheses or statistical analysis (Eriksson and Kovalainen 2008: 5).

Koskinen et al. (2005: 31-32) list features that describe qualitative research. It is often characterized by the interaction between the researcher and single observations (in this research, a single case), which are classified according to the perspectives or meaning provided by the participants (in this research, the researcher and those who actively participated in the process). Qualitative research is also usually *inductive*, which underlines the potential of the data and the research subject, and results in their unique enabling rich and multifaceted examination (Hirsjärvi, Remes and Sajavaara 2001: 155). In this research, theoretical constructs were contrasted to real-life events, which were obviously observed and examined from various perspectives. Furthermore, qualitative research favors naturally occurring material over data that is generated by the researcher (Koskinen et al. 2005: 32). In this research, the real-life events of the entrepreneurial creation process justifiably represent material that can be classified as naturally occurring.

Qualitative research often employs qualitative methods in acquiring material and data, and the study subjects are selected purposefully, not randomly (Hirsjärvi et al. 2001: 155). In this particular research the process, which is the study subject, was selected because of the initial observations of its potential connections to the theoretical constructs which I became familiar with. I was

also involved in the process, which enabled me to observe those connections in the first place.

Selecting and employing the qualitative research approach benefits the setting and aims of this research in several ways. As creation processes are unique and potentially unpredictable in nature, qualitative methods can be used to observe and analyze single processes in a versatile, detailed way. There is also a possibility of increasing understanding and knowledge of the manifestation and diversity of the effectual principles and dimensions when analyzing them qualitatively and in detail. Furthermore, qualitative methods allow a pragmatic approach to a real-life setting, which can provide useful when considering applying the results of the analysis in, for example, business facilitation, teaching and other qualitative research settings. Qualitative methods used in this research are explained in detail in the following parts of this section.

3.1.3 Case study

The research for this thesis can be classified as *case study*. Yin (2002, in Eriksson and Kovalainen 2008: 118) defines a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context”. The definition includes the notion of unclassifiable and unclear boundaries between the phenomenon and its context, and the multitude of data sources used in the research process. My argument is that the characteristics of the effectual construct manifested in real-life actions are highly context-dependent, and therefore it is reasonable to analyze the process in a *single-case* study.

Furthermore, Eriksson and Kovalainen (2008: 116-117) also state that by using case study as a research strategy, researchers are able to produce detailed and holistic knowledge of the subjects that are being studied. Because the aim of this research is to observe the manifestation of theoretical constructs in practical human action, the case study method provides an opportunity for diverse and longitudinal observation.

Eriksson and Kovalainen (2008: 121) describe the case study research process as “a continuous interplay or dialogue of theory and empirical data”. This is also the approach in the research, data interpretation, and the analysis conducted in this thesis. It enables comparing and contrasting theory and practice, offers clarity, and is a practical way of illustrating the research project and reporting and interpreting its findings and results.

This case study can also be classified as *intensive*, as it aims at understanding, describing and interpreting a unique case in a certain context and from a certain perspective (Eriksson and Kovalainen 2008: 120). Koskinen et al. (2005: 154) state that in addition to being a company or a part of it, the selected case can also be a functional, such as a process. The creation process examined in this research thus meets this criterion as well.

Case studies provide new thoughts and perspectives and thus develop the knowledge base of business studies (Koskinen et al. 2005: 155). As mentioned earlier (and illustrated further in the following sections), the case subject in this study is a creation process, which I was able to observe and analyze. To my knowledge, effectuation research has not been conducted in an identical way

before, and since the initial selection of this topic I was hopeful to generate new insight to this interesting theme.

To further elaborate the nature of this qualitative case study research, it can be classified as *descriptive*. Descriptive research aims at describing concepts, events, processes and phenomena, and documenting their focal features (Hirsjärvi et al. 2001: 128; Eriksson and Kovalainen 2008: 27, 39-40). It can be contrasted by other common types of research, such exploratory research, which Patton (2002: 193) illustrates as something that can be used when studying subjects of which little or no existing theory exists, or explanatory research, which Eriksson and Kovalainen (2008: 27) describe as a way of examining and explaining causality or consequences. The descriptive approach was selected because the study aims at analyzing the creation process from the perspective of existing theoretical concepts of effectuation. Therefore I analyze the events and the characteristics relevant to the subject, albeit from a certain point of view.

3.1.4 Action research

The method that was selected for the purposes of this research is that of *action research*. I initially connected the characteristics of the effectual construct to naturally occurring phenomena while working out a solution to a certain technical issue within a business setting. My continued involvement in that process, combined with my growing interest towards effectuation as an area of research, encouraged me to look at the process from a new perspective.

When initially plotting potential research designs it came clear that my own involvement in the process would limit the methodological choices of the research. That being said, the close involvement obviously could be seen as an excellent opportunity to intensively observe and study action and events in the context of a certain theoretical framework, in this case effectuation. Therefore, selecting action study as a research method was ultimately practical and justified not just from my own perspective, but from the perspective of the goals of the research as well.

Kemmis and McTaggart (1982, in Fisher 2007: 54) define action research simply as “trying out ideas in practice as a means of improvement and as a means of increasing knowledge”. In this research setting that idea was trying to observe the manifestation of effectual action and events with effectual characteristics by being one of the participants in the process that is being analyzed. The aim of this was to potentially increase knowledge and understanding of the concrete, practical occurrence of effectuation.

Action research is characterized by its close focus on particular issues in certain settings, connecting reflection and action, the researcher’s participation and collaboration with non-academic actors and entities, and taking multiple perspectives in data gathering and analysis (Eriksson and Kovalainen 2008: 194; Fisher 2007: 53). All of these characteristics were taken into account in conducting this research and reporting it.

Fisher (2007: 53) also states that action research enables learning, improvement and challenging of the researcher’s own understanding about the subject matter. This was obviously one of the reasons why I was content with

action study as a research method: I wish to be able to connect this intriguing theoretical construct to real-life pragmatic settings. Furthermore, Eriksson and Kovalainen (2008: 197) see that action research often benefits the conventions and practices of the organization in the context of which it is conducted. However, in this particular case, the focus was not on improving the examined practice or process but rather on observing it from a certain perspective while simultaneously being involved in it.⁴ I will clarify this view in the Analysis section.

Koskinen et al. (2005: 48) see that action research emphasizes the need to make research useful and applicable also in other than academic contexts. Thus, by employing this method I aim at benefiting both theory of effectuation and the practical understanding of creation processes. These views will be further elaborated in the Discussion section of this thesis.

Eriksson and Kovalainen (2008: 193) view that action research is highly applicable in settings such as the one in this research: the research question aims at describing “an unfolding series of actions that are taking place over time in a certain group, organization or other community” from the perspective of effectuation. The emphasis is on describing, interpreting and understanding.

One of the significant benefits of the action study setting in this research is that it enables the analysis of several actors related to a single setting in which effectuation processes occur. Because I wanted to gain a comprehensive view of the effectual process, I felt like it was necessary to not only observe the thoughts and actions of the entrepreneur, but those of the focal stakeholders as well. As the stakeholders who commit to the process shape its nature, characteristics and outcomes, it is essential to observe their behavior to the extent it is reasonable and practicable. Perry et al. (2011) also presented examining these entrepreneur-partner relationships and their characteristics as a way of advancing understanding of effectual action.

As is the case with every research method, action research obviously has its issues. High level of subjectivity and potentially biased interpretation, problems with observation and documentation, acknowledging the possibly dualistic role and the degree of involvement of the researcher, and the cyclical nature of evaluating the researcher’s own actions and the aims of the research are all valid concerns that also needed to be taken into account in this research. Eriksson and Kovalainen (2008: 201-202) present ways of improving the quality of the action research by tackling these issues. The potential issues of this particular research design and process are addressed and explained in the reliability and validity parts of this section.

Eriksson and Kovalainen (2008: 208) also suggest that the thorough evaluation of the quality and development of the research process is crucial in order to achieve the goals of the research and the learning of the researcher. The research process and the phases of the action study are examined in the Evaluation section of this thesis in order to ensure the quality and academic diligence of this particular research.

⁴ From a professional perspective, I quite obviously hope that my involvement in the process improved its quality at least in some ways.)

3.2 The research subject

This section is provided in order to preface the analysis and to illuminate the context and actors that are related to the central creation process, which was analyzed for the purposes of this research. I will introduce the characteristics of the focal entrepreneur, the company, the people, and the creation process. I will also briefly address my own role both as a researcher and as a stakeholder in the process, and discuss that in the Data collection section of this thesis. Furthermore, I will justify the selection of the timeframe of the action research process.

I attempt to avoid using overly complicated technical and professional vocabulary so that those unfamiliar with the subject matter would not be estranged from the actual research report. Furthermore, I must obviously refrain from presenting excessive technical details in order to prevent the potential imitation of the idea. The purpose is to illustrate the process more than the potential products or outcomes of it.

3.2.1 Background

The entrepreneur behind the beginning of the creation process is a male in his late fifties. During his adult life he has worked both as an employee and an entrepreneur in several Finnish SMEs in different industries, ranging from building trade to heavy machinery industry. His current company, which he founded in 1992 and is actively involved in, is a small specialist firm operating in the Finnish heavy machinery industry and especially hydraulics.

The company's main areas of expertise are the planning and execution of installation, repair and maintenance of hydraulic components and systems in different environments, such as manufacturing plants, and in different working vehicles and systems, such as excavators. Furthermore, the company also practices resale of hydraulic systems and components to both companies and private people. The emphasis is on continuous planning and maintenance for manufacturing plants, which in Finland are usually owned by large companies.

Rather than having several regular employees, the company engages specialist subcontractors who assist them in different projects. In recent years there has not been a high turnover of subcontractors, and my impression is that the company seeks to form long-term, low-hierarchy relationships with these subcontractors rather than hire them for individual short projects. The subcontractors are mostly specialists and entrepreneurs with their own small businesses.

I myself am an entrepreneur and a subcontractor for this company as well. Having worked for them as a part-time employee in different projects during my university studies I decided to found my own company in the beginning of 2012 and become one of their specialist subcontractors. This enabled my involvement as an entrepreneur in various projects and obviously one of them is related to the creation process examined in this research as well.

I discovered the construct of effectuation in autumn 2011 and learned about its dimensions and about concrete examples of how it can be manifested

in human action. By that time, the company I was involved in had been working on a simple solution for a seemingly simple issue. One of its clients, a wood processing plant, had problems with a hydraulic system, which consisted of a hydraulic press.

3.2.2 The problem context and the initial solution

Because of the relatively long operating age of the system, the gaskets located in the hydraulic cylinders of the press would wear out and hydraulic fluid (oil) would leak out and spread, causing environmental and safety hazards, and also resulting in the need of adding more liquid into the system. Usually these gaskets would be replaced with new ones. However, in this particular system, the cylinder construct was planned and assembled so that it would be highly difficult in terms of time (both elapsed and system downtime), manpower, and equipment to replace the gaskets. Furthermore, replacing them would possibly only work for a few months until they would need to be replaced again.

