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THE ROAD TAKEN: EVOLUTION OF AN EMERGING COMPANY

Master of Science Theses

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ABSTRACT

SEIJA HALVARI: The road taken: Evolution of an emerging company
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This study aimed to give more insight into the evolution of the start-up. Yet, there are many studies related to the start-up companies, and they provide useful information about startups' business success factors as well as the reasons for failure. However, there is a prominent gap in the definition of a start-up company, which makes comparison and generalization of these studies difficult.

The objective was primarily to bring forth the research of a start-up business by proposing a new approach for defining the start-up company. In addition, this thesis brings up the practical problems, which the company has encountered and what has prevented the company from achieving its goals. Further, the purpose of the thesis was to propose actions to the case company, which they can consider when returning to the growth path.

The theoretical framework has been the business model ontology and the Lean Startup-principles. The framework was supplemented with other selected literature from the field of business theories. The thesis applied qualitative research methodology, and philosophically this research belongs to constructivism. The research strategy was a single case study, and the research data was gathered using two separate thematic interviews and content analysis.

The results were three-folds: first, the identification of the turning point that eventually led to the business model formation. Secondly, the case company's development path was portrayed multi-dimensionally, and the business was described through the business model ontology. Thirdly, the study showed in which early customer and its customer segment were identified emphasizing the importance of understanding customer value through illustrative examples. Follow-up actions for the case company were proposed, which also took into account the company's prerequisites for change. The way in which the case company was described in this study was revealing, but further research of the applicability of this approach is needed. Further studies might not only help to gain a better understanding but also to promote the definition of the start-up.

TIIVISTELMÄ

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Tämän tutkimuksen tarkoituksena oli lisätä tietoa start-upin kehityskulusta. Start-up yrityksiä on tutkittu paljon ja tutkimukset antavatkin hyödyllistä tietoa yritysten menestystekijöistä ja epäonnistumiseen johtavista syistä. Start-up yrityksille ei ole kuitenkaan olemassa yleisesti hyväksyttyä määritelmää, mikä vaikeuttaa eri tutkimusten vertailua ja tulosten yleistämistä.

Työn tavoitteena oli ennen kaikkea viedä eteenpäin start-up liiketoiminnan tutkimusta ehdottamalla uutta lähestymistapaa joka tähtää start-up yrityksen määrittelyyn. Työn tarkoituksena oli tuoda esiin käytännön ongelmia, joita start-up yritys on kohdannut ja jotka ovat estäneet yritystä saavuttamasta tavoitteitansa. Lisäksi, työn tavoitteen oli esittää jatkotoimia mitä voidaan hyödyntää kasvutavoitteiden saavuttamisessa.

Tutkimuksen teoreettisena viitekehyksenä oli liiketoimintamallin ontologia ja Lean Startup -periaatteet. Viitekehystä täydennettiin tarvittavin osin muulla liiketoiminnan teoreettisella kirjallisuudella. Työ toteutettiin kvalitatiivisena tutkimuksena ja sen tutkimusfilosofia kuuluu konstruktivismiin. Tutkimusstrategia oli yksittäinen tapaustutkimus. Työn tutkimusmateriaalin keräämisessä sekä analysoinnissa hyödynnettiin sisältöanalyysiä sekä kahdella eri tavalla suoritettua teemahaastattelua.

Työssä saavutettiin kolmenlaisia eri tuloksia: ensimmäinen tulos oli liiketoiminnan kannalta oleellisen käännekohdan tunnistaminen, joka lopulta johti liiketoimintamallin vakiintumiseen. Toisena tuloksena esitettiin tutkitun yrityksen liiketoiminnan aikainen kehityspolku ja yrityksen liiketoiminta kuvattiin liiketoimintamallin ontologian avulla. Tutkimuksen kolmas tulos oli alkuvaiheen asiakkaan ja sen asiakassegmentin tunnistaminen. Siinä korostettiin asiakasarvon ymmärtämisen merkitystä havainnollisilla esimerkeillä. Yritykselle ehdotettiin jatkotoimia huomioiden erityisesti yrityksen tämänhetkinen tilanne. Menetelmä millä tutkimus toteutettiin ja tulokset esitettiin antaa viitteitä lähestymistavan hyödyllisyydestä myös jatkotutkimuksille. Lisätutkimukset voivat auttaa ymmärtämään paremmin start-up yrityksiä, mutta ne voivat myös ohjata start-up yrityksen määrittelyä eteenpäin.

PREFACE

> *"[ ] start-up software companies often must learn to run before they can walk.*" Sutton (2000)

This citation has inspired me during this thesis. It carries the meaning of how uncertain and a dynamic market situation may feel like. We do not expect the babies to run – instead, they take a step at a time so that they do not hurt themselves. That is also The Lean Startup – by experimenting, the companies can take baby steps and soon learn to move on.

This thesis is written especially for the small firms – entrepreneurs- who are dreaming for change but do not know how to start, for researchers who are keen in getting some insight on how the start-up has evolved and for anyone that pursue specialized interests in the field of start-up companies. This thesis explains the venture of a small firm exposing insight on the case company premises and challenges and proposes attainable guidance for the future. As this is a qualitative case study, it comprises subjective interpretations, which is a limitation, but it also made possible to draw up a consistent depiction of the case company's evolution.

This job was an adventure and a study trip for me. Questioning old beliefs and finding new dimensions that, however, would not have been possible without the support that I received during the way. I want to express my sincere gratitude to my professor Marko Seppänen for the discussions that supported me to shape my work, and all review comments that greatly improved this thesis. The case company interviewee, whom I promised to keep anonym, thank you for your honesty and support. My dear friends and colleagues, how can I thank you enough. Every time I lost the common thread, you suffered with me and soon after I found it, you rejoiced, as if it was a life matter to you. And my family, thank you for your interest and all the encouragement you gave me – special thanks for providing me a piece of quiet whenever needed – I have been a bit absent lately, but I will make it up to you, I promise.

Finally, the special thanks go to you Jarmo, for believing in me also when I had my doubts – you made all this possible.

Pori, November 21, 2018

Seija Halvari

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ABREVIATIONS AND NOTATIONS

BM	Business Model
BMI	Business Model Innovation
BMO	Business Model Ontology according to Osterwalder 2004
B-M-L	Build-Measure-Test loop or cycle
B2B	Business to Business
B2C	Business to Customer
ibid.	same citation than previous (used in citation)
ICT	Information and Communication Technology
LSA	Lean Startup Approach
MVP	Minimum Viable Product
n.d.	no date, (used in citation)
OECD	The Organization for Economic Cooperation and Development
R&D	Research and development
RE	Requirement Engineering
RFQ	Request For Quotation
RQ	Research question
TLS	The Lean Startup
VPC	Value Proposition Canvas

1. INTRODUCTION

High-growth companies are vital to European competitiveness in the global economy (Innobarometer, 2014; European Commission, n.d.) and they create the significant part of the new jobs (Ministry of Employment and the Economy, n.d.; OECD, 2010). The early venture of growth is often funded by venture capitalists investments, business subsidies (Koski & Pajarinen, 2013) and not that much with equity (OECD, 2010 p.9). However, the studies are showing that start-up companies often fail (Pena, 2002; Gage, 2012; Klotins et al., 2018; Carmine et al., 2014; Bajwa et al., 2017) and it makes the venture capitalists investments to start-ups risky (Koski & Pajarinen, 2013).

Therefore, it is not surprising that the success factors of start-up companies have been studied a lot, e.g., from the perspective of success prediction factors (Silva et al., 2016), intellectual capital (Pena, 2002; Gately & Cunningham, 2014), impact of human relational capital (Hormiga et al., 2011), process implementation (Sutton, 2000), customer satisfaction (Girgenti et al., 2016), and growth (Moroni et al., 2015; OECD, 2002; OECD, 2010).

It is commonly recognized that high-growth companies have exploited the drivers, i.e., changes in economic, technology, globalization, to differentiate their Business Model (BM) (Casadesus-Masanell & Ricart, 2010). Any measure the entrepreneurs make affects the BM formalization (Foss & Saebi, 2017). Teece (2010) argues that every firm employs a BM either it is established explicitly or implicitly. Although, rarely start-ups get their BMs right immediately (Teece, 2010; Bajwa et al., 2017). The challenges with the correct BM seem universal, and only few companies understand their existing BM so well that they can see if there is a need for leveraging the core business or if there is a need for a new BM (Johnson et al., 2008). In start-up company's early phase, entrepreneurs' BM management seems to concentrate on the cash and competence, but they need a well-developed BM to avoid failure in delivering or capturing the value from their business (Malmström & Johansson, 2017). The intentional BM evaluation is seen supporting the front-end of innovation, giving focus also elsewhere than in the product. Especially in a dynamic environment, BM thinking improves front-end effectiveness and enables the company to adopt new business opportunities. (Schrauder, 2018) Well-established BM is essential for software start-ups in other means as well. It is studied that requirement engineering processes (RE-process) maturity would yield business benefits (Sommerville et al., 2005), but RE-processes do not fit well to start-up companies that do not have established product, customer base, nor revenue stream (Sutton, 2000).