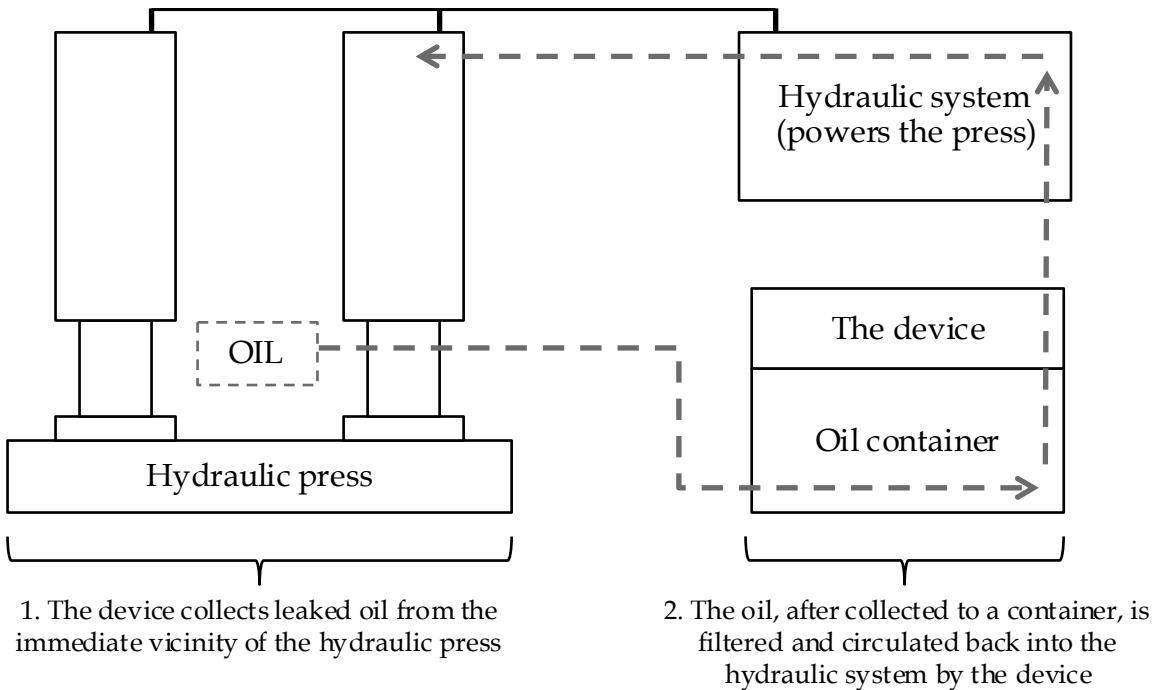


Figure 2: Operational principles of the device

This is the context in which the initial steps of the creation process took place. In 2010, when the problems with the system were severe, the entrepreneur quickly developed a solution: a simple device (operational principles pictured in Figure 2), which was able to collect a portion of the leaked hydraulic fluid into a clean container and circulate it through an oil filter and back to the hydraulic system. This way the spillage and the need for adding more hydro-

lic fluid to the system were reduced without compromising its uptime and relative cleanliness.

The device described above, however, was only a quick and temporary solution. It was not automatic and required regular attention because the container needed to be emptied before it filled up. The components were simple and modest, and the spillage was only partly collected. In other words, the device functioned in temporarily solving the problem but required someone to use it and lacked effectiveness.

3.2.3 The creation process analyzed in this research

In September 2011, the entrepreneur presented his proposal for the new and improved solution for the problem to me and another long-term subcontractor.⁵ The other subcontractor is an entrepreneur in his fifties with decades of experience from mechanics, metal product industry, heavy machinery industry and hydraulics. He was (and still is at the time of compiling this thesis) working regularly for the company in several different maintenance, installation and planning projects, and the two entrepreneurs have known each other personally for over twenty years.

At that point I was working for the company in different projects regarding maintenance planning, installation and repair of hydraulic systems. I had also assisted in installing the first version of the device in 2010. The second version would include a mechanism that would significantly increase the effectiveness of reducing the spillage, and another mechanism that would make the device automatic in terms of capturing and circulating the hydraulic fluid. When introducing the improvements for the first version in September 2011, the possibility of developing an actual product (as this was a unique solution for a certain type of hydraulic system) that would utilize the same technical solutions was also presented. This was the point when I realized that the process might have potential connections to the constructs of effectuation and causation, as it showed characteristics of a process that could potentially result in the emergence of a new product.

I decided to keep observing the process in order to discover whether I would be able to perceive features of effectuation. I selected the process to be the subject of my thesis research and continued working with the development of the device within the company context. I started my own business in the beginning of 2012 and became an entrepreneur subcontractor for the same company. This changed my role in the process from an employee to a stakeholder of sorts but it also enabled me to chase my other entrepreneurial aspirations and potentially become involved in other projects by other business entities. It also enabled me the possibility to employ my other areas of expertise than the technical aspects, since my background was also in business studies. I will analyze my own role in detail in the Data collection section of this thesis.

⁵ On an anecdotal note, the sketch was actually presented verbally and illustrated on a napkin with a ballpoint pen while having lunch!

3.2.4 Selecting the timeframe for action research

I had to determine the starting and end points of the process in order to analyze it within this research setting. Determining the starting point was relatively easy in the sense that at that point I became familiar with the concept of effectuation and the possibility of developing a new version of the device was presented. These two events occurred simultaneously by coincidence, which can be considered fortunate in retrospect. The end point obviously could not be determined at the beginning of the research process since the ultimate outcomes of the creation process were unknown.

As the development of the device advanced and the research setting and its methods were clarified (as often happens in action research) as the process went further, it became clear that it would be reasonable to limit the timeframe of the analysis to a certain point of the creation process. In the spring of 2012 I determined that this point could not be, for example, the introduction of a “final” product to a certain market, as the development of the device would not likely reach that point for a while. This is also related to the practical time limitations of the thesis work. I decided to conduct interviews on the focal stakeholders in April 2012 in order to confirm and reflect on my observations and views. I also decided to continue observation throughout the summer of 2012 in case of any pivotal events or actions would occur, and conclude the observation period in September 2012.

The definitive starting and ending points of creation processes are ambiguous at best. One of the ways of defining the pinnacle of an innovation process is taking the moment when the newly created product is introduced to the market for the first time. Effectuation processes, however, can occur also in only certain phases of the innovation process, or they might not occur at all (Sarasvathy 2001a). Koskinen et al. (2005: 98) view that determining the end point of fieldwork in research can be either systematic or automatic, depending on a conscious decision or the phases of the process or phenomenon, which is being researched. In this case it was a mixture of both. My conscious decision was to limit the analysis to certain phases of the process in order to better capture the effectual characteristics and to understand whether they occurred specifically within that timeframe.

In September 2012 the process had been in the same stage of development for a while and had undergone no significant development during the previous two months. Therefore my decision of ending the intensive period of observation seemed justified. I was still able to work on developing the device further and observe the process so that I could determine if anything decisive happened.

3.3 Data collection and interpretation

In this section, the conventions of data collection, data interpretation and reporting are illustrated in detail. The aim is to provide a comprehensive impres-

sion of the research process, to explain and justify the methods employed in the research, and to create an understanding of the ways of interpreting and reporting the findings of the research. Furthermore, as this is an action research, I will illustrate and justify my role in the process. The issue of research ethics is also addressed in this section.

3.3.1 Data collection and the role of the researcher

As the selected research method was action research, data collection was a combination of different types of observation complemented with interviews. As effectuation and causation are manifested in decision-making, reasoning and human action (Sarasvathy 2001a), I decided to employ a holistic approach. In practice this meant simply observing situations of planning and implementing plans, and periodically discussing possible ideas related to the process.

Another reason why data collection was organized this way was the fact that I knew both of the initial stakeholders well and they also knew me from years of cooperation. More tightly structured and formal data collection could have resulted in negative effects for observation and even for the actual process. I understand the implications this can have on the reliability and validity of this research (and these are addressed in their respective sections), but I also wish to emphasize the special nature of the action study setting and the alternatives that it offers to researchers.

Because I truly wanted to see the surfacing of causal and effectual features in the process, I tried to control the content of my own verbal involvement in planning and decision-making. With two seasoned entrepreneurs this was usually not a problem since their technical expertise far exceeded mine. I commented on the ideas that they presented from my own perspective, which was that of a colleague with some technical expertise and an entrepreneur with some knowledge on productization.

Due to my dualistic role as a researcher observing the process, I was at no point of the observation period actively trying to vitally advance the product development process so that my actions would be defining its phases. In other words, I attempted to be a stakeholder who offered help and expertise, but shared the goals of the entrepreneur. This was not overly difficult since the entrepreneur behind the idea was naturally the one who ultimately decided the course of action.

Concrete ways of data collection included I carrying a notebook at all times when working within this project and other projects with the two entrepreneurs in order to write down any ideas and plans they provided. Because of the open and informal relationship I had with both of them from the beginning of the project and this research, I did not have to worry about missing out on crucial information. All I needed to do was ask if I was not present at some informal meetings regarding the process - and most of the times I was kept informed anyway because this was not the only project I was working on with them.

I wanted to keep the data collection discreet and natural and thus I did not record any of the meetings or discussions with any device such as an audio recorder or a video camera. I felt that I was able to write down the characteristics and any decisions made regarding the project. In April 2012 I conducted semi-structured interviews on both entrepreneurs in order to understand their views and actions regarding the process. The interviews were conducted in the informants' homes, outside of working hours in order to ensure an unhurried and confidential atmosphere. These interviews were recorded and transcribed for analysis.

Eriksson and Kovalainen (2008: 201) regard interviews as one of the most typical ways of data collection in action research because of their relative simplicity and the rich data that can be generated through them. Because I designed the interviews to be semi-structured I was also able to guide their progress without fully controlling them, which can be seen as a factor increasing efficiency of the method (Koskinen et al. 2005: 105). Eriksson and Kovalainen (2008: 202) also emphasize that there should be a variety of different data collection procedures, and I share this view as well. I was privileged to both observe actions and discussions, and conduct interviews. All of these methods also generated data that could be used for the goals of this research.

Some observed data was collected in retrospect because I was not present during every single conversation regarding the device. The entrepreneurs did not have any formal meetings and could discuss the project over a coffee break or when working on some completely different project, for example. I attempted to confirm this type of retrospectively collected information during the interviews and other conversations with the entrepreneurs.

I also photographed the device on several occasions for the purposes of the process (potential productization and patents) but also so that I was able to connect those photographs with certain events of the process for the purposes of this research. This supported my written observation and was very simple with today's digital cameras and other imaging devices.

I attempted to construct a timeline of the central events of the process in order to analyze their causal and effectual characteristics. I also aimed at forming a holistic picture of the development of the process. Constructing the rough timeline turned out to be a highly useful tool for analyzing the most definitive and central events of the process and I feel that it also hinders the retrospective bias that is present in the analysis.

The written observation also included the analysis of my own thoughts, actions and involvement during the process. I evaluated the methodological choices and the research design. I also reflected the events of the process with existing theoretical constructs of effectuation and causation in order to determine their manifestation and occurrence. Furthermore, I was able to assess my different roles in the process as a researcher, as an employee or as a stakeholder.

My own role as a researcher is quite well described by Koskinen et al. (2005: 282) as they view that the researcher appears mainly to the working community as an associate or colleague when studying one's own employer. The entrepreneurs supported my research as they knew me personally and also

saw the research as a good way of diversifying the process. They did not feel that the research or my dualistic role as an associate and a researcher could affect the process itself negatively.

Becoming the “researcher” was straightforward in this case. The participation was informal, voluntary and supportive, and the entrepreneurs were still aware that I was observing the process from different perspectives. I feel that this did not overly or negatively affect my attitude towards them or vice versa. The entrepreneurs agreed to take part in the interviews without hesitation and based on my relationship with them I feel that they acted in a natural way during the interviews.

Eriksson and Kovalainen (2008: 200) posit the view that there is no single way of defining how involved the researcher should be in the processes they are researching and that the role of the researcher is determined together with those who are being researched. As this is also a question of research ethics I ensured that my role was discussed and agreed upon before the research process began. I also clarified that the observation data and interview data were both confidential, that the subjects would remain anonymous and that the unique characteristics of the potential product would not be overly explicated in my reports.

Those working within the process did not know the specific details of the theoretical dimensions of effectuation or causation until the end of the “observation period” because it was neither necessary nor reasonable from the perspective of the purposes of this research. Furthermore, it might have affected the phases and events of the process, and could have damaged the reliability and validity of the research. The entrepreneurs were only informed of the observation and the fact that my own involvement and their actions were reflected also from the perspective and purposes of this research. They simply knew that I was observing and analyzing the process from a certain point of view and were content with this information.

3.3.2 Interpreting the findings

Sarasvathy (2001a) posits the view that the decisions of entrepreneurs can be classified into either as causal or effectual by using the contrasting principles of both approaches. This is why it is also used as the foundation of this research. However, as the decisions in this process were often manifested into actions, these actions were also interpreted and analyzed from the perspective of the theoretical constructs of causation and effectuation. My view is that effectuation should also be analyzed in real-life contexts and situations when possible; this enables new contributions to existing research and increases our understanding of the construct and human action.

As explained in the previous section of this thesis, Sarasvathy (2001a) applies the effectual construct mainly to new venture creation settings. However, there is a clear connection to other creation processes as well, such as the creation of products, services and even markets. These *economic artifacts*, as Sarasvathy (2003) calls them, are created in a myriad of different ways but the creation processes can also be analyzed from countless theoretical perspectives. In

this research, the perspective of effectual and causal constructs and their principles was employed.

It is important to note that highly subjective qualitative methods are beneficial because the context in which the processes occur can vary significantly in terms of its nature and characteristics. In this research the five principles of effectuation and their manifestations are evaluated in a qualitative fashion, but an extensive interpretation might require other measures as well.

I considered employing the measures developed by Chandler et al. (2011) in order to not only discover causal and effectual constructs but to also measure their occurrence through their validated scales. Their focus, however, is in new venture creation rather than in various different creation processes of economic artifacts. Furthermore, their measures are related to complete processes that are to be analyzed solely in retrospect and that, in my view, differs too much from the research setting in this study. These factors caused me to use the principles of the effectual and causal constructs as the foundation for the analysis of the data.

None of the current measures in terms of scales are sufficient for accurately measuring effectuation. In my view, this is not only because the scales might not be able to accurately measure all the required dimensions of effectuation (Chandler et al. 2011), but also because of the varying contexts, which render the interpretations ambiguous at best. Therefore the focus of this research is in determining the occurrence of effectual processes rather than in measuring their level of intensity or the relative strength.

Data interpretation in this research consists of interpreting observations, spoken interview data, and my own actions. Observations were made during work interaction (e.g. discussions, installation and maintenance of the device) with the main stakeholders of the process. Spoken interview data was recorded, transcribed and later interpreted. I also interpreted my own actions as a researcher and an employee in order to determine my own role in the process and to improve the research design and the quality of the analysis.

I attempted to analyze and interpret the collected data by employing the five principles of effectuation and causation as categories in which events and actions within the process could be assigned. Because of the action study research setting and my understanding of the theoretical dimensions of effectuation I was able to reflect and compare real-life events to theory while the process was ongoing during the observation period. I also had the chance of forming a holistic picture of the process, which helped me in determining its nature in terms of effectuation and causation.

Every event that seemed to be connected to advancing or altering the process was initially included in the analysis. The characteristics and details of these events were analyzed in order to determine whether they would fall into effectual or causal category. This way I aimed at discovering whether the analyzed part of the process had more effectual than causal characteristics.

Upon re-evaluating the action study setting during the observation phase I realized that the events were often highly ambiguous with neither clear start nor end point, or that they could only be deciphered in retrospect. This steered

me towards a more holistic approach in analyzing the process and to the decision of using interviews to confirm some of the underlying perspectives and attitudes towards the product development process. The progress of the process was also irregular and ambiguous, and because of this it was difficult to determine how meaningful certain events were at the time of their occurrence.

Ultimately, when interpreting the data, I selected the parts (or events) of the process that were related to some progress or change in it. These parts were then analyzed in order to discover their nature in terms of effectual and causal characteristics. Furthermore, the overall comparison of the process itself to the theoretical constructs and dimensions of effectuation and causation proved useful and offered clarity to the seemingly ambiguous events. This way (visually represented in Figure X), the analyzed process was interpreted by viewing it from the perspective of the theoretical constructs, and also by connecting characteristics of different events within the process to causation and effectuation. Using these two approaches and multiple methods of data collection was a way of ensuring the consistency and reliability of the research.

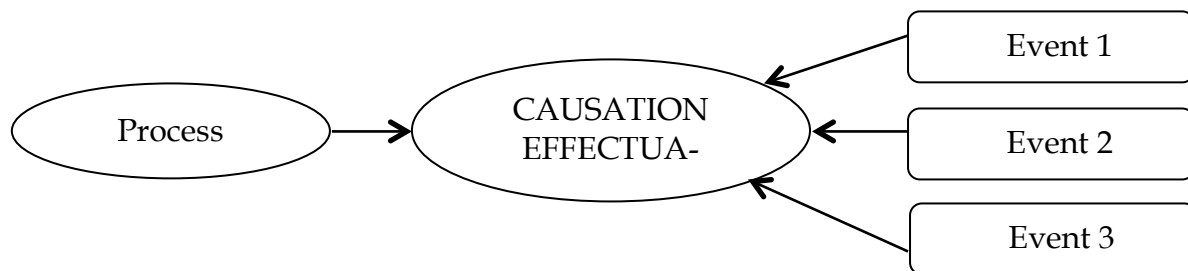


Figure 3: The whole process and its events compared to the theoretical constructs of causation and effectuation

3.4 Research reliability and validity

In this section the issues of reliability and validity are addressed. Reliability refers to the ability to generate results that are aligned with the methodological choices of the research, and the repeatability of the results with said methods (Hirsjärvi et al. 2001: 213). Validity refers to the consistency and applicability of the research methods in terms of accurately depicting the research subject (Koskinen et al. 2005: 253).

3.4.1 Reliability

In order to improve case study reliability, Yin (2003: 97) recommends that the reasoning of the researcher should be explained as well as possible. This has also been the goal in constructing and conducting this research. The theoretical framework of reference is explained and connected to the real-life events of the process. Data collection methods and sources have been demonstrated and provided. Furthermore, the selections and decisions made by the researcher have been explicated and validated in order to ensure transparency.

However, it should be noted that as a fundamental characteristic of a qualitative case study, perspective and characteristics of the researcher have obviously affected the data, which cannot be avoided. Furthermore, high level of subjectivity and potentially biased interpretation, issues related to observation and documentation, acknowledging the role and the degree of involvement of the researcher, and the cyclical nature of evaluating the researcher's own actions and the aims of the research are all valid concerns that also needed to be taken into account in this research.

Having been the only individual doing the observation and interpreting the data generated by observation, interviews and continuous assessment, my own views, knowledge and expertise obviously affect the outcome of this research. When interpreting the observations I also acknowledged that I obviously wished to find more manifestations of effectuation than of causation, since that was my idea of one of the characteristics of a potentially successful creation process and good entrepreneurial action. However, I attempted diligence and integrity in the analysis so that I could also get a truthful impression of a process in which I was a part of as well. Rather than a biased, romanticized view, honesty and integrity are far more beneficial and fruitful for this research, for the stakeholders involved in the process, and for myself.

Documenting the observed actions, discussions and events was not completely systematic during all times of the process. This was due to the periodic evaluation of the research methods, the multitude of other different processes those working on this process were, and the fact that I as a researcher could not obviously have heard every coffee table conversation or phone call, or read private e-mails and other messages on the subject. Getting this type of tacit knowledge and information is virtually impossible and must be accepted as a limitation in the research design.

I also did not record conversations (other than the interviews) into transcripts because I was also part of them, but rather wrote down keywords, contents and characteristics that might depict the nature of the interactions and actions for further analysis. This way the analysis was not always real-time but rather occurred after the interactions. Furthermore, I could have created a classification system for causal and effectual elements in interactions and discussions in order to categorize them and make the further analysis easier. This would have been very difficult with this type of research design, albeit possible.

Koskinen et al. (2005: 258-259, based on Grönfors 1982: 178-179) suggest three matters that should be taken into account in order to ensure the reliability of a qualitative study. First, a systematic report of the actual methods used in conducting the study should be presented. Second, the researchers should explicate how the produced material and data is validated and checked, especially if there are several methods of data collection. Third, the effect of the researcher and different organizational matters on the results must be assessed. All of these have been considered and the first two are explained earlier in the methodology section. The action research setting is evaluated in a latter, separate section of this thesis.

3.4.2 Validity

Eriksson and Kovalainen (2008: 202-204) comprehensively address different validity issues related to action studies. The aim is to explicate and justify the selected and employed methods of this research. Assessing the validity of the research provides a possibility for learning and reflecting on the research design.

I have stated my position, aims, interests, and goals regarding the research process. The methodological choice of action research has been justified and its benefits have been explicated. As action research should be evaluated, this evaluation enables reflecting on the learning and new insight gained from the research process. The quality of the research process was also continuously evaluated in order to improve it and to improve the validity of the research. The complexity of the action research setting is also taken into account and the consequences of the process have been examined.

The definitive starting and ending points of creation processes are ambiguous at best. One of the ways of defining the pinnacle of an innovation process is taking the moment when the newly created product is introduced to the market for the first time. Effectuation processes, however, can occur also in only certain phases of the innovation process, or they might not occur at all.

Describing a process and analyzing it from the perspective of theoretical constructs is challenging and can be highly subjective. In this case, the five dimensions of effectuation and causation can be manifested in human behavior and thus can be observed. However, it is up to the observer to classify actions and interactions as either effectual or causal. Reporting the observations is obviously subjective as well.

In similar action research or other settings having multiple observers could increase validity and offer a possibility to compare the observations and classification of phenomena (Hirsjärvi et al. 2001: 215). Mixed methods were used for data collection in order to increase validity but ultimately having several researchers observing would make the research process more reliable. There are obviously practical limitations to this but in another context or environment it could be tried.

In order to ensure the reliability of my observations about the key events in the process, I also presented the two entrepreneurs the written outline of my own view on the phases of the project. This enabled them to comment on it before I proceeded to write the analysis of said events. Because they were involved in the process, I was able to verify the truthfulness of my view on the events by consulting them. After presenting the outline and discussing its contents with the two entrepreneurs I was able to move to the analysis without altering my view on the events. I regarded this as proof of the authenticity of my observation.

4 ANALYSIS

The analysis is divided into three parts. In the first part, the time frame of the process is provided and the focal events are explained in order to further illustrate the characteristics of the process. This description also includes some events that occurred before the observation period; these events have been included in order to provide a clearer impression of the first steps that led to the realization of the product potential of the solution. In the second part, the five principles of effectuation and causation are connected to the events of the process. Furthermore, the observed and perceived events are connected to the two focal theoretical constructs in order to determine their manifestation. The third part is about providing a holistic view of the analyzed process and there the overall effectual nature of the process is discussed by analyzing my own observations and conceptions, and the views the focal stakeholders expressed in the interviews. These observations and views are then connected to the theoretical dimensions of the effectual process.

The analysis is thus constructed chronologically starting from the realization of the potential manifestation of effectual characteristics within the process, moving to the observation period, connecting the constructs to real-life events, and concluding with holistic analysis of the observed process. This structure was selected in order to ensure clarity in reporting both the events and their relationship to the theory, and to maintain the researcher's own role as the main reporter and analyzer in written form. The focal entrepreneur who came up with the concept for the potential product and is responsible for acquiring the client for whom the initial solution was constructed is referred to as E1 in this section. The focal stakeholder, the long-term subcontractor and entrepreneur, who assisted in further product development, is referred to as E2.

4.1 Chronological description of the process

This section includes a chronological description of the creation process for the device with potential of becoming an actual product. A timeline (see Figure 4) is

provided in order to visually illustrate the different events related to the process. This timeline also includes different periods of the process which are provided for increased clarity and understanding.

The first concrete solution that is related to the potential product that was under development during the process was assembled in the autumn of 2010. This solution would later be referred to as the first prototype of the potential product, since it had similar functioning principles. Furthermore, it was installed to the same hydraulic press that would later be equipped with the next, further developed prototype.

The client had requested a solution for reducing or removing the oil leaks and spills caused by the gaskets in the hydraulic press wearing out over time. This solution, like most technical solutions in similar contexts of manufacturing plants and maintenance, was to be cost-effective, functional, practical, and requiring the minimum amount of downtime in production. The client had tried other solutions, such as replacing the gaskets when possible and limiting the visible oil spills to certain areas and parts of the system, but they did not function well enough and solve the problem completely.

The first solution offered by was simple in the technical sense and solved three problems: the visible oil spillage, the collection of the leaking oil into a container, and circulating the newly-refined oil back into the hydraulic system. It was assembled, installed and tested during the autumn of 2010 by a subcontractor and myself, and it seemed to provide a functional (although partial) solution for the problem at hand. There was still some occasional leakage in the system and the oil circulation back into the system had to be activated by hand. Despite these deficiencies, the solution remained in place for a year.

The second solution, which included the features of the prototype to be developed further, was conceived during the summer and autumn of 2011. The technical solutions for the improved device were discussed and planned by E1 and E2, and implemented during the late autumn and early winter of 2011. These solutions included a way of collecting all or the vast majority of the oil leakage into a sealed, uncontaminated container, and an automated set of components for returning the collected oil back into the system after the container was filled to a certain level. New components were used when assembling the device and new hydraulic lines were installed for circulating the oil.

Because of the production and maintenance schedule of the manufacturing plant, it took almost a year before the improved device could be installed as a part of the hydraulic press. Most of the technical improvements and solutions for the new device were planned during that time period. The realization of the applicability of the device in other hydraulic systems was first presented to E2 and me in the early autumn of 2011.