Business Model Innovation (BMI) is about novel changes in BM architecture of value creation, delivery, and capture mechanisms. Foss & Saebi (2017) suggest to study more of BMIs and especially what facilitates and hinders BMI in entrepreneurial firms (e.g., startups) compared to established firms. What makes the comparison difficult, is that there is a prominent gap in our understanding of what is a start-up. Even there are many studies on start-up companies; still, further research would benefit on understanding how the start-up companies evolve. By understanding the start-up company and its evolution, it would be more likely to achieve a common understanding of the definition as well.

The nature of start-ups is not far from the nature of an established company when there is a need to change the BM, as business uncertainty is growing. In fact, the definition of a start-up by Ries (2011) does not include the company's age or the industry, but it highlights the high uncertainty. The approach encourages for experimentation, but the goal of the experiment carries the meaning of success or failure, and this failure is what companies have tried to avoid for the sake of costs. E.g., in product design, entrepreneurs often fall in the victim to paralysis of analysis by attempting to secure that there will come no errors in design (Ries, 2011 pp.90-91). Bajwa et al., (2017) encourages companies to consider failure as an opportunity to learn and change the company's strategic direction. The issue related to the cost of experimentation is not valid only for newly established companies, but also well-established companies should experiment.

However, The Lean Startup thinking (TLS) is new and has no particular theoretical grounding, although there are indications that thinking has been influenced by many different theories (Fredriksen & Brem, 2017; Ghezzi, 2018). Ghezzi (2018) studied TLS approach with a relatively large number of startup companies. His results are promising, but the companies did claim that the approach was far more complicated than they initially thought (Ghezzi 2018). Despite that research, the practical functionality of TLS is still needed. To succeed entrepreneurs needs management skills and processes so that they survive in high uncertainty (Ries 2011, pp.8-15; Sutton, 2000). This is in line with Carmine et al. 2014 finding that unsuccessful start-ups had inconsistency between managerial strategies and execution. Methods and practices that make it easier for start-up businesses to grow are vital for the companies, but the overall potential impacts positively to the whole economy. Therefore, practical methods to support BMI are needed.

1.1 Research problem, questions and objectives

What makes the start-up special is its importance for the global economy and employment i.e., the expectation of high-growth and success. Even minority of all start-up companies are successful, these companies are considered immensely important. The high failure rate tells us about the unbelievable potential that even minor improvements can make.

The research on start-up companies is very problematic as the start-up misses its definition. Generally, the lack of universal definitions is not rare in research, but especially in this case, it has a significant practical impact. Of all new emerging companies, we cannot unambiguously distinguish a start-up company from other small companies. Especially, we do not know when the start-up company ceases to be no longer a start-up. If we do not understand the mechanisms that makes the company a start-up, it will lead to the fact that start-up business research is obscured with other business research. For that reason, the evolution of a start-up company must be understood and recognized the so-called turning points that leads to the consolidation of the business.

With that in mind, the evolution of a start-up company is being explored in this work through a single case study. In addition, this study will propose further actions for the case company. This study will answer three research questions which are also shown in the timeline of the case company (Figure 1). The research questions *RQ1* and *RQ2* (*RQs*) are:

> *RQ1: What was the turning point of a business that was identified in the company's lifecycle?*
>
> *RQ2: How did the business model evolve in a start-up company?*

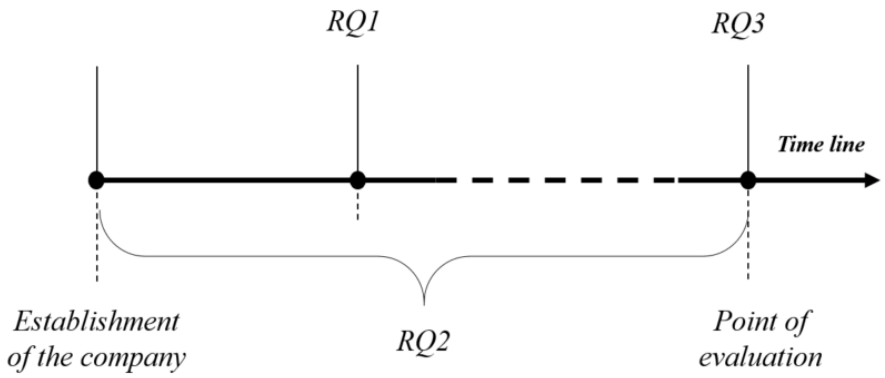

Figure 1. *The timing of research questions RQ1, RQ2 and RQ3.*

The research question RQ3 aims to answer how the case company can exploit their inner potential to pursue vision better in the future.

> *RQ3: What are the future actions to exploit internal potential?*

The objective of this thesis for the academics is primary to bring forth the research of a start-up business by proposing a new approach for defining the start-up company. The objectives of this thesis for the case company and practitioners are:

- To explain the case company current BM, the conditions and decisions that have influenced its formation.
- To find the case-specific features that the analysis reveals and utilize those in the proposals for further actions for the case company.

Within this thesis, the Business Model Ontology (BMO) elements are used as categories/themes that support the analysis, and later the themed analyzed material is synthesized with other business literature. With Massa et al. (2017) terms, the BMs are attributes of real firms, i.e., the case company. By this approach, the aim is to depict the case company business, its evolution and the turning points. The BMO provides at least the way of categorizing the company BM, although we cannot say if there are only nine different elements in the BM and if the connection of different element appears as it is intended. In fact, Foss & Saebi refer to studies that have found 42 and 73 semantically different BM components. (Foss & Saebi, 2018) Yet, the BMO categories, elements as Osterwalder calls those, are principally the same as in widely used "Business Model Canvas" (Osterwalder & Pigneur, 2010) which at least to some extent indicates the usability of the model. Due to Foss & Saebi (2018) study, other supplementing material is used to give a more comprehensive view of start-up's business in addition to the *'snapshot'* that BMO will provide.

In BMI literature the BMI and experimentation and learning are connected (Foss & Saebi, 2017), and therefore the practice of using Build-Measure-Learn cycle (B-M-L) is applicable. This thesis also introduces a new approach to obtain a clearer picture of the decisions that the company does in daily project business. This approach utilizes TLS-thinking and the illustration of "Effectual-thinking" (Fredriksen & Brem 2017). This description shows the effect of learning of customer needs during the project and the points when the decisions are made that follow from the learning. By identifying decision-making points, it is possible to assess whether the following decision is subconscious or conscious. Understanding of the customer needs is essential for any company.

This thesis applies qualitative research methodologies, and philosophically this research belongs to constructivism. According to the chosen philosophical perception, the reality is always in relation to one's surrounding. The aim of this thesis is to portray the start-up company business subjectively from its premises, but connect the findings from analyses into the theoretical framework. This thesis research strategy is a single case study, and the employed data gathering methods are two separate thematic interviews and content analysis.

The case company of this thesis is a micro-size private limited technology firm employing the two founders of the company (Table 1). The studied case company is operating in business to business (B2B) markets providing medium-sized software systems to various industrial customers. The period under examination is from the case company establishment in 2010 until May 2018, yet, the data was gathered in 2018.

The case company vision has been to grow. In the early days, the company won an innovation award with their product. After the innovation award, the case company applied for external funding for further development of the product, but they got negative funding decision. Since those times, the case company has operated in project business doing research and development in a side of the project.

Table 1. *Case company characteristics.*

Characteristics	*Case company*		
Age	*0 -1 years*	*1-2 years*	*2-8 years*
Innovativeness	Product development	Innovation award	Project specific R&D
Turnover	0	avg. less than kEUR 200	
Customers	Unknown	B2B - Industrial	
Employee	2 (owners)		
Industry	Technology, Software engineering		
Vision	Growth		

The case company is innovative, has invested in research and development (R&D) rather heavily, and company founders have had an ambition for growth. Therefore, the case company was a start-up company in its early years. The problem that the case company has is that its visions of growth have not been realized over the years, and the number of employees and turnover have remained stable.

1.2 Thesis structure

The first chapter introduces the reader in the background of this study, the research question and research structure (Figure 2 see next page). Theoretical framework, in chapter 2, unfold the context of a start-up company, explains the BMO (Osterwalder, 2004), the TLS (Ries, 2011) and supplementing it with the Lean Startup Approach (LSA) (Ghezzi & Cavallo, 2018) and other selected material from the field of business research. Chapter 3 portrays the research design framework that comprises of the research philosophy, methodology and data gathering methods as an approach for the answering the research question. Chapter 4 Analyses will compound the BM elements and research material. Chapter 5 Results will tie-up the analyses result and combines that with the theoretical framework, and answers to the research questions. Chapter 6 Conclusions encapsulates the observations during the study, an evaluation of its effectiveness, study limitations and the need for further research.