After that discussion with E1, E2 and me, the device was gradually assembled and modified for this particular hydraulic system. E1 and E2 further discussed the technical features of the device and combined their views on the solutions. As the device required installation and modification of electric parts and a certified electrician must do that type of modification, one was contacted through E2. Most of the components of the device were ready components that could be used in several types of hydraulic or other mechanical systems. Other

components were machined, made and modified by E1 and E2, and by the manufacturing plant maintenance personnel in accordance with the requests of E1.

The installation of the device occurred in late autumn of 2011 and was executed by E1 and E2. Initial tests proved the device to work successfully and purposefully; reducing the oil leakage to a minimum and circulating the refined oil automatically back into the system. The device was connected to the hydraulic system of the hydraulic press and left to function automatically. It was periodically (at least monthly) inspected for proper functioning by E1, E2 or me, depending on who would be present to conduct the on-site inspection.

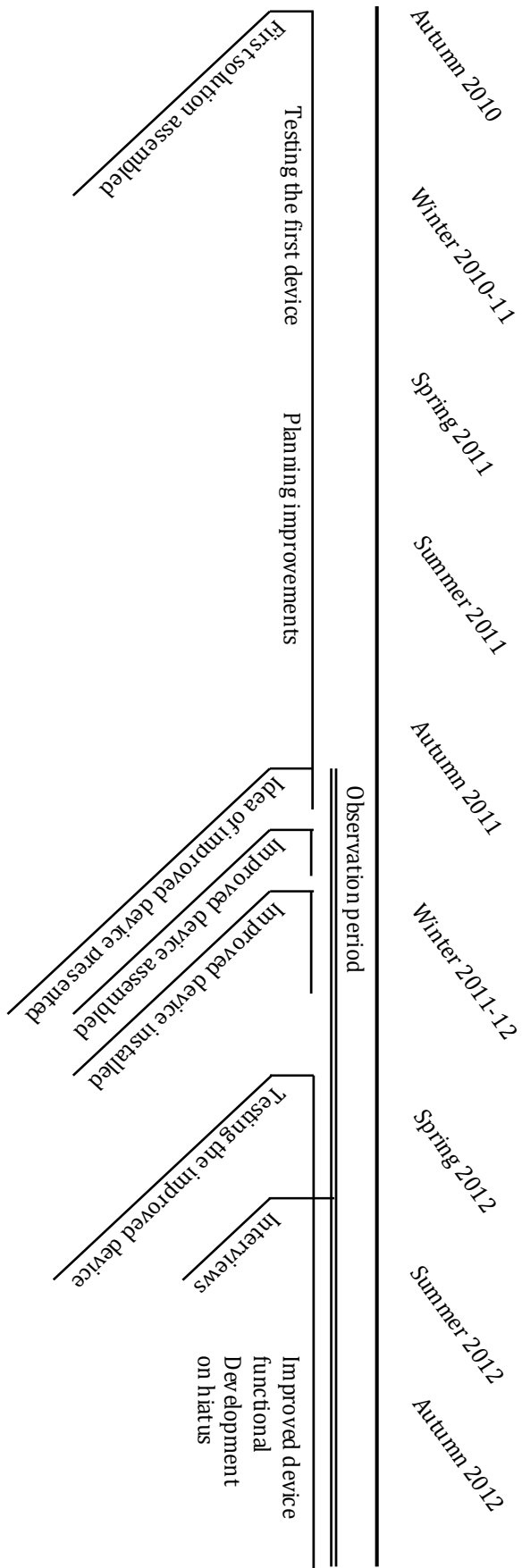
During the test period (late autumn of 2011 – spring of 2012) E1, E2, and I discussed alternatives for further developing the device into a potential product. This was mainly due to the fact that similar problems can occur in virtually any production plant that uses hydraulic systems and machinery. Furthermore, the product could be customized for various different systems in different types of production plants. The emphasis of this development was mainly on the technical aspects of the device but productization and potential clients were also discussed.

During the six months of testing E1 and E2 had brief discussions with few existing clients about testing altered models of the device. I looked into productization aspects such as patents and protection of design conventions. We also discussed whether the device could be marketed as either product or service to new clients. The thoughts gathered from these discussions were used in constructing the semi-structured interviews for E1 and E2. I interviewed E1 and E2 in April 2012, when the test period was also concluded. The device was left to function independently and its operation was ensured during the summer of 2012.

The summer of 2012 was a busy time regarding other work projects for all three of us and the development of the device was on hiatus of sorts. As the device could be sold as either product or service, it was decided that having such references of successful functioning would be highly useful should the development continue. Technical improvements and modifications were still discussed and E1 drew operating principles and blueprints for the device.

In September 2012 I concluded the observation period, as the productization process had not significantly advanced during the past summer months. The device had functioned properly and without problems for almost a full year and was ready for further development, but there was neither time nor a need to turn it into an actual product, as single copies of the device could still be provided to different clients if such need would occur.

Figure 4 (next page): The time frame of the creation process



4.2 Principles of effectuation and causation manifested in the creation process

Here, the five principles of effectuation and causation are connected to the events of the observed process. Each of the principles is addressed in their own respective sections. I have analyzed the causal and effectual features of the process by examining each of the principles and what characteristics of the process can be connected to each of them. These characteristics and their classification into five different categories are justified when they are presented.

4.2.1 A given goal or a set of means as a starting point

The creation process described in this thesis initially began as a problem-solving process: a client wanted a problem solved and it happened. The goal at that point was solving a certain problem with selected means. The issue of reducing leakage and circulating the oil back into the hydraulic system was addressed by employing a set of existing means, such as equipment and expertise that E1 already had at his disposal. However, after initially reaching the goal of solving the problem with existing means, the creation process evolved further.

When beginning the observation period (when the planning of the improved solution began in the autumn of 2011) it quickly became evident that the way in which the solution to the initial problem was crafted would provide foundations for a potential product creation process. The problem-solving process included a clear goal, which can be seen as a causal characteristic, but that goal was not related to creating a potential new product, company or industry, only solving that particular problem. Solving the problem provided further understanding of the available means, and these means provided the option of creating a potential product.

The starting point of the product creation process was, therefore, a set of means rather than a certain goal of creating a product. This is categorically a determining effectual characteristic of the starting point. The means include required expertise for solving the initial problem, the equipment and components used when constructing the first solution, knowing people who could be of assistance in developing the solution into a potential product, and the technical expertise and understanding of the problem context.

At the beginning of the observation period E1 was an expert entrepreneur in the heavy machinery industry and hydraulics. He had been actively developing his expertise and increasing his knowledge of the field by running a business and working with different types of clients, machinery, equipment, and projects. He had also developed technical solutions to different types of problems on the industry before and took pride in his problem-solving skills on the field.

E1 knew the technical aspects of hydraulic systems and he also had a conception of the unique nature of the potential product, the idea of which had been conceived during the problem-solving process. He knew the facilities and the machinery of the client's production plant well because of the long-term customer relationship. He knew the maintenance personnel, the organizational culture of the client's local organization, and had also become to know the plant's technical managers personally.

E1 also had known E2 and me for years. He and E2 had been developing technical solutions before and had developed an effective and resourceful way of collaboration. They knew each other's working habits and skills. E1 also knew of my background of studies in entrepreneurship and marketing, and of my technical knowledge. Because of our long-term cooperation, both E2 and I were people who were easy to communicate with and share ideas related to the creation process, as we both were involved in the initial problem-solving process.

The characteristics presented above paint a comprehensive picture of the means that became evident to me due to knowing E1, E2, the production plant and some features of the initial problem-solving process. They are provided in order to demonstrate what types of means were employed as the starting point of the creation process for the potential product, and in order to justify my interpretation of the effectual nature of the initial steps of the process.

4.2.2 Focus on expected returns or affordable loss

The causal perspective on the creation process emphasizes calculating and maximizing expected returns. Furthermore, its focus would be on the upside potential of the potentially succeeded product. When examining the characteristics and events of this particular creation process it quickly becomes evident that expected returns were never calculated and that the focus was on limiting downside risk rather than maximizing the upside potential.

The initial solution was assembled from components that were readily available. As the creation process for the potentially new product began, the initial solution was already deemed functional and its features could be gradually improved. This was conducted through planning the new features and building the new device while the first solution was still up and running at the production plant.

No significant financial investments regarding the product were made during the observed creation process. On the contrary, the device was mainly developed and tested during working in the client's production plant, which saved both time and money, since the client had agreed to use the developed version of the device at the plant. The client would also pay for potential maintenance of the existing device. Therefore, the potential losses related to the potential product during the observed process were only time and insignificant amounts of money in terms of business continuity.

Experimentation was emphasized in the development and creation process in several ways. Modifications to the device depending on the hydraulic system it would be connected to were considered by reflecting on the perceived

issues in existing systems in different plants and environments. These modifications could be tested by simply altering the existing device, and this would not require risky investments or detailed calculations on expected returns. The modified devices could be installed in different plants, but if new clients could not be acquired for any reason, the losses would still be limited to the already small-scale investments to the existing device.

The creation process was open-ended and the device could be marketed and sold as either product or service, depending on the context, from a relatively early stage of development. There were no clear goals for productization, marketing or sales, as the technical development and modifications were the keys to improving the device. There were also no time limitations to the development process, which would most likely occur when making calculations of the potential returns that a finished product might generate.

My impression is that the creation process would not have shifted to the state of hiatus if expected returns would have been focused on or calculated. Therefore, focusing on limiting the downside risk also enabled freedom in terms of determining the timeframe of the process. This also enabled experimentation and room for error and unexpected events.

4.2.3 Competitive analysis or alliances and precommitments

When reflecting on the events that took place in the autumn of 2011, it is evident to me that the creation process resembled almost a textbook example of effectual alliances and precommitments. When E1 presented the principles and features of the improved device to E2 and me, we became stakeholders through our commitments to developing the device. At that point the notion of potential productization was also discussed and we expressed our willingness to providing our input to the process.

E2 and I were committed to developing the product from our own perspectives and based on our own expertise. We also shaped the creation process accordingly. E2 was friends with a certified electrician who crafted the electrical components and wirings for the improved device according to the requirements of E1 and E2. E2 also visited other production plants for other projects and planned potential modifications for the device that would be suitable for other plants and hydraulic systems.

I looked into the productization aspects and helped with the installation and maintenance of the device. I also commented on the ideas for technical improvements and modifications within the limits of my own technical knowledge. Furthermore, I provided perspective on expanding the initial clientele with ideas regarding the diversification of the device features, customization options, and different options for marketing the device as a service.

E1 and E2 are experts in the context that they are operating. This also reduced the need for systematic competitive analysis or market analysis. Already knowing of the other clients' potential issues that could be solved with similar solutions and devices provided a potential client base, which could be catered without mass-production or extensive modification of the device.

As our wish was to gradually expand the client base with existing clients whose systems and machinery we were already familiar with, there was no need to financially contribute to the development of the potential product during the observed process. Our contributions were time, expertise, effort, and ideas. This can also be interpreted as a risk-reducing factor as we believed in the device's potential and did not require other reward than the fee the client was paying us, and the feeling of achievement from being able to create something potentially new. We were able to shape the creation process according to our own actions and decisions without definitive knowledge of its outcomes.

The client for whom the initial solution and the subsequent improved device were developed can also be regarded as a stakeholder. The client committed to creating the solution by paying for its development and installation, and by allowing its further development and improvement. This obviously reduced the potential risks and uncertainties associated to the creation process significantly.

When looking into the patents and protection of design conventions I briefly checked if any similar products were available on the market. We had also discussed the potential existence of similar solutions to the same problem together with E1 and E2, but no systematic market research was conducted; our own understanding of the industry's product lineup and some internet searches on different products were the only sources of information.

4.2.4 Exploiting knowledge or leveraging contingencies

The manifestation of this effectual principle in this particular creation process is related to accepting uncertainty and benefiting from it through remaining flexible. Practical contingencies that were leveraged or even exploited during the observation period did occur. Yet, in my view, the most significant unexpected turns of events affecting the creation process happened when the first solution (the first device) was operating for the period of one year before constructing the next one. However, as pointed out in the previous sections of the analysis (and further elaborated in the following ones), the focus of the process was more in experimentation than goal-oriented development, and this experimentation accepted these potential unexpected events.