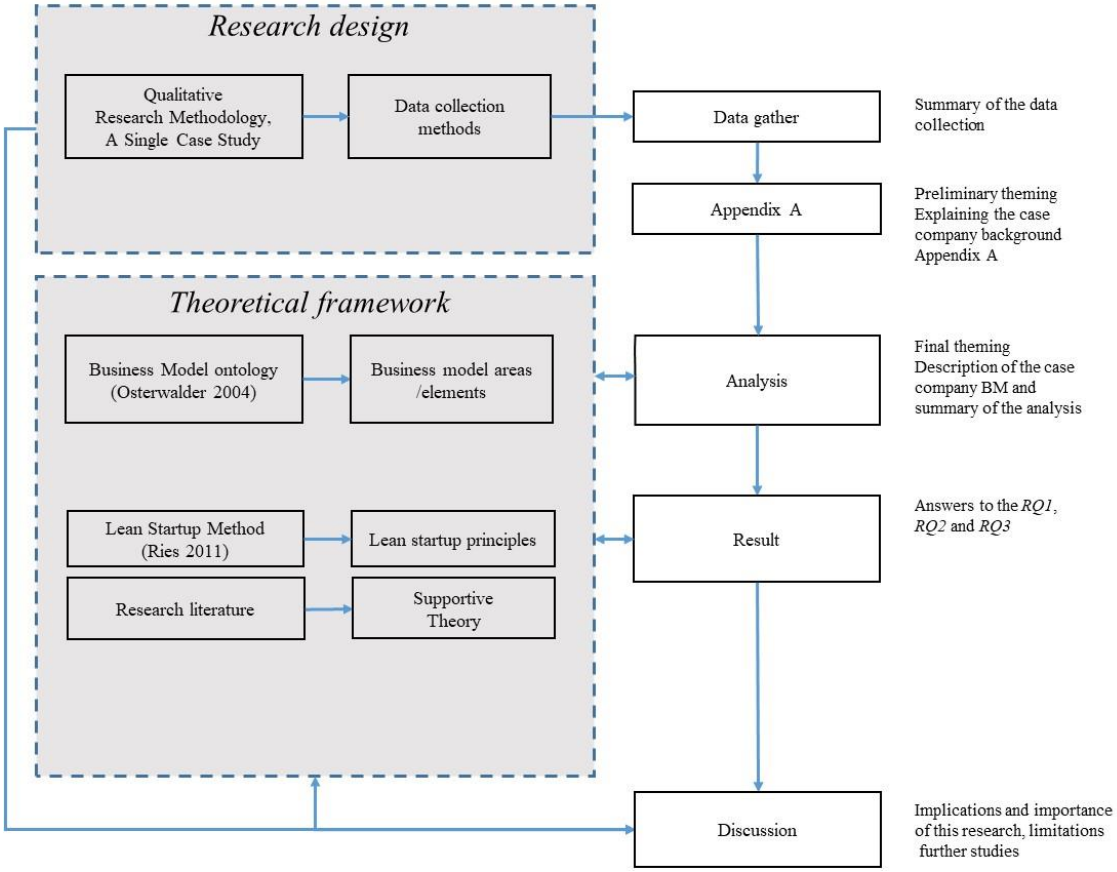

Figure 2. *Research structure.*

2. THEORETICAL FRAMEWORK

This chapter will explain the theoretical framework for this study. The first subchapter explains briefly the concept of a start-up company. The second subchapter introduces the concept of a BM and the BMO (Osterwarlder, 2004) that is used in analyses. The third subchapter discloses the Lean Startup thinking (Ries, 2011; Ghezzi & Cavallo, 2018; Ghezzi, 2018). Together with this framework, other literature in the field of business theory will consolidate this theory as applicable.

2.1 The definition for a start-up

There is an abundance of descriptions for a start-up company (Silva et al., 2016; Shontell, 2014; Zaech & Baldegger, 2017) and some of them are very precise definitions while others describe common characteristics for start-ups (Appendix B). It can be said that the term "start-up" is used rather freely, and especially in spoken language, it even gets emotional meanings, e.g.,*"start-up is a feeling"* Jan Koum, co-founder of WhatsApp (Shontel, 2014) and *"It is a state of mind"* CEO of Homejoy, Adora Cheung (Robehmed, 2013).

Due the selected framework, this thesis follows Ries's (2011) definition of a start-up:

> *"a human institution designed to create new products or services under conditions of extreme uncertainty."* Ries (2011).

Start-up, by his definition, is closer to a certain phase in the company life cycle and it is not tied to company's age, size, or industry. The reference to company's young age or emergence seems to be a dominant characteristic for a start-up company (Shontell, 2014; Zaech and Baldegger, 2017; Wikipedia_a, n.d.; Business Finland, n.d; OECD, 2007). Some definitions seal in the start-up company's 'maturity' (limited processes, structures, and routines) and development stage (Silva et al., 2016; Zaech & Baldegger, 2017; Shontell 2014), the BM, and how the start-up company is organized (Eloranta, 2014). Ability and intention to grow or scalability (Eloranta, 2014; Silva et al., 2016; Shontell, 2014) were also mentioned as definition criteria. In addition, the innovation is very often mentioned in literature of a start-up (Eloranta, 2014; Gately & Cunningham, 2014; Hormiga et al., 2011; Klotins et al., 2018; Silva et al., 2016; Sutton, 2000; Doruk and Söylemezoğlu, 2014) and it is seen important for startups company success as well (OECD, 2002; OECD, 2010; Ries, 2011 pp.27-28). In fact, companies that prioritize the innovation will gain the highest increase in turnover (Innobarometer, 2014). The success of innovation seems irrelevant. Companies that innovate regardless, if they succeed or not, tend to perform better than the companies that do not make an effort on innovation.

(OECD, 2010, p.15) Yet, the term innovation also lacks a general definition and it is applied rather freely (Crossan & Apaydin, 2010).

2.2 Business model

From 1990s the popularity of the term 'business model' started to increase (Osterwalder, 2004), but still in 2010's the concept was missing theoretical grounding (Teece, 2010) and even today there is a little agreement on the definition (Foss & Saebi, 2017; Foss & Saebi, 2018; Massa et al. 2017). Disputes over definition often debate whether the BM is synonymous with the strategy or whether it is a separate matter (Massa et al. 2017). In this thesis the definition is according to Teece's definition:

> "*A business model describes the design or architecture of the value creation, delivery and capture mechanisms employed.*" (Teece, 2010)

The concept of a BM is still evolving, and two of the recent outgrowths of BMs are 'sustainable business model' and 'business model innovation'. The sustainable BM emphasizes the balance of economic, social and ecological value (Boons et al., 2013). Definition of value proposition includes among the customer also other stakeholders affected by a company's activities (Lüdeke-Freund et al., 2018). In fact, the costs and benefits should be balanced between all associated actors. Boons et al. (2013) argues that most of the companies do not operate on a sustainable business model. (ibid.)

BMI is relative recent research field (Foss & Saebi, 2017). Foss &Saebi, (2017, p.203) spotted the roots of BMI into 2003, when Mitchell and Coles made a first notion that BMs can be innovated. Yet, the BMI did not '*break through'* that time, but got more popular after Zott et al. article in 2011 (ibid.). The recent interests themes on BMs and BMI research are listed in Table 2.

Table 2. *Recent business model and business model innovation article reviews gathered and themed in the table (adapted from Foss & Saebi, 2017)*

Focus: Authors	*Findings*	*Number of articles*	*Data source*
Busienss Models (BMs)			
George and Bock (2011)	Use of business models Organizational design Resource-based view Narrative and sense making Nature of innovation Transactive structure Opportunity facilitator	108	EBSCO Business Source Premier and ISI Web of Science
Zott et al. (2011)	Three themes of BM literature E-business Business models and strategy Innovation and technology management	103	EBSCO Business Source Premier
Lambert and Davidson (2013)	Three themes of BM literature Business model as basis for enterprise classification Business models and enterpirse performance Business model innovation	69	ProQuest database
Wirtz et al. (2016)	Four research foci Innovation Change and evolution Performance and controlling Design	681	EBSCO Business Source Complete
Business Model Innovation (BMI)			
Schneider and Spieth (2013)	Three streams of BMI research: Prerequisites of conducting BMI Process and elements of BMI Effects achieved through BMI	35	ISI Web of Knowledge and SSRN
Spieth et al. (2014)	Three motivations for engaging in BMI research: Explaining the business Running the business Developing the business		Not provided
Current study*	Theory assesment and research agenda: Construct clarity Congruence Contingency hypothesis Boundary Conditions	150	EBSCO Business Source Complete and Science Direct

* Foss & Saebi (2017)

2.2.1 Business model ontology

Teece (2010) argues that the company BM is established either explicitly or implicitly, but it does exist. Casadesus-Masanell and Ricart (2010) sees the BM as a reflection of the firm's *realized* strategy, which is in line with Mintzberg (1979) who wrote that there exists deliberate and emergent strategies (Mintzberg, 1979).

Company's strategy, BM and business processes are intertwined, addressing the same problem but in different business levels (Osterwalder, 2004, pp.14-16). Figure 3 illustrates the business levels and external forces in connection to the BM.

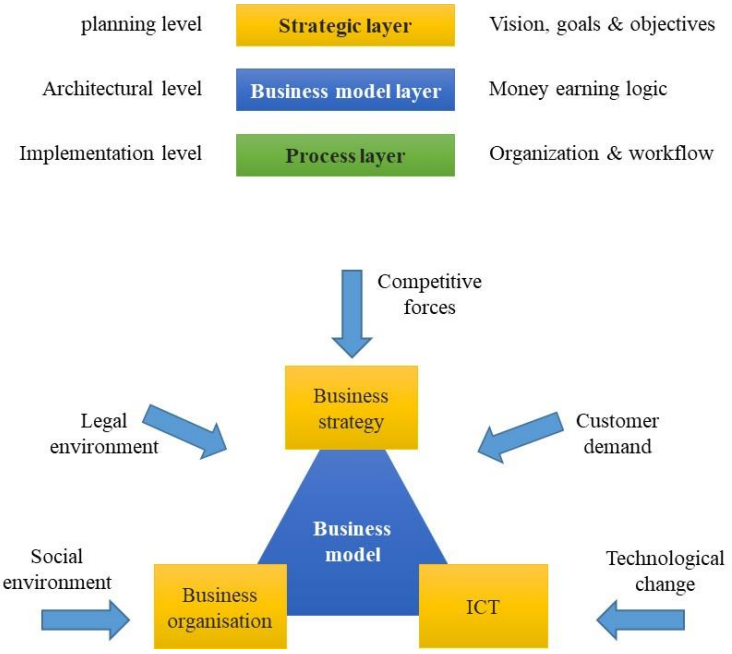

Figure 3. *Business layers (adapted from Osterwalder 2004 p.14, 16).*

The business strategy is on the first business layer and it includes the vision. The vision is a stimulus for a BM. Yet, after the BM formation, the evaluation that BM still fulfils the strategy is needed. (Osterwalder, 2004 p.16-17) The vision can be described as yin and yang, core ideology and envisioned future. Two different parts are forming the *core ideology*; *core values* that are timeless intrinsic values and *core purpose*, the reasoning for organization existence reflecting people's idealistic motivation. The *envisioned future* denotes hopes and long-lasting dreams that are at the same time clear and realistic. (Collins & Porras, 1994).

The external forces that affect the company and its BM are technological change, competitive forces, customer demand, and legal and social environment (Osterwalder, 2004, p.16). The company adaptability is crucial in the constantly and rapidly changing business environment as these forces may even challenge the existing BM (Osterwalder 2004, p.18-19). When exploiting the external drivers, the BM change may change turn into success (Casadesus-Masanell & Ricart, 2010). For example, the social acceptance

(social environment) of new technology may open entirely new markets and by that impact to the BM of a firm. That way it also may influence the customer demand as well. (Osterwalder, 2004, pp.18-19) In fact, the metaphoric "Blue Ocean Strategy" (Kim & Mauborgne, 2004) aims for steering the company from the crowded red ocean into the blue ocean. Blue ocean, illustrates the unknown markets that are untainted from the competition whereas the red ocean depicts the crowded ocean with ever-increasing competition and rivalry. (ibid.) The competitive forces (potential entrants, buyers, substitutes, suppliers and industry competition) affects to the business by e.g., influencing the prices, costs, and required investments. If the company understands its position among competitors, the industry structure and profitability, the competitive forces can be utilized to shape the strategy. Eventually that will lead to the decision of choosing either cost, differentiation or focus strategy. (Porter, 1985) Whatever the direction company aims to take, the potential BM must be assessed with the current state of the company's ecosystem, and its evolution (Teece, 2010).

Figure 4 shows the BMO developed by Osterwalder (2004). It is a good approach to create and communicate business plan as it suits for capturing, visualizing, understanding, communicating and sharing the business logic, but it can also be later used for analysing and managing the BM (ibid. p.20-21). The BMO has roots in Balanced Scorecard (ibid. p.42).

BMO embeds nine different elements in four segments:

- *Product*; Value Proposition,
- *Customer interface*; Target Customer, Distribution Channel, Relationship,
- *Infrastructure management*; Value Configuration, Capability, Partnership,
- *Financial aspects*; Cost Structure and Revenue model (Osterwalder, 2004, p.43).

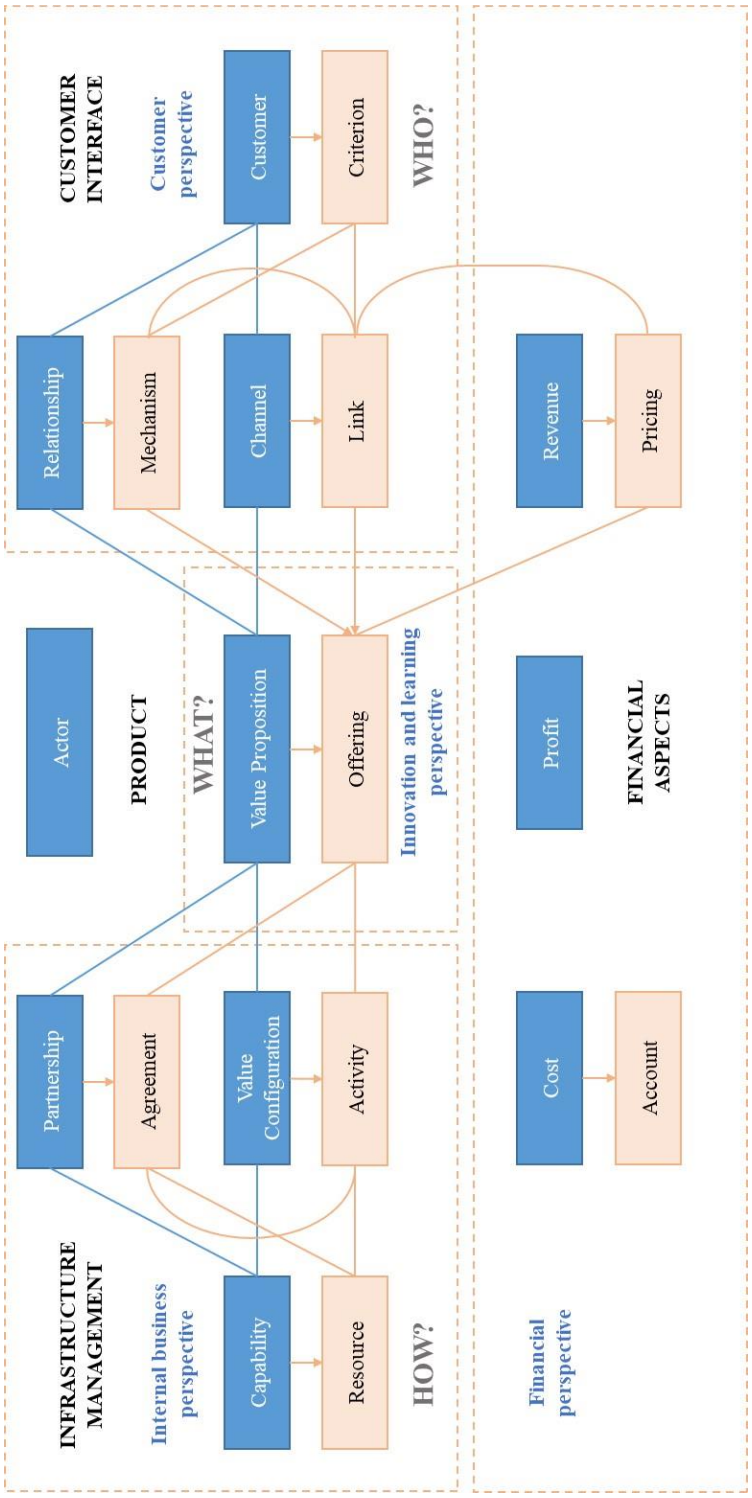

Figure 4. *The Business model ontology segments and elements (adapted from Osterwalder 2004 p.44)*

2.2.2 Value Proposition

Success starts – not from thinking about the BM, but from thinking about the opportunity to satisfy the real need of the customer (Johnson et al., 2008). Nowadays, when the technology has enabled lower cost provisions of information and customer solutions, the businesses should re-evaluate their value propositions and be more customer-centric (Teece, 2010).