When viewed from the perspective of effectual action, the creation process included some unexpected events, which led to technical improvements. The first solution was not practical enough since it was not automated and required regular maintenance in terms of circulating the oil back into the system. This contingency occurred when one production plant employee who was responsible for periodically turning on the circulation simply forgot to do this at one occasion and the container overflowed. This event led to the idea of reducing the need for interfering with the device and to the technical solutions of automatically activating the circulation when a certain oil level was reached in the container.

Another contingency is related to the effectiveness of reducing the oil leakage. The first solution did not eliminate the leakage to full extent but rather reduced it. The discovery of this fact led to the technical improvements in the

new prototype of the device and opened up possibilities for several ways of solving that particular problem. Through technical expertise and knowledge this initially unanticipated problem could be solved effectively. Furthermore, it resulted in understanding the unique nature of the device and affected the creation process as well.

Inconveniences, such as the two events mentioned above, can be regarded as contingencies that could have been either leveraged or avoided. In this creation process those inconveniences were exploited and solved. They provided possibilities for justifying the further development of the device to the client, paved way for new ideas regarding the technical solutions that could be implemented in the potential new versions of the device, and even affected the novelty of the improved device.

According to my impression, the notable contingencies that occurred during the observation period of the creation process are related to time management and the further improvement of the device. Since E1, E2 and I were all working on multiple different projects during the creation process, the time for intense development and goal-oriented productization of the device was limited. Because of this, the options for customizing the device for the needs of limited (already existing) clientele acquired from earlier contracts and interactions were discussed and reflected upon. Furthermore, the need for mass-production was deemed insignificant due to limited time and resources. This led to the ideas of marketing the device both as a product and a service, depending on the context, and the unique needs and technical systems of the potential clients.

The causal perspective emphasizes planning and utilization of existing knowledge in order to avoid contingencies and their effects. Existing knowledge, mainly technical expertise, was utilized in the creation process to a significant extent. However, this knowledge was used in creating the device through experimentation, not for predicting potential events in the process. Knowledge and expertise can be viewed as factors that reduce the need for planning and prediction, which is, in my view, an interesting feature in this particular case.

4.2.5 Predicting or controlling the future

When the initial solution was developed for the client, the acknowledged need for predicting the future was nonexistent. This is due to the fact that the commercial potential of the solution was not explicitly expressed, and the need for further development was neither required nor evident. However, as the ideas regarding the improvement occurred to E1 during the year-long period for which the first solution was operating in the client's production plant, the notion of productization also included the possibility of prediction.

When reflecting upon the events of the observed creation process, the examples provided in the other categories of effectual and causal principles strongly point towards non-predictive control, which is a cornerstone of the effectual construct. The emphasis was on experimentation, affordable losses and gradual expansion rather than on calculated choices, expected returns and investments.

Furthermore, E1 was completely in control of the choices regarding the further development of the device. These choices included potential productization, acquiring new clients, and also the technical improvements and modifications regarding the device, among others. As the client was satisfied with the solution (and further improvements to it), the initial development was covered and funded completely.

E1 acknowledged the need for references and gradual expansion of clientele. He emphasized that potential clients needed to be assured of the usefulness of this type of solution as he viewed that they might attempt to solve similar problems in other insufficient ways or ignore them completely. However, as there was no certain knowledge about this, making custom versions of the device or marketing it as a service were discussed and considered.

At no point of the observed creation process were the events of the external environment in terms of the industry's market or competition explicitly taken into account, reflected or considered. As the main focus was on technically developing the device and potentially marketing it to existing clients, the process could be constantly controlled and affected regardless of external events. The choices of E1, E2 and I, and our suggestions as well as other input were the factors that affected the development and the future of the potential new product the most.

4.3 The effectual nature of the overall process

In this section I compare and contrast the observed creation process to the theoretical effectuation process in order to explicate the similarities and characteristics that can be connected to the construct of effectuation. The approach employed utilizes the interview data acquired from E1 and E2 and my impressions of the creation process and its characteristics. Having been able to longitudinally observe the process provided significantly more understanding of its characteristics and its nature than only observing certain events of it.

This section is provided in order to further validate my claims of the manifestation of effectuation in the observed creation process. In my view, it complements the comparison between real-life events and the dimensions of the causal and effectual constructs by comprehensively reflecting on the overall observed process rather than pointing out certain events from it. Furthermore, I was able to incorporate the views of the focal stakeholders to the analysis to ensure that the creation process was viewed from other perspectives than mine.

The creation process observed and analyzed in this research emerged from solving a client's technical issue. The solution was crafted by employing the means available to E1. These means included technical expertise, understanding of the client, existing tools and components, and people with necessary skills to assemble the initial solution among others. According to the effectual process, employing the available means results in having several potential goals or courses of action. In this creation process, available means resulted in a tech-

nical solution, but also in the realization of further developing the solution into a potential product. Furthermore, employing existing means enabled having multiple overlapping and simultaneous projects since the need for resource accumulation decreased.

According to E1, the underlying technical solution behind the device occurred to him “probably several years ago because of a need for solving a similar issue” and that “it was implemented now because the opportunity presented itself”. When I asked about this what he meant by this opportunity, he referred to the fact that the improved device could be tested on-site and that the client paid for the development as the device was provided for their needs.

The device was developed for the particular hydraulic system in the particular manufacturing plant. E1 wished to utilize the idea behind the device in other contexts as well. When I asked him about whether he could point out the origins of the initial thoughts of making the device into a product he answered that he “aims at turning everything into a product” and emphasized that it is “commercial thinking” and “constantly thinking how things could be capitalized on”. This type of entrepreneurial thinking was combined with available means in the creation process.

In addition to developing the underlying idea behind the solutions, interactions with E2 and me also resulted in technical improvements and ideas regarding the development of the device and the product creation process. E1 viewed these as “new versions” and told me that ideas such as the one that led to the creation of the device are refined as new several people are involved and bring new ideas to the process. These interactions can lead to stakeholder commitments in effectual processes.

Becoming a stakeholder in an effectual process also results in collectively shaping the goals of said process. In this case, the options of further considering productization, as well as continuing the development of the device for new clients were discussed when E2 and I agreed to become intensively involved in the process. Our expertise and views affected the process and its outcomes.

In this creation process E2 and me committed to shaping the process after interacting with E1 who presented the idea of improving the device. We committed to product development with our time and expertise and our input provided thus provided new means and goals to the creation process. E2, for example, presented the idea of the electrical automation and knew the electrician who could assemble such a technical solution. He then consulted the electrician who did the electrical work according to the wishes of E2.

Through our involvement and contribution, the resources available for the process were increased. Simultaneously the potential losses from a failed or discontinued project were kept at a minimum, which was one of the factors increasing flexibility. Furthermore, it also allowed experimentation and contingencies that could be capitalized on. When I asked E2 about the origins of his ideas regarding the development of the device he told me that he often contemplates different matters in order to develop them further and that experimenting with different versions and options is enjoyable. This mindset, in my view, adequately reflects his attitude towards the creation process as well.

As stakeholder commitments generate and provide new resources for the effectual process, they also create limitations on the commonly created goals. During the observed creation process there were only two stakeholders in addition to E1: E2 and me. I view this as a matter of resources and time, since managing a larger group of stakeholders would potentially require a significant amount of both. Furthermore, as the potential losses were kept to a minimum and the creation process remained flexible, this type of constraints in the early stages of the creation process could have negatively affected its further development.

The key limitations generated by E2 and I were, in my view, related to time in terms of managing our time between different projects, and to the further productization aspects of the created device. Since we had limited time for the purposes of the creation process and our efforts towards productization, product development and initial client accumulation generated the results they did, the creation process was shaped accordingly. The involvement of E2 and I resulted in the creation of goals related to potential productization; our commitments and actions affected and shaped those goals as we considered different options for customization, product or service design, and client accumulation.

The creation process resulted in a functional device, a new product to be marketed to clients with similar problems as the one who bought the initial solution and paid for its consequent development. The above-mentioned added means and goal-affecting factors combined led to this particular result, which is also viewed as the outcome of an effectual process: existing means were transformed into a new product through the decisions and actions of E1, and through the commitments and actions of E2 and I.

5 DISCUSSION

In the discussion part of this thesis, the findings and the contents of the analysis are discussed. The results of the analysis are summarized and they are addressed from the perspective of existing theoretical contributions to effectuation research. The practical aspects of the creation process are addressed, and my views on the potential of effectuation and its pragmatic applications in different settings based on the findings of this study are considered and elaborated. Furthermore, the implications of the findings on existing effectuation research are considered.

5.1 Effectual dimensions

When analyzing the creation process and its events, it became evident that the dimensions of the effectual construct were manifested in that process. Furthermore, the events in the process were clearly characterized by features of effectuation processes rather than those of causation processes. Thus, as the process appears to demonstrate effectual action, it seems justified to discuss the elements of effectuation in it.

Sarasvathy (2001a; 2008: 81, 101) views that the means that effectual entrepreneurs begin with can be divided into three categories: their identity, prior knowledge, and social network (who I am, what I know, whom I know). In her seminal paper on effectuation (Sarasvathy 2001a) she further divides these means according to levels (individual, firm, economy). Identity, knowledge and networks are the entrepreneur's means on an individual level. Firm level includes physical, human, and organizational resources. Furthermore, the level of economy includes demographics, technology regimes and sociopolitical institutions.

In an action research setting such as this, the level of economy is the macro level and difficult to analyze. Individual and firm level means, however, can be reasonably observed and confirmed. In this creation process, the means that E1

began with can be defined in terms of identity, knowledge, and networks, as pointed out in the analysis. Furthermore, the analysis illustrates that when examining the firm level, physical, human, and organizational resources were all utilized as means in order to promote the process.

Read et al. (2009: 582) illustrate the means aspect by providing more concrete details (see Table 2) for relevant means when starting a new venture.⁶ This type of detailed description of potential means can be useful in concretely illustrating what can be assigned into the three categories. However, my view is that it can often fail in taking into account the different types of startups, industries, entrepreneurs and entrepreneurial teams. Diversity often renders such listings partially unusable, as they are only partially applicable to most situations and contexts. That being said, they can still be significantly useful when understanding and analyzing the means dimension of the effectual construct, and that is the reason why the process was contrasted to that listing as well.

Who I am	What I know	Whom I know
Capital*	Entrepreneurial experience*	Entrepreneurial parents
Assets*	Industry experience*	Friends in the business*
Technological capabilities*	Functional area experience*	Business network*
Internal R&D investments*	Partner expertise*	Number of university links
Business-related patents	Human capital*	Social capital*
		Network capabilities*
		Firm size*
		Team size*
		R&D partnerships*

Table 2: Three aspects of effectual means elaborated by Read et al. (2009: 582). Those relevant to the analysis and the events of this creation process have been marked with an asterisk (*).

Understanding the means that were potentially used as the starting point of the process can be very difficult for researchers with limited knowledge of the observed subjects and entities. I benefited greatly from knowing E1 and E2 and their ways of operating even before this particular creation process began and before the beginning of this research process. Even still, understanding how the initial solution, the prototype of the device, came to be through existing means, took time and detailed analysis of the events.

The means, especially when related to the focal entrepreneur, are highly individual and often tacit. Therefore, the ways of understanding, observing and confirming those means are multiple depending on research methodology and conventions. For example, confirming entrepreneurial identity in an action research setting is highly different than in, for example, think-aloud experiments or interview studies.

In this research the emphasis was on actions and observed behavior rather than understanding the identity of the entrepreneur, but the identity aspect was

⁶ I obviously acknowledge that this research is about new product creation rather than new venture creation, so not all of the means might be relevant from that perspective. However, in my view, most of them are.

and should be taken into account as well. As Sarasvathy (2008: 80) puts it: “identity allows us to construct our preferences when preferences do not exist”.

In addition to knowing E1 and his entrepreneurial mindset, I confirmed at least some traits when interviewing him, as he told about the background of the conception of the device. However, the methods for conclusively exploring the effectuation-related entrepreneurial identity are beyond the limitations of this research.

The second effectual dimension, focus on affordable losses and downside risk, is key to generating multiple potential outcomes and allowing experimentation (Sarasvathy 2001a). As pointed out in the analysis, this particular dimension was manifested in the reality of this SME product creation process in various ways. Furthermore, the causal counterpart of maximizing potential short-term returns never occurred in discussions, planning, or action during the observed process.