Osterwalder speaks about a product or more largely BM element 'value proposition.' The value proposition, the infrastructure management, and customer interface are all connected. Those explain 'what we deliver,' 'how we deliver it' and 'to whom we deliver' (Figure 4). (Osterwalder, 2004, pp.49-50) The value proposition is what the company is offering to the customer, and it is divided into a collection of elementary offerings. Elements describe how the customer receives the value. Customer value is not just the value of product *use* (*reasoning*) and the *product price level*. The *risk reduction* is an important customer value especially for software products, where incompatibility between programs creates the most significant problems. (ibid. pp.50-51)

The customer receives the value in various ways as we can see in Figure 5. Value level indicates the rivalry that the company is facing with its offering. If the company is operating in *me-too* markets or if the value level is *innovative imitation,* they are competing in the crowded "red ocean"(Kim & Mauborgne, 2004). Value level *excellence* is about meeting all customer needs (Osterwalder, 2004, pp.50-51). Even if the company manages to satisfy the customer at all levels, the rivalry may still be in "red-ocean." *Innovation* is when the company has managed to differentiate its offering by introducing an entirely new product or services (ibid.), and by that, the company have reached the "blue-ocean" (Kim & Mauborgne, 2004).

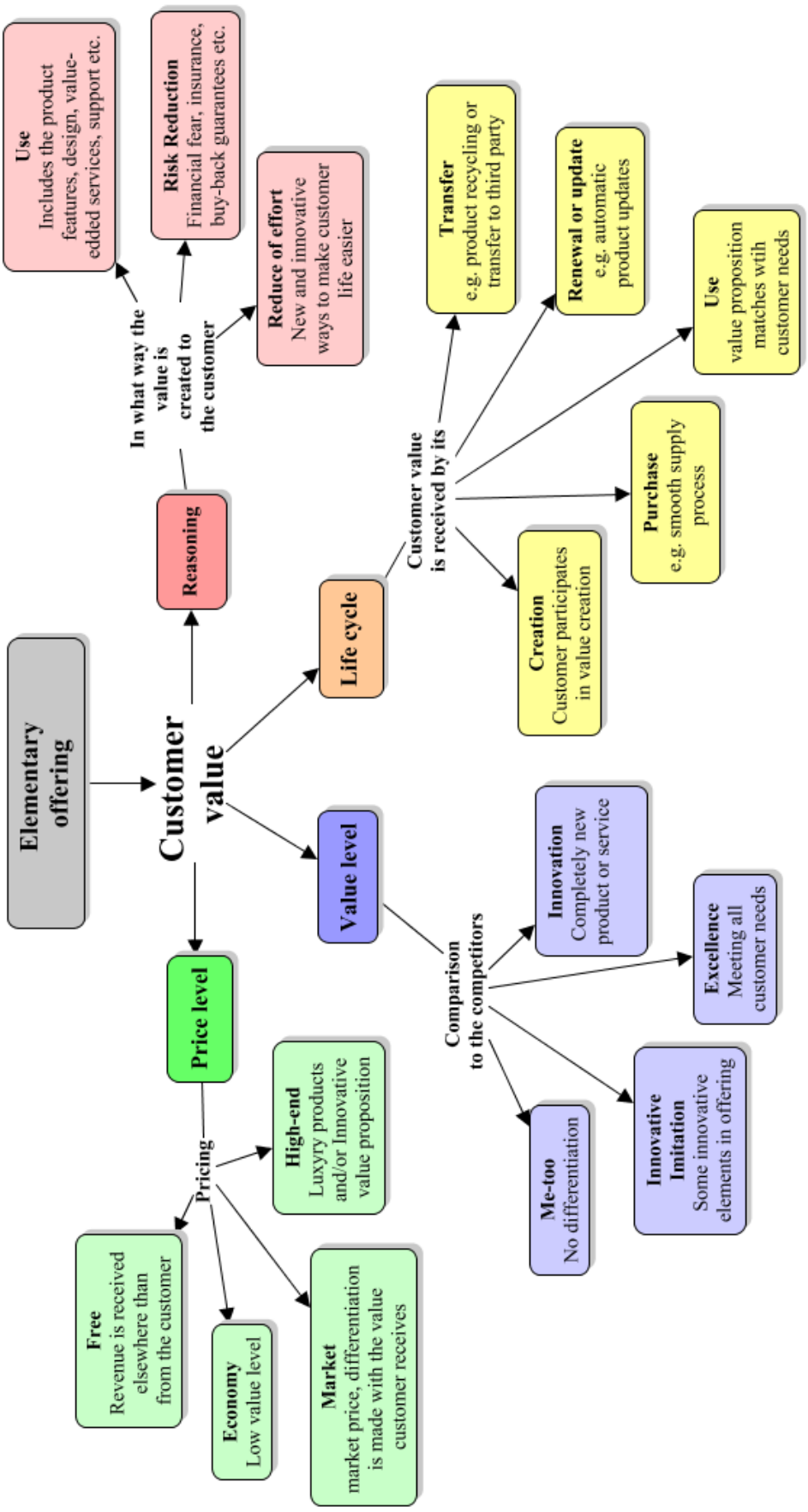

Figure 5. *Set of elementary offering (Osterwalder, 2004 p50).*

Value Proposition Canvas (VPC) is a practical tool for designing the value proposition. It shows the relationship between the customer segment and the value proposition. VPC content suit better for the practitioners than for the academics. (Osterwalder et al. 2015) The customer need is presented in VPC as a customer *job, gain* and *pain*. The *Customer job* is what the customer is aiming to do. That can be a problem to solve or task they aim to accomplish. The *Gains* are what the customer is expecting to receive or would be positively surprised of. The *pains* are negative things that customer would like to avoid, e.g., risk, cost, poor performance. The idea of the *value proposition*, in brief, is that the value proposition should *create gains, relieve pains* with offered *products and services*. (Osterwalder et al. 2015)

Seppänen (2018 pp.30-31 see Kostamovaara, 2007) explains the expected and received customer value as presented in Figure 6. Very often the customer job is forgotten, and the offering for the customer is based on the beliefs of customer needs (Seppänen, 2018, pp.30-31; Ries, 2011). Klotins et al. (2018) think that one reason for start-up companies' failures is in product development, e.g., poor product idea and under or over-engineering the product. Bajwa et al., (2016) and Ries, (2011), thinks that start-up companies have understood, the real customer problem, but they have failed in finding the correct customer segment. Carmine et al., (2014) think that the customer problem is not understood in the first place (Carmine et al., 2014). All that does not contradict with Osterwalder's theory on the value proposition, rather it brings a new perspective into the picture. The value supplier thinks they produce is not necessarily the value customer receives. Companies should figure out as quickly as possible whether their belief in the customer value is correct.

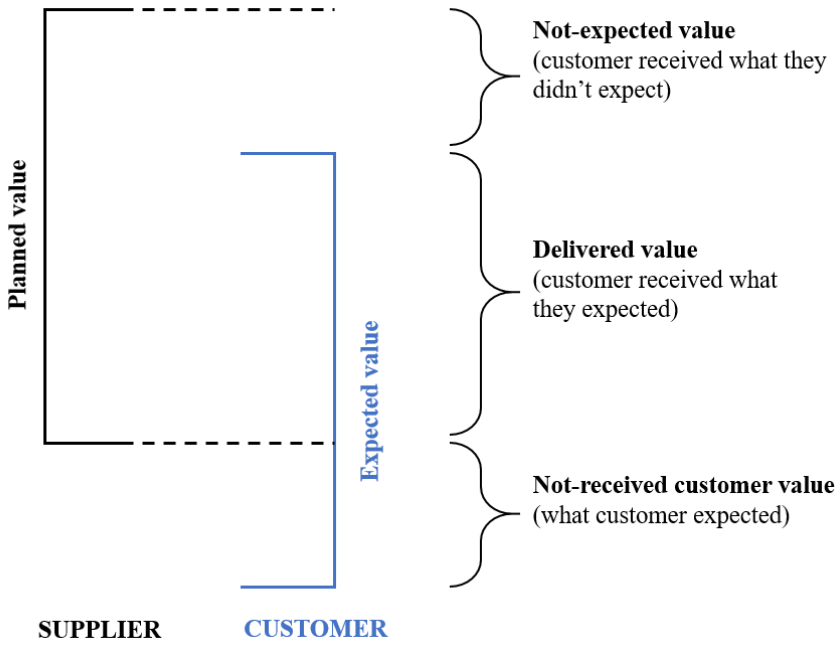

Figure 6. *Expected and received customer value (Seppänen, 2018 p.31 see Kostamovaara 2007)*