As an observer, researcher and stakeholder, the affordable loss dimension was the most evident in its manifestation to me. This was partly because of the complete lack of its causal points of comparison, but mostly because experimentation and incremental development were so clearly present throughout the observed creation process. Furthermore, the financial investments and development decisions made during the process always seemed to include and accept the notion of potential failure, which led to eliminating downside risks.

Chandler et al. (2011) view that the affordable loss principle is manifested as the entrepreneur allocates additional resources to the creation process when experimentation yields results. In this case, understanding the potential of the improved device led to investing time, work and some money on its further development and exploration of the productization aspects. Furthermore, it was experimentation that initially led to the discovery of the solution itself, and that solution was incrementally improved over time.

The stakeholders of the creation process were also acquired from as close as possible: among existing clients, contractors and personal networks. This is exactly how Sarasvathy (2008: 88) describes the affordable loss principle to manifest itself. Regional actors who were also acquaintances, business partners and subcontractors provided ways for limiting losses, enabling informal discussion and planning, and allowing experimentation.

Affordable loss and experimentation aspects of effectual action are highly interesting to witness in a real-life setting. In my view, they resemble the everyday problem solving and creative experimentation of people with limited resources, and entrepreneurs are no exception. I claim that manifestations of the affordable loss dimension can be good indicators of other effectual dimensions and effectuation processes, because affordable loss can be related to not only experimentation and risk, but also to contingencies, cooperation, and control (Sarasvathy 2008: 89).

The third dimension of the effectuation construct emphasizes strategic alliances over competitive analyses (Sarasvathy 2001a). Again, as with the affordable loss dimension, the causal aspect of competitive analyses was distinctly

absent when analyzing the events of the observed creation process. On the other hand, E1 got precommitments from focal stakeholders (E2 and me), and made a strategic alliance with the initial long-term client in order to ensure the continuation of the device's creation and development.

As explicated in the analysis, all of the alliances and precommitments in the observed process had effects on the goals of the creation process. These effects include the ideas related to the technical development of the device, different alternatives for productization, product testing and development in an authentic setting, ensured funding for additional development, and attempts of expanding the initial clientele, among others. Furthermore, the initial precommitments of E2 and I ensured that the process began to advance from the stage of problem solving to potential product development.

Sarasvathy (2008: 89) connects this principle to the one of affordable loss as strategic alliances and precommitments reduce the need for making significant financial investments. This was the reality in this particular creation process as well. The financial investments were kept at a minimum level throughout the observed process, which can also be seen as a manifestation of both principles.

I was able to witness how the alliance with the initial client significantly reduced uncertainty regarding the creation process and enabled flexibility. Furthermore, the initial client formed a potential customer segment to expand upon. This process of gathering customers and partners was virtually identical to the one described by Sarasvathy (2003) as an example of precommitments, alliances and risk-reduction. Sarasvathy (2003: 208) underlines localized possibilities and incremental development through contingencies as a starting point for effectual processes and client acquisition. This is exactly what occurred in this creation process as opposed to the causal optimization from predetermined goals.

The fourth effectual dimension, exploiting contingencies, was most likely first manifested as the initial solution for an existing client's problem was seen as an opportunity for new product creation. The dimension is related to flexibility and remaining flexible in actions and reactions (Chandler et al. 2011), which was ensured by the choices and actions of E1 throughout the observed process. The analysis of exploiting environmental contingencies, however, can be challenging, as processes can either include them or the focal entrepreneur can be prepared to them in spite of their absence.

In this action research setting, the fourth effectual dimension could be confirmed mostly through observing the creation process and the other effectual characteristics manifested in it: flexibility and affordable loss are strongly connected on the level of action, and so are flexibility and experimentation. However, as pointed out in the analysis, some contingencies and their exploitation could be observed from the creation process.

Furthermore, it can even be argued that the whole creation process began because of contingencies. Sarasvathy (2008: 90) views that entrepreneurs are able to leverage unexpected events in order to gain control of the situation. She also connects the principle to the incremental nature of planning and advancing

through contingencies, both of which can be regarded as characteristics of the observed creation process. Another way of putting this is as follows: "Given specific means, choice of effect is driven by characteristics of the actor and his or her ability to discover and use contingencies" (Sarasvathy 2001a: 251). This is exactly what happened in the observed creation process.

In an entrepreneurial team and an SME context the flexibility aspect seems more self-evident than in the context of larger corporations. While the focal entrepreneur is obviously in a key position in terms of flexibility, reaction, and exploiting contingencies, the manifestation of contingencies is not always certain. Should contingencies occur, determining them as such is most likely easier in retrospect rather than in real-time, whereas determining the flexibility of a creation process can be done as the process advances. However, if all unexpected and surprising events are labeled contingencies, then contingencies are obviously evident, and it is the entrepreneurs' reactions to them that should be observed and analyzed, not the contingencies themselves.

The fifth dimension of effectuation, the logic of control, could also be seen in the overall observed creation process rather than single events of it. As Sarasvathy (2001a) puts it, the logic of control is applicable when the effectual entrepreneur actively shapes the future with committed stakeholders. This, like actions according to the other four effectual principles, reduces risk and uncertainty.

Sarasvathy (2008: 92) emphasizes the effectual entrepreneurs' disregard for predictions and the way control is achieved through experimentation, flexibility, leveraging, and cooperation. The principle underlines that entrepreneurs focus on the controllable aspects of an unforeseeable, unpredictable future by actively and incrementally gaining control of the things that benefit them (Sarasvathy 2001a).

When analyzing and confirming the manifestation of the logic of control in the observed creation process, it became clear that the logic is truly manifested in all dimensions of the effectual construct. Their interrelated nature made the initial confirmation challenging and recognizing the aspects of the logic somewhat difficult. However, as the creation process advanced and the observations generated increasing amounts of data, it became clear that the logic of control was employed and manifested in the process.

As I reflected on the past events of the creation process I understood the embedded logic of control from two distinct features. The first was the lack of prediction, which was evident from not only the manifestation of other effectual dimensions, but also from the interviews and the conventions of the creation process. The absence of the causal counterpart of the dimension was strikingly clear, whereas the characteristics of the effectual dimension were visible.

The second was the incremental nature of the different aspects of the creation process such as stakeholder acquisition, experimentation, and product development. All of these events emphasized the logic of control as *KE1* and we stakeholders actively controlled their course, and prediction was ignored in both planning and execution of plans.

5.2 The process view

In addition to the five principles of effectuation and causation, the dynamic model of effectuation was an invaluable tool in observing, confirming, and analyzing the creation process in this research setting. Despite my initial aims of comparing and contrasting the creation process and its events mainly to the five principles, I later understood that by including the process view of the theoretical construct I would gain new perspectives, deepen my understanding, and improve the analysis of the process. Furthermore, the process model was highly useful in compiling a coherent impression of the events and in illustrating their effectual characteristics.

I connected the effectual characteristics of the dynamic model to the observed real-life creation setting in the analysis section of this thesis. Here, my aim is to discuss different aspects of this process view and their implications on the observation phase of this particular action research setting. These concepts and ideas occurred during the observed process and its analysis.

The observed creation process, when contrasted against the ones presented by Sarasvathy (2008: 101-121) and Wiltbank et al. (2006) and elaborated in both texts, includes notable similarities, such as the structure of the process cycle and features in individual events that resembled the examples provided in theoretical texts. This type of comparison, however, became possible only after the process had reached a certain point. In this case, that point was when initial stakeholder commitments (the initial client's agreement to further development of the solution, and the commitments of E2 and I) were made. Since the process had evolved and progressed according to the dynamic model of effectuation, it made sense to continue reflecting the events against the model in order to understand the process better from the perspective of effectuation.

The comparison of a real-life creation process and theoretical process descriptions is obviously not devoid of issues. For example, are there "clear" effectual processes without any causal characteristics? Sarasvathy (2001a) posits the view that effectuation and causation are overlapping constructs, but what are the implications of this view on observing and analyzing creation processes as they are underway? The particular process observed in this thesis included effectual characteristics from all the theoretical dimensions of effectuation, but more ambiguous and unclear processes can occur.

My claim is that the significance of understanding the different parts of the effectuation process and their relationship in terms of progress is essential when analyzing a real-life, real time creation process from this perspective. When combined with understanding the core principles of effectuation and causation, the researcher (or any type of observer) can combine sets of characteristics from the process in order to determine whether effectuation or causation (or both) occur in the process and in what stage the process could be when compared to theoretical underpinnings.

According to the effectuation process, the ultimate result is a new market, a new firm, or a new product (Sarasvathy 2001a, 2008: 15; Wiltbank et al. 2006). It must be mentioned that the results of the observed creation process are am-

biguous in this sense, as the development of the device into a product was not definitively concluded. On the contrary, the goals of the device's productization were left open due to the high level of potential customization of the product according to customer needs, the needs of the existing clientele at that particular point of the creation process, and the number of other ongoing projects. While this can still be viewed as being consistent with the construct of effectuation and the effectuation process, it has implications on the research setting and the practicalities of research design.

Sarasvathy (2008: 15) views that an effectuation process is aborted if the resources, networks and common goals do not result in the conception of a new market and a new venture. According to that definition, the analyzed creation process could be viewed as aborted from the perspective of this research, since it did not result in those artifacts when the observation period was concluded. However, the realities of the creation process illustrate how ambiguous such processes can be, and how they can still be analyzed and observed in search of effectual characteristics.

There are probably few researchers who have the time and the resources to observe the actions of an SME entrepreneur and focal stakeholders in a longitudinal research setting, let alone action research setting, with the goal of simply confirming the manifestation of effectual and causal constructs. Furthermore, the aspect of facilitating and assisting effectual processes is affected by extensive time periods as well. Time can be viewed as a contingency for entrepreneurs with multiple projects or ventures underway, but the effects of prolonged creation processes must be taken into account in effectuation research design.

When interviewing E1, I asked him about the time frame of the process. His view of having two devices (the initial solution and the improved device) within two years and developing the concept even further was relatively fast-paced. To me, this was a welcome reminder of the relative nature of the duration of different processes and how they are conceived; for a single-case research process the duration can be seen as a limitation but in terms of creation there simply are no rules.

5.3 Observing, analyzing, and understanding effectuation

5.3.1 Notes on observation and its conventions

Observing effectuation from behavior, actions and verbal output of different individuals is ambiguous, context-dependent, and highly affected by the characteristics and competencies of the observers. In a qualitative research setting there is most likely always something that either cannot be observed, and something that will be omitted from the observations due to a myriad of reasons. My observations from this creation process and this particular research setting were unique like all others, but I will attempt to illustrate some particular features that might benefit future research around similar topics. I already mentioned the difficulty of real-time observation in an action research setting.

Some of the practical and methodological issues are addressed in the next section, where I evaluate the action research. Here, the issues I will discuss are related to understanding and observing effectuation in particular.

Sarasvathy's (1998; 2001a) seminal research, which led to the discovery and theoretical creation of the effectual construct, was about a set of think-aloud problem-solving tasks. The verbal output was qualitatively analyzed and common elements derived to later form the dimensions of the effectual construct. In this research, analyzing and interpreting verbal outputs was only one of the research methods, the main method being the longitudinal observation of actions and interactions. Analyzing the data collected through observation provided, in this case, evidence that the observed process contained the elements of effectuation and that the process resembled the model of the effectuation process. Furthermore, the research process generated insight on what types of things could be emphasized when observing creation processes in search of effectual and causal characteristics.

The emphasis of data collection was on actions rather than discussions, even though verbal output was also employed when triangulating the data for analysis. This was a conscious choice, since my aim was to find traits related to effectuation and causation in the context of SMEs and entrepreneurial teams. The ambiguity related to analyzing and observing behavior is not surprising to me, but there are some aspects in this type of observation that I wish to discuss.

In order to observe effectual characteristics, the observer or observers must obviously either be physically present or employ methods such as video cameras or other recording devices. Being present is understandably preferable, since it enables interaction so that the observers can get a clearer understanding of the decisions and actions of the observed people. However, depending on the detailed aims of the observation and research, the practicalities of the observation must be planned and defined in advance.

Should observations include discussions between the focal entrepreneur and potential stakeholders, clients or everyone who is related to the project in any way? Is it practical or even ethical to continuously observe behavior as a researcher in hopes of finding effectual features? Should the stakeholders be included in the observation only after definitive, goal-shaping, or binding commitments have been made? These are some questions that need to be answered in the planning phase of potential observation.

The observation period is difficult to determine in advance, since the creation processes can greatly vary in terms of length and development. In a multi-case research setting it could be reasonable to observe the early stages of potential creation processes, attempt to discover effectual and causal characteristics, and then continue observation on the cases that initially included effectual features. Even then, the nature of the observation cannot most likely be continuously as intensive as in the action research setting of this particular research.

Because of the varying lengths and characteristics of creation processes, and the difficulties of interpreting actions and interactions, the data collected through real-time observation does not immediately provide answers or clarity regarding the (effectual or causal) characteristics of a single creation process. Retrospective combining and analysis of collected data is essential in under-

standing effectual and causal characteristics, as those characteristics can be manifested as combinations of details that seem initially insignificant. It is risky to definitively categorize events immediately as they occur, as it can lead to oversimplification, generalization and even falsification.

When considering this particular research setting, the first effectual characteristics that appeared through observation and data collection were starting with available means and limiting downside risk (affordable loss). According to the effectuation process, the means aspect should most likely manifest itself in the earlier phases of creation processes, but ambiguous processes can include other dimensions in various orders. In those cases it is easier to compare the events to the dynamic model of effectuation in search of similarities.

5.3.2 Analysis of data for effectual and causal features

The analysis of data collected through observation in an action research setting includes the obvious possibility for biased analysis by the observer and the researcher. This bias can be reduced by diligence and integrity during the observation phase, and by attempting to understand the pieces that make up the effectual or causal characteristics in the analyzed creation process. When analyzing the process within this research setting I benefited from the multitude of manifestation of different effectual characteristics. Furthermore, the absence of causal counterparts made confirming dimensions of effectuation easier.

However, as with several types of qualitative research, there are issues in determining the level of detail of the analysis in effectuation research as well. Observation leads to detailed data, which can suggest and provide important details about the effectual and causal characteristics. This type of detailed data is either useful or mundane, depending on the aims of the research. In understanding effectuation and causation in the actions of individuals, detailed and rich data should be useful for the purposes of analysis.

In the context of this research, I initially (and somewhat naïvely) imagined the events to unfold in such a way that actions could simply be categorized according to their effectual and causal characteristics. As the observed creation process progressed, I began to understand that many of the events of the process could only be analyzed in retrospect, as their characteristics only became coherent and understandable when connected to other events. This led to the realization that in addition to the real-time observation and analysis of events for effectual and causal elements in an action study setting, retrospective analysis is essential for understanding those elements, and, furthermore, the potential effectuation process.

Effectual principles could be derived from individual events and instances of the creation process. However, a more holistic analysis is also required in order to comprehend the actual creation process and its effectual features, and connect those features to the effectuation process, which, in turn can be contrasted against the real-life setting. Events and actions are interconnected, patterns of effectual features can be derived from data, and unexpected events can sometimes be deemed unexpected (and then exploited) only after a period of time. Definitive moments when effectuation or causation is clearly manifested

can probably occur, but comprehensive analysis must not assume this to automatically happen.

When analyzing effectual and causal characteristics in the creation process, I employed similar methods as those who had analyzed new venture creation processes from the perspective of effectuation before. These researchers included Sarasvathy and Kotha (2001), Harting (2004), and Harmeling et al. (2004). They compared the perceived real-life processes to effectual and causal constructs, and listed decision events and semantic chunks that were related to either construct. This yielded results in my research as well and I was able to deduct that effectuation was in fact manifested in the observed process. Furthermore, I gained insight into analyzing effectuation from a process that I could observe myself rather than retrospectively analyze solely secondary written data or primary interview data.

Observation enabled the analysis of focal stakeholders and their actions, impressions and thoughts related to the process. Chandler et al. (2011) suggested this type of analysis as a way of increasing knowledge and improving effectuation research settings. My impression, based on this particular research process, is that this type of analysis can generate deeper understanding and more detailed knowledge of effectual and causal characteristics. The roles of different actors and their implications on the events and results of the process seemed to align with the theoretical dimensions of the dynamic model of effectuation. However, the relationships between different causes and effects are not always clear, and analyzing the process requires rigor and clear guidelines, which should be determined in advance.

After connecting the events of the creation process to the theoretical dimensions of effectuation and causation, other scales, such as the one suggested by Chandler et al. (2011) in their validation study, can be utilized in further examining the manifestation of effectuation and causation. Despite this type of analysis being retrospective in nature, it could still be employed to complement other ways and perspectives from which the collected data can be analyzed. These measures could also combine the aspects of real-time observation and retrospective analysis, and thus complement the comparison to the theoretical constructs of effectuation and causation. Furthermore, such scales can be used in structuring interviews or questionnaires to the focal stakeholders.

Other theories and frameworks, such as bricolage, can be used in facilitating entrepreneurial action, and they can complement the effectual construct in enhancing and improving action. That being said, the manifestation of effectual characteristics does not exclude other theoretical perspectives in facilitation, consulting, or even research. Collected data from creation processes can be analyzed from other theoretical perspectives as well in order to increase knowledge and understanding.

Sarasvathy (2001a), Wiltbank et al. (2006) and other effectuation researchers also present concrete examples of effectuation manifested in practical venture settings. The utility of these from the perspective of analyzing collected data lies within their ability to illustrate effectuation and causation. Ultimately, however, interpreting and categorizing events according to their effectual and

causal characteristics is the responsibility of the researcher, or researchers, in individual research settings. This, in turn, affects the outcome of the research, and triangulation in analysis and interpretation could be employed to decrease personal bias.

5.3.3 Effectuation in human action

What is the practical contribution of understanding and confirming the manifestation of effectuation in a creation process? What should be done with the information generated through an action research setting? When I began planning this research, one of my aims was to gain knowledge and understanding on the practical application of pointing out effectual characteristics in real-life settings. One of the perspectives is that of facilitation and consulting entrepreneurs and aspiring actors so that they could benefit from acting according to the principles of effectuation and the effectuation process.

Collecting detailed data can be useful in facilitating effectual processes, as it further increases understanding of the creation process. Participating in the process either as a stakeholder, a facilitator or an independent consultant could enable positively influencing the process, enabling learning and increasing knowledge. Naturally this requires skills and in-depth knowledge of the theoretical dimensions of effectuation and their manifestation in practice, and the effects can also be negative.

However, I believe that effectual entrepreneurs, entrepreneurial teams and ventures would benefit from recognizing effectual characteristics in their behavior and actions, and from reflecting their actions against the principles and the dynamic model of effectuation. Whether or not effectuation has positive effects on performance is beyond the limits of this research, but I claim that its effects on experimentation and incremental growth are useful and worth experiencing.

Furthermore, can expertise be taught? Gradual development of skills is credible, since people seldom wake up one day as experts. Which elements of effectuation can novices facilitate? Can they even be learned through teaching or should they be learned through action? As these questions indicate, there are still numerous facets of the theory that can be explored and discovered through the practical application and manifestation of the effectual construct.

It could be claimed that this research is not even compatible with the current research streams of effectuation. SMEs are not represented extensively in previous research reports and the expert entrepreneur definitions have been derived from sampling successful millionaire businesspeople. However, because not everyone who aspires to become an entrepreneur becomes a serial entrepreneur⁷, even the first entrepreneurial processes and their first steps are highly important in understanding entrepreneurial behavior. In such cases, understanding effectuation and the benefits of acting effectually could have a significant positive effect on new venture creation and entrepreneurial thinking. Increasing knowledge about effectual processes and facilitating creation pro-

⁷ This is true especially in Finland, where it is often argued that becoming an entrepreneur is unrewarding and risky because of several reasons, such as taxation, social security and even the common attitude.

cesses from the perspective of effectuation has potential in the SME context as well.

This research contrasted causation and effectuation in order to point out potential effectual dimensions and characteristics from a creation process. Reflecting on the practicalities and further utilization of the insights gained through this research process, however, I asked myself whether contrasting causation and effectuation is the best method when facilitating effectuation. In analysis such as this it is important to acknowledge and know the characteristics of both constructs, but is it ultimately so that the focus on effectual characteristics and facilitating them is best justified?

The duration aspect must be addressed here as well. When facilitating effectual creation processes, the focus could be on certain phases of a process, or effectuation researchers or consultants could regularly assess the process and its characteristics in order to improve them. As the seemingly straightforward and simple, small-scale creation process observed and analyzed in this research lasted for several years and is still ongoing on some levels, it can be imagined that larger-scale venture or market creation processes can take even longer. In order to increase knowledge of effectuation and its manifestation, let alone increasing or influencing effectual traits and characteristics, a solely retrospective approach is insufficient.

Tolerating failure and uncertainty is one of the important aspects enabled by effectual behavior. As Sarasvathy and Read (2005: 16) put it: "The end product in effectuation is fundamentally unpredictable at the beginning of the process." This is, in my view, exactly why analyzing and examining an ongoing process and affecting it is highly rewarding and interesting. Concentrating on the downside risk rather than expected returns enables more options and possibilities for experimentation, and helps limiting losses. Observing and analyzing creation processes can result in recognizing this type of practicalities, and such traits can also be facilitated and enhanced. Selection between (or creation of) multiple opportunities, creating new ones, and failing early are truly intriguing aspects of effectuation, and can benefit both startup entrepreneurs as well as experienced corporate actors.

5.4 Implications on future effectuation research

Based on this research process, I share the views of Perry et al. (2011) about the analysis of stakeholder interactions, and highly recommend the observation and analysis of the effectual network related to the process as a way of increasing knowledge. This type of research method is challenging and laborious, but also highly rewarding. Furthermore, it complements understanding on the stakeholder commitments and strategic alliances, and it can illustrate the perspectives of other focal actors than the entrepreneur.

It would also be interesting to see effectuation and causation analyzed in an action study research setting in, for example, an idea competition where the actions and decisions of competing teams could be analyzed in real-time. De-

spite this somewhat differing from authentic entrepreneurial creation processes, it could still offer new insights of effectuation in action. Furthermore, it is closely connected to Sarasvathy's (2001a) original thought experiment, only with decisions manifested into actions. Therefore, the initial effectuation research design still has its benefits in terms of yielding and analyzing results.

This research does not present proof of conclusive connections between effectuation and performance. What should be noted is that the creation process presented potential, which can later transform into positive results. However, this potential is highly subjective and context-dependent. Future research could address and examine the connection between aspiring entrepreneurs and the success of their endeavors according to their actions from the perspective of effectuation and causation.

The context of this research was a creation process in a small business, where the focal stakeholders were subcontracting entrepreneurs and coworkers, and an existing client. I wish to emphasize the notion that future effectuation research, in order to truly reach its potential as a theory that can shake the existing entrepreneurship paradigm, must address the aspiring entrepreneurs, small business owners and entrepreneurial teams with experienced entrepreneurs on all industries. By that, the theory would address a wider variety of creation processes than from what it originated and its characteristics could be researched and observed in virtually unlimited contexts.

6 EVALUATION OF THE ACTION RESEARCH

In this section, my aim is to evaluate this action research setting and its characteristics for several reasons. I wish to illustrate the progress of designing, redesigning and modifying the research setting as the observation period advanced. I also wish to assess the quality of the action research conventions and issues related to the practicalities and conventions employed and manifested in the research process. Furthermore, I regard evaluation as a way of enhancing my own learning and understanding of both the research process and the subject of this research.

6.1 The course of the action research process

This action research process can be summarized as follows. The first steps were the initial planning of research methodology and deepening my understanding of effectuation and effectuation research. As I wanted to understand the potential manifestation of effectuation, I selected the dimensions of effectuation as the main point of comparison. At this juncture, I selected action research to be the research method and began exploring its conventions and details. As the creation process, which I wanted to observe, was already ongoing on some level, I needed to determine my own level of involvement and my role as a researcher. Furthermore, I developed and selected the initial tools and methods for observation.

When I began observing the creation process while being involved in it, I attempted to collect data by keeping notes and comparing observed events to the theoretical dimensions of effectuation. This was successful, but it, along with understanding the need for continuous evaluation of the action research during the observation period, also led to the realization that another point of comparison would benefit the aims of the research and further improve the quality of the observation. This is why the dynamic model of effectuation was employed in the analysis during the observation period in addition to the principles of effectuation.

I attempted to develop my data collection methods during the observation process in order to gain a better understanding of the characteristics of the process and in to improve the quality of further analysis of its events for causal and effectual characteristics. I also realized that in order to understand some characteristics of the process, real-time continuous observation needed to be complemented with retrospective analysis and combination of features of different events. This realization led to the implementation of a more diverse way of analysis and observation. The modifications on observation conventions were planned and put into effect, as the observation period was ongoing.