2.2.3 Target customer

The *target customer* element belongs to the segment of *customer interface*, and it is all about the segmentation of customers. By segmentation, the aim is to recognize the customers that have the most interest in the company's value proposition. Segmentation uses pre-defined criterion, and it helps in defining the correct channel to reach the customer. There are various ways of segmenting the customer, geographic area, communities, industries, size, turnover et cetera. Perhaps the most common general segment types are B2B (business to business) and B2C (business to customer). The Information and Communication Technology (ICT) provides excellent opportunities to reach the customer, e.g., data mining or targeted e-mail advertisements. (Osterwalder, 2004, p.60-61)

2.2.4 Channel

Figure 7 explains the ways in which channel creates value for the customer, through *use, reducing risk* or *reducing a customer's effort.* The companies should evaluate the customer value in each of the four phases of the customer buying cycle in *awareness*, *evaluation*, *purchase,* and *after sales* phase. (Osterwalder, 2004 pp. 64-67)

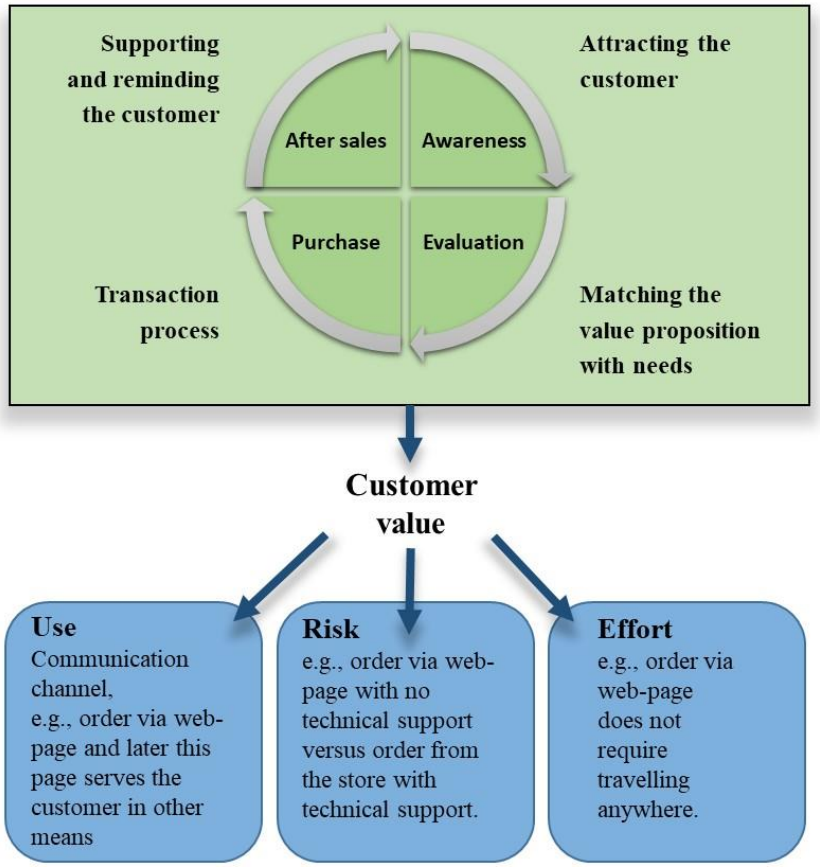

Figure 7. *Channel link Customer buying cycle (Osterwalder, 2004, pp.61-62).*

The element *channel* explains how the company connects the value proposition and the target customer. The company may have several *channel links* that are used to deliver value to its customers directly or indirectly, e.g., via the retailer or broker. (Osterwalder, 2004, p.63) The purpose of the channel is to make the right quantities of the right products or services available in the right place, at the right time to the right people (Osterwalder & Pigneur, 2003)

There also exists a risk of a 'channel conflict.' Two channels that serve the same customer may cause a channel conflict, e.g., if a company is selling goods to retailers and the end customers, retailers may feel disgruntled. (ibid., pp. 70-71)

2.2.5 Relationship

Customer interactions between a company and its customers belong to relationship building (Osterwalder, 2004, pp.70-71). Individuals are behind the purchase decision also in B2B business (Ries, 2011 p.88). Figure 8 unfolds the customer equity goals that are acquisition, retention and add-on selling (Osterwalder, 2004, pp.70-72).

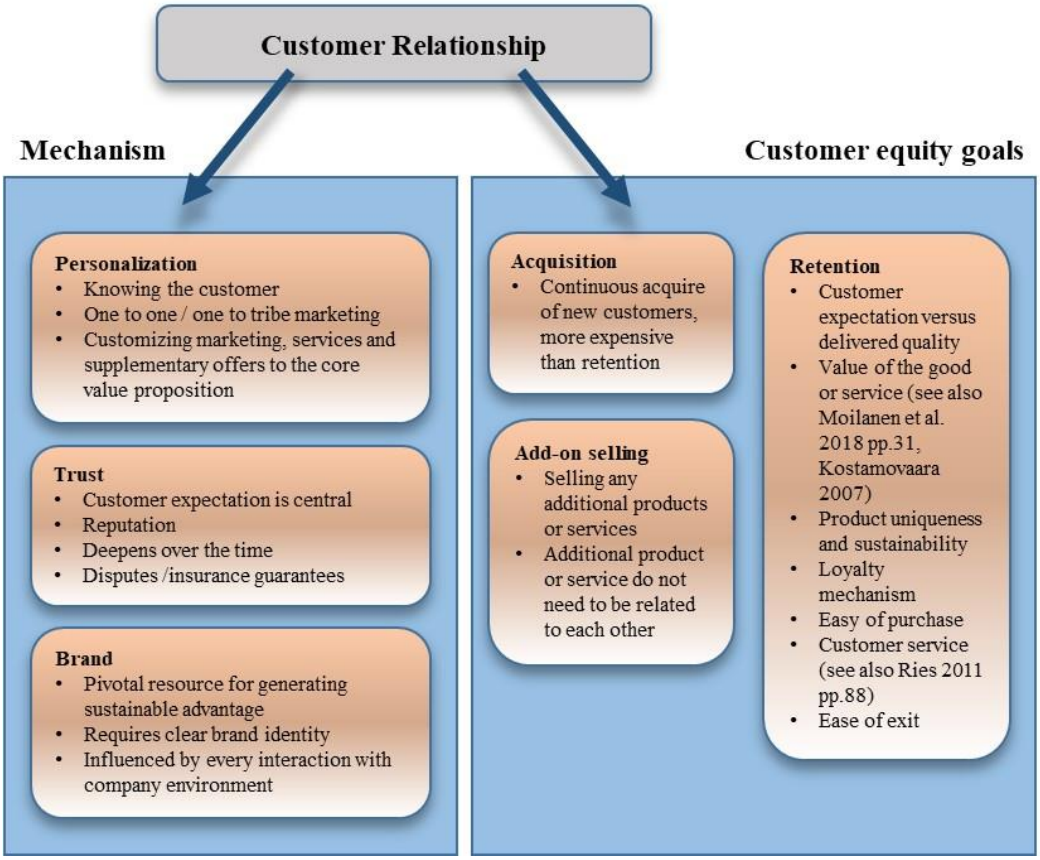

Figure 8 *Customer relationship (Osterwalder, 2004 pp.71-78).*

Customer acquisition is much more expensive than serving the existing customer. However, while trying to extend existing relationships duration, companies must continuously acquire new customers. Customer acquisition is vital also for the reason that

retention and add-on selling is not possible without existing customer base. Nowadays, the customer focus is increasingly on switching costs where large software systems are a good example. Especially with software retention depends on the switching costs. If the benefits of the new system are higher than the cost of replacing the system, the acquisition of a new system is profitable. It does not necessarily matter how inexpensive the new system is if the switching-cost from the previous system is seen more expensive. Add-on selling is any additional sales, which may have nothing to do with the core product. (Osterwalder, 2004 pp.70-73)

2.2.6 Capability

Key resources deliver the value to the customer, and it embodies people, technology, products, facilities, equipment, channels, and company brand (Johnson et al., 2008). These key resources are capabilities that create value, and those capabilities are split into intangible, tangible and human resources. The Capability-element is about in-house capabilities and resources, and external partnerships. Tangible resources are physical resources, such as plants and equipment. Intangible resources are for example patents and brands. Human resources are people-based skills (Osterwalder, 2004, pp.79-82). Long & Vickers-Koch (1995) demonstrated the capability with Figure 9.

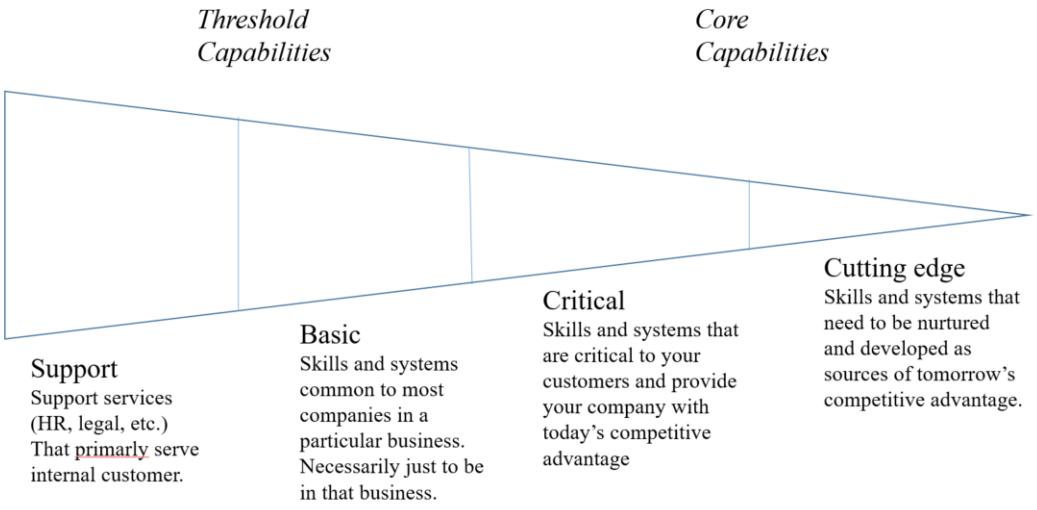

Figure 9. *Company capabilities (adapted from Long & Vickers-Koch 1995).*

There are two types of capabilities *threshold* and *core capabilities* and both are the needed in companies business. Core capabilities can be split into *critical* and *cutting edge* capabilities. The thresohold capability embodies the *support* and *basic capabilities*. (ibid.) Osterwalder (2004) is mainly discussing the basic and critical core capabilities in his ontology, as those are the ones that are involved in value creation. Although, he briefly mentions the supportive activities as enablerers for primary activities to take place in

(*value configuration*). The cutting-edge capability is not currently producing value to the customer, rather it is about preparing for the future. (Long & Vickers-Koch, 1995)

ICT has affected the organizations, by reducing the transaction costs, and this trend is continuing. Bjørn-Andersen & Raymond (2014) sees that it leads in new types of organizations that focus on core capabilities, and everything else is sourced rest from the markets (Bjørn-Andersen & Raymond, 2014).

2.2.7 Value Configuration

Customer value is the result of all internal and external activities and operations. The Key processes enable companies to deliver the value to the customer including management and operational processes but also the company's rules, metricizes, and norms. By activities, a company creates market value and generates profit. Activities are split into primary activities (creation of value proposition) and supportive activities (enablers for primary activities to take place) that are then linked to the resources. (Osterwalder, 2004, pp.83-87).

2.2.8 Partnership network

Partnership networks have become an essential component in implementing strategies. The intention is that both parties will benefit from the partnership agreement. Partners may optimize their activities or the partner benefits on economies of scale that the other partner can offer. The partnership agreements can reduce the risks by improving anticipation opportunities in uncertain and the high-risk environments. The acquisition of resources from foreign markets, knowledge acquisition, data, or customer access is also the reason for partnership. The partnerships leverage the company’s BM and the competencies as well. (Osterwalder, 2004, p.89, 91-93)

2.2.9 Revenue model

The company produces economic value or business value if in the long term it produces more benefit than it uses resources (Martinsuo et al., 2016. p.19). Although companies are often good at providing customer value, they might still have difficulties to get the customer to pay for it (Tikkanen et al., 2007, p. 60). The profit formula presents the company’s value creation to itself and its connection with value creation to the customer. Profit formula includes the revenue model, cost structure, margin model and resource velocity. (Johnson et al., 2008).

The revenue model measures the company’s abilities to generate revenue income through their actions and products that increase the customer value (Osterwalder, 2004, p.95). Osterwalder uses the word ‘ability’ as it is not only about the value customer gets it is

also the ability to transfer it to money. Revenue model may have different revenue streams (stream types) with diverse pricing mechanisms (pricing methods). (ibid., pp.95-97)

According to the Osterwalder (2004, pp.96-98), there are five different revenue stream types; *Selling, lending, licensing, transaction cut* and *advertising*. *Selling* is when the ownership of the product is given away in exchange for money, and therefore the sold product does no longer generate additional revenue. When giving something to someone for a period in exchange for money, is called *lending*. Important is that the product cannot generate income while it is away. The *licensing* agreement gives an official permit to do or have something in exchange for money and depending on the contract, the *licensing* can theoretically generate unlimited income. When paying the settlement to the party that has organized, facilitated, or performed the deal, it is called *transaction cut*. *Advertising* stands for telling or praising something publicly to influence the choice in exchange for money. (ibid.)

There are also different pricing methods (Osterwalder, 2004, pp.98-101):

- Fixed pricing is where purchasing volumes or current market situations do not affect the prices. As an example, pay-per-use and menu pricing are fixed prices.
- Differential pricing base on product features, customer characteristics, volume or value, but the current market situations do not affect the prices.
- Market pricing is based on current market situations.
    - Bargaining; the oldest and most common dynamic pricing mechanism that is based on bargaining between buyers and sellers.
    - Yield management; pricing policy for optimizing profits from the sale of perishable assets.
    - Auctions; classical auction is where the seller is presenting the goods that are for sale and buyers are bidding the goods, and the highest bid will win the deal.
    - Reverse auctions; the buyer tells the price, and what he wants to buy and the suppliers offer the products. The lowest offer will win.
    - Dynamic market; a pricing mechanism, where the price follows the real-time market prices and is close to the optimal market situations. (Osterwalder, 2004, pp.98-101)

2.2.10 Cost Structure

In the BM, the financial situation is displayed as revenue, cost of sold goods, gross margin, and operating costs. Cost element measures all the expenses that have incurred when the value is created, marketed and delivered to the customers. (Osterwalder, 2004, pp.101-102) All costs decrease the profitability and cost saving is a potential way of improving it. However, with the indiscriminate cost saving is possible that companies only go out of business slower (Ries, 2011, p.160).

2.3 The Lean Startup

Eric Ries introduced method is his book of "The Lean Startup, How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Business" (Ries, 2010). In his book, Ries calls TLS 'a method' and also a 'methodology' (Ries, 2011). Instead of method or methodology, recent studies are calling it a Lean Startup *Approach* (LSA) (Ghezzi, 2018; Ghezzi & Cavallo 2018), and The Lean Startup (Fredriksen & Brem, 2017). In fact, even The Lean Startup is a bestseller and many successful start-ups have made use of the thinking (Ries, 2011; Fredriksen & Brem, 2017; Ghezzi, 2018), it lacks the theoretical foundation (Fredriksen & Brem, 2017; Ghezzi, 2018, see Ghezzi & Cavallo, 2018). TLS is connecting the theoretical roots from multiple research streams and disciplines (Ghezzi, 2018; Fredriksen & Brem, 2017). Table 3 presents the connections from other theoretical roots to TLS.

Table 3. *Research streams connection to the Lean Startup.*

Connection to The Lean Startup	*Ghezzi, 2018*	*Fredriksen & Brem, 2017*
Lean	x	x
Software engineering	Agile	Extreme programming
New Product Development	x	x
Real Options	x	
Organizational Learning	x	
Business model innovation	x	
Effectuation	x	x
Bricolage	x	x
Opportunity creation	x	

Acknowledging the importance of research and lack of theoretical foundation, this thesis focus on TLS how Ries, (2011) defined it, and supplements that with "LSA"(Ghezzi & Cavallo, 2018).

2.3.1 Introducing Lean Startup

As Ries (2011) says, entrepreneurs are everywhere and the TLS can be applied anywhere regardless of the size or the sector of a company. In fact, Ries (2011) speaks about start-ups in his book, but the examples he is referring are in the early phase of the product and/or service idea. To succeed entrepreneurs needs management skills and processes so that they survive in high uncertainty (Ries 2011, pp.8-9, 15, Sutton, 2000) and it is in line with Carmine et al. 2014 finding that unsuccessful start-ups had inconsistency between managerial strategies and execution. Still, entrepreneurs are suspicious of implementing management processes and practices, because they see that it accumulates the bureaucracy (Ries, 2011, p.15). Ries (2011) introduced Pivot is kind of a structured change that aims to put the company on road of growing sustainable business. Table 4 presents different pivot types (Ries 2011, pp. 149-150, 172-176).

Table 4. *Different pivot types (Ries 2011 pp.172-76).*

Pivot category*	***Description***
Zoom-in	Single product feature becomes a whole product,
Zoom-out	product becomes a single feature,
Customer Segment	Product solves real customer real problem but the customer is not the customer who company initially intended to serve,
Customer Need	Understanding the customer need was initially wrong, but when learning it, company discoveres true needs to satisfy,
Platform	Change from application to platform or vice versa,
Business Architecture	Changing from high-margin and low volume to low-margin and high volume or vice versa,
Value Capture	Changing the way company captures the value (monetization or revenue model),
Engine of Growth	Changing the growth strategy, may require the change for value capture as well,
Channel	Change of sales or distribution channel
Technology pivot	Providing same solution by changing the technology and achieving benefits on price and/or performance (common with established business).