After over six month of observing the process, I interviewed the focal entrepreneur and stakeholder. I had initially planned second interviews to take place at the end of the observation period, but the analysis of actions and events had yielded results, which, in my view, rendered the interviews unnecessary at that juncture. The semi-structured interviews were designed and executed during the observation period.

After almost a full year of observation, when the observed creation process had reached a stage where it went into hiatus, the observation phase was concluded. At that point it had presented evidence of effectual characteristics based on the continuous analysis of the collected data. This analysis was then complemented with retrospective analysis of the events and the data collected of them through observation. Furthermore, the observed process was holistically viewed from the perspective of the effectual construct and the dynamic model of effectuation in order to increase understanding and to illustrate the process in an adequate way.

The action research process was continuously evaluated, and the final evaluation was conducted when writing the research report. This evaluation is the amalgamation of the different instances of evaluation that occurred during the research process.

6.2 Discussion on action research conventions

Eriksson and Kovalainen (2008: 201) elaborate the conventions of action research evaluation as follows: "Evaluation most typically focuses on actions taken during the research process, and implemented." I also used this description, as it is the most practical way of evaluating the process from the perspective of my own actions regarding research design, implementation and modification. Here, I address some issues that affected the action research process and the research setting in this particular research.

Only as the observation period of the action research setting was ongoing did I truly realize the need for constant evaluation of the action research, its conventions and its quality. The reality of the research setting and my aims for the research led to the understanding that action research is much more dynamic than several other types of research settings. Furthermore, the theoretical aspects and underpinnings of the research need to be continuously assessed and evaluated as the action research process advances.

As I mentioned in the discussion section of this thesis, I initially had a conception that I would be able to recognize events and phases in the creation process that would clearly resemble the effectual construct or include effectual characteristics. However, the reality is much more ambiguous. When determining the manifestation of theoretical principles such as effectuation and causation great caution must be employed when designing the action research. Furthermore, intensive involvement and observation do not automatically lead to the discovery of certain characteristics from human action. The role of the researcher is crucial but very demanding and difficult in this sense.

When planning the research and when beginning the observation period and I had a notion of looking at the “turning points” and events of the process and then categorizing them into causal and effectual categories according to their characteristics. During the observation period it quickly became evident that this would be impossible since the events could only be analyzed to such extent in retrospect. The most useful and applicable way of analyzing the data collected of the observed events was to reflect the characteristics and details of those events to the causal and effectual constructs, and the dynamic model of effectuation for similarities and differences, both real-time and retrospectively.

Despite the perceived negative effects of retrospective analysis, such as heightened possibility for distortion and false categorization, I claim that real-time and retrospective analysis are both required in similar action research settings in order to outline the events and to analyze, clarify and report them in a comprehensive way. Rigor in data collection and determining the level of involvement and the role of the researcher (and adhering to that selected role) is crucial and requires continuous evaluation of own actions and the research setting.

Categorized principles, such as the ones within the effectual construct, are dangerous in the sense that the mind of an observer or an analyst can “bend” certain events and characteristics of the process into these categories and not address them critically enough. This is especially true when addressing said events in retrospect. That retrospective bias was also present in this research and being involved in the process obviously involves the subjective aspects on the categorization of events. This will most likely occur in all action research processes, but it is important to acknowledge it and attempt to decrease its effects. I addressed this also in the methodology section of this thesis.

One of the ways of eliminating retrospective bias and understanding my own role and effects on the process could have been a more thorough and ongoing reflection of my own actions. This was not overly systematic in this research process in terms of logging and data collection, but rather regular reflection related to the events of the creation process. However, in future action research settings, I would definitely design a more systematic approach for continuous self-evaluation.

When evaluating the data collection and logging methods, I cannot help thinking that the methods that were employed for the purposes of this research were relatively primitive. I used a notepad because of its versatility, but mostly because I would regularly use it to make notes about other things than those that were related to this research process, and that made it a subtle and discreet

way of recording my observations and thoughts. This is also why I did not want to use video cameras, audio recorders or such equipment during the observation period, as I believe that E1 and E2 would have behaved differently during the creation process.

The informal nature of our meetings related to the creation process also affected my logging. I would suggest similar discreet logging methods for action research in effectuation in other research settings as well. However, the data collection for this research would have most likely benefited from determining the theoretical frameworks (effectual principles and the dynamic model of effectuation) to be employed both in a detailed and a holistic way before beginning the observation period. This way I might have paid attention to details and chains of events I could have missed during this research process. Furthermore, a good perception of the usefulness of retrospective, holistic analysis would have benefited the actual observation process and logging as well.

My own level of involvement from the perspective of this research and the observation related to it remained relatively similar throughout the observation period. Obviously the interviews made me appear more like a researcher, and they were also conducted outside of working hours and in different environments than those where we usually worked together as stakeholders. We did not discuss the research process or its details during the observation period, and E1 and E2's actions were seemingly unaffected by the research process, which can be seen as a positive thing regarding both the goals of the research and the creation process.

The interviews could have been more theory-based in terms of determining the entrepreneur identity of E1 (and potentially E2), whereas now they were more like conversations about the events of the creation process and technical improvements regarding the device. My aim was to find out whether effectual elements would be manifested in semi-structured discussions about the creation process, but I could have employed the process model of effectuation in interview design in order to explore the perspectives of E1 and E2.

Perhaps second interviews would have confirmed some of the views that I had acquired through observation and the first interviews. The second interviews were also originally planned as a part of the research process but I deemed them mundane from the perspective of confirming effectual characteristics in human action. These interviews, however, could have shed some additional light on E1's and E2's views on the process and their reflection of their own actions could have provided vital information on the effectual or causal nature of said actions. Especially E1's views on entrepreneurial behavior and different aspects of the process could have been confirmed through second interviews. However, the main goal of the process was to confirm effectual principles and characteristics from actual events, not retrospective interviews.

The dualistic role of a researcher and a stakeholder when working with multiple projects is also something to consider when evaluating the action research setting. I would not say that this affected the research process negatively in terms of results and analysis, since I managed the observation period of the creation process and was able to divide my time between observation and involvement coherently and purposefully in terms of both scientific research and

actions as a stakeholder. However, I do acknowledge its potential effects on the results of the research.

6.3 The learning aspect of action research

Eriksson and Kovalainen (2008: 202) mention action research evaluation as “a key element for the learning process and the successful action research project in general”. I wish to reflect my own learning and insights gained through this research process before concluding this research report. This reflection hopefully benefits myself, and others who are planning action research settings around similar themes and topics.

I obviously learned significantly about the practicalities and conventions of designing and conducting action research, since this was the first time I had the chance to use such an approach in research. Furthermore, the research process was a reminder of the fact that action research, much like all scientific research, can strive for perfection but never quite reach it and that there is always room for improving and refining research designs and methods. In action research, this assessment, development and refinement is essential and should be ongoing during the research process, and I had the chance to understand this by designing and conducting such research.

As well as gaining insight into the conventions and realities of conducting action research, I learned valuable aspects of functioning as a stakeholder in an effectual process. This helped me further understand the potential of effectuation in entrepreneurship research, business facilitation, and entrepreneurial processes. The effectual construct was applicable in this research setting and, because of that, this research confirmed my initial presumptions.

I also had the chance of working in an entrepreneurial team during a creation process, which resulted in new knowledge about the realities of such cooperation and action. In consequent projects I will be able to capitalize on that knowledge and those people with whom I have the privilege to work with will hopefully benefit from both that knowledge and my increased understanding of effectual processes. I can also use this knowledge for further examining and researching the effectual construct in both academic and business context.

One of my aims was to gain insight on whether effectual action and such processes could be analyzed as they begin and develop in order to further facilitate them and affect them positively through consulting, teaching or other types of intervention. Luckily the potential for this was confirmed and this type of approach allows employing several perspectives and methods for facilitation rather than the limited set of methods that need to be employed in a research setting such as this one.

7 CONCLUSION

According to this research, the observed and analyzed new product creation process displayed elements of the effectual construct. These elements could be perceived through an action research setting, where I participated in the creation process as a stakeholder and simultaneously observed and analyzed it as a researcher. In the creation process, effectual characteristics and elements were observed mainly from actions and interactions of the key entrepreneur and self-selected stakeholders. Discussions were also observed and the focal actors were interviewed during the process. These methods resulted in data, from which manifestations of effectuation could be confirmed through analysis.

Observing the creation process generated detailed data. Retrospective compiling and analysis of different parts of the process is essential in order to “make sense” of its effectual and causal features. Analyzing events and their characteristics during observation and in retrospect are complementary methods and can, when combined, provide holistic, detailed information about effectuation and causation in real-life settings. In this particular case study, this information was not only beneficial for the purposes of this research but also for documenting and assessing the creation process itself. Entrepreneurial creation processes can seem irrational, haphazard, or even random, but analyzing and confirming their effectual and causal features helps in understanding different phases and events in these processes.

Despite the main body of effectuation literature concentrating on the creation of new firms and markets, I believe that understanding processes such as the one analyzed and observed in this research can positively contribute to the existing effectuation research. Effectuation research is still in a state in which qualitative methods are needed in order to develop measures and scales both for confirming effectuation and for understanding the extent the construct was manifested in processes. Action research settings can provide insight into creation processes and benefit them in return.

Single-case action studies are able to take the entrepreneur, the company, and the industry contexts into account. As the characteristics of all three contexts can vary wildly, it is important to gather and generate knowledge from different settings in order to determine the applicability of the theoretical effec-

tual construct in various real-life settings. In action research, the observations of the researcher can be combined with the views and actions of the entrepreneur(s) and stakeholders. Subjective, qualitative measures are obviously not devoid of issues, but in effectuation research they should be seen as an essential part of the research, which complements quantitative methods.

The emphasis of existing effectuation research has mainly been on large businesses (which, naturally, were once small businesses) and serial entrepreneurs who have taken one or more of their companies public. This research, along with the realities of, for example, the Finnish societal and industry structure of businesses, points towards the realization that the SME context of entrepreneurship should not be understated in analyzing and observing effectuation. The variety of effectual artifacts is, in my view greater than ventures and markets, and effectuation can be manifested in various creation processes.

Entrepreneurship education and consulting can both benefit from research settings similar to the one presented in this report. Rather than exhausting entrepreneurship students with statistics and vague industry stories, case examples are often used when elaborating different entrepreneurial creation processes. By providing detailed reports with details that students can relate to and understand because they are not just simulations and numbers but real-life events, educators could make entrepreneurship appear as an appealing possibility rather than a tremendous risk.

Effectuation complements entrepreneurship education with a practical touch, as it provides an exceptional opportunity to view and analyze entrepreneurial action and creation processes. It takes into account both the randomness of life and the crucial role of the focal entrepreneur, and makes the analysis of the events of creation processes logical, natural, and humane. Understanding entrepreneurial creation processes is essential especially in entrepreneurship education, and not only because of the apparent rise in the appreciation and popularity of entrepreneurship.

The increased understanding of entrepreneurial creation processes can also be utilized in facilitating those processes with and for entrepreneurs, entrepreneurial teams, SMEs and larger ventures. As the results of this research point out, it is indeed possible for a researcher (or a consultant, for that matter) with knowledge of effectuation and its dimensions to confirm and facilitate the different effectual characteristics of creation processes. Furthermore, understanding the effectual construct can be beneficial for existing and experienced entrepreneurs as well.

Entrepreneurs can make use of effectuation in the real-time and retrospective analysis of their own actions. As the construct (as well as the principles of causation) is straightforward to explain and teach, it could be utilized in good management and entrepreneurial practices on a concrete level. By understanding the principles of effectuation, avoiding risks and benefiting from contingencies and random events can be viewed as parts of human action and even inexperienced, aspiring entrepreneurs can benefit from them.

Ultimately, becoming an entrepreneur and creating something new can be less risky, more enjoyable and "closer to home" when the effectual approach is used in the creation process. Furthermore, as they enable and encourage explo-

ration, effectuation processes allow trying out multiple options with limited resources, which is usually the case with aspiring entrepreneurs. My view is that effectuation is an integral part of everyday human decision making and problem-solving and thus should be taken into account when analyzing entrepreneurial action as well, as it has significant potential in understanding and facilitating it.

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