* Pivot categories adopted from Ries 2011 pp.172-76

Ability to react on time is seen a key for start-up company success (Klotins et al., 2018; Sutton, 2000; Bajwa et al., 2017). The fast learning and adjustment of the BM, good guesses about the future customer, competitor and cost is vital (Teece, 2010). TLS seeks to eliminate waste by speeding up the **build-measure-learn cycle** (B-M-L) (Figure 10) and meet the real need of early customer (Ries, 2011). Build phase is to build a product with minimum effort and time to get the product out to the potential customers to test. Measure and learn is about testing this product and learning from experience.

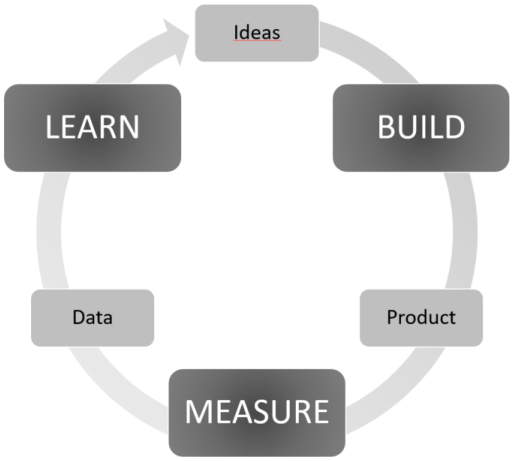

Figure 10. *The time through the loop of B-M-L must be minimized (adapted from Ries, 2011, p.75).*

Figure 11 presents the purpose of the TLS with the scenario that is adopted from Fredriksen & Brem (2017) and it explains what *validated learning* and B-M-L stands for (Ries, 2011). The more traditional approach for product development, 'causal thinking,' is also included in the Figure. Ries (2011, p.76) uses the expression of '*leap-of-faith'* in this context which means that believing in something that existence or outcome cannot be proved. Figure is explaining how companies can build products that customer wants instead of spending time on building product that customer is not willing to adopt (Ries, 2011 pp. 8-9, 40-49). The start-up company 'idea' is in the center of the circle and the solution is the outer circle. TLS also makes use of 'effectual thinking,' and it enables to reduce the uncertainty and test during the development. Each of the arrow (with solid line) in Figure 11 is one B-M-L loop. In B-M-L ideas are built into products and customer response is measured. The learning from experience starts after each measurement. (Ries, 2011 pp. 8-9) After each B-M-L cycle, there is a decision to be made – how to react to what was learned. In this figure, the validated learning are the small circles, and it is about finding a balance between the vision of the company, and what the customer accepts. The received data from 'learning from experiments' gives more accurate information on customer demand than asking the questions from the potential client (Ries, 2011 p.63-66).

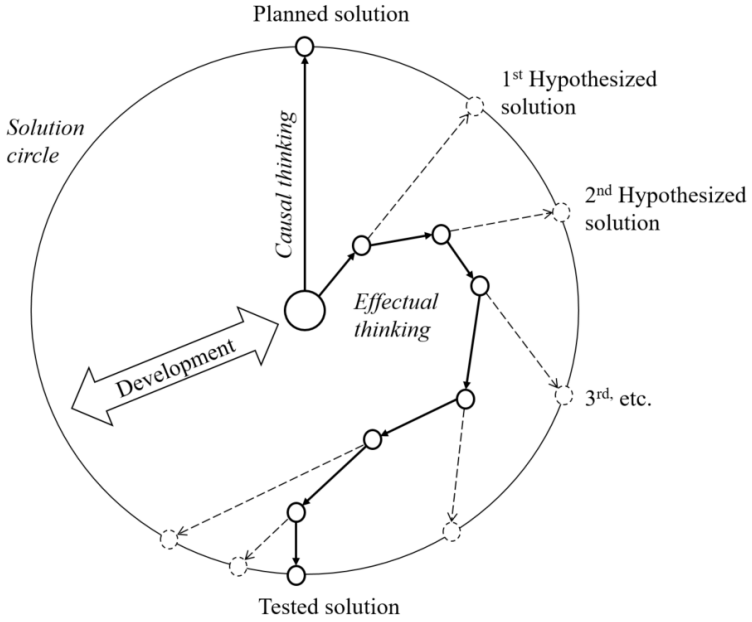

Figure 11. *Two different solution approaches; 'causal thinking' and iterative 'effectual thinking' (adapted from Fredriksen & Brem, 2017)*

After each B-M-L loop, the future actions must be decided – the more loops, the more you have to decide. The effectual thinking or applying the B-M-L cycle decreases the uncertainty.

Tversky & Kahneman (1974) explained that with an example where the distance of an object is defined based on how clearly the object is seen. The object seems close if it is sharp because the objects that are far away are blurry. The reliance, however, leads to a systematic error when estimating its distance. Therefore, the object's distance is easily over-estimated, if the visibility is poor because its edges are fuzzy. Similarly, the error occurs when the visibility is good and objects edges are sharp and therefore it leads to underestimation of distance (ibid.). Thence, the distance leads to common biases, which are also found in the intuitive judgment of probability. When standing in the centre of the circle (Figure 11) and trying to see to the solution circle, there is some uncertainty of what you see. However, the decisions you make is exposed by biases due to the over- or underestimation of the *probability* of success. The probability and behavioural and cognitional biases link the described phenomenon into another fairly recent research field of "error management". According to Johnson et al. (2013), biases may lead to mistakes, but on the other hand, studies are also showing that biases can also steer people away from more costly mistakes.

Meeting the real need of early customer is not simple. The customer needs are both varied and complex, and customer actions are not always consistent with what they say and what they want (Defeo & Juran, 2014). Human perception and experience are not necessarily the same, and it is possible that there may not be even link in between them (Laine, 2018

pp. 40-41). Particularly in the software business, the collection of customer needs is challenging, because software's are relatively immaterial, but its structure is dynamic and complex (Callele et al., 2017). Customer needs are gathered into requirements from different people operating at various levels in an organization and the ways the users, business processes and devices function are typically complex (Kotonya & Sawyer, 2014. pp.1-2). The problem is that requirements are often incomplete, informal and inconsistent (Callele et al., 2017), wrongly specified (Kotonya & Sawyer, 2014. pp.1-13) and understood differently (ibid.; Callele et al., 2017). Besides, the human factor is often forgot and the focus has been more in structure than in behavior (Callele et al., 2017). Understanding the requirements evolves as the design and development proceeds, and that leads to revisions of requirements. Requirements should not be vague nor open to interpretation, because those will be verified and tested after each iteration (Kotonya & Sawyer, 2014. pp.1-3, 1-11, 1-13).

A concept called Minimum Viable Product (MVP) aims to expedite the learning process (Ries, 2011, pp.93, 107-109). The first products are not meant to be perfect – additional features or polish beyond is waste, yet it is customer/industry dependent how unfinished the product can be (ibid., p.95). Ries (2011, p.77) suggests to experiment, and in practice, he advises to build the MVP. According to MVP definition, the MVP is produced with a minimum effort and time, and by following the B-M-L cycle. This MVP a prototype is measured (tested) with the real customers. (ibid.) Measurement of the progress, setting up milestones and job prioritization, is called innovation accounting, (ibid., pp. 8-9). In TLS, learning milestones are like the product milestones in traditional business. Innovation accounting reminiscent of an Agile method in software-engineering with the distinction that the purpose of the Agile is to create a software product, whereas TLS is not industry specific. In Agile, each iteration is like a miniature of a software project. Each iteration has limited time when all the engineering activities to implement the new functionality are made. Together the customer and supplier will evaluate the product features and original project requirements and agree on the content for the next iteration.

The Runway is "the amount of time remaining in which startup must either achieve lift-off or fail"(Ries, 2011, p.160). The runway has a connection to the company's financial situation, expenses and remaining cash in the bank. It is possible to extend the runway (time) by cutting the cost or getting additional funds. If the cost savings slows down the B-M-L loop, the company is only slowing down of going out of business. The correct way of estimating the length of the runway is to measure the number of opportunities to pivot before the company runs out of cash. Therefore speeding up the B-M-L loop lengthens the runway by enabling to achieve the same amount of validated learning in a shorter time and lower cost. That ultimately empowers the company to reach each pivot faster. (Ries, 2011, pp.160-161)

2.3.2 TLS process

Ries is not offering any clear processes or methods in his book. He justified the functionality of his *method* by telling either success stories or failures that he linked to TLS. Ghezzi & Cavallo (2018) developed LSA that supplements the TLS with "customer development" approach.

The product should be at first split into *the value hypothesis* and *the growth hypothesis*. The value hypothesis reminds the search-phase in LSA. It discloses if the customer is truly interested in using the product. The value hypothesis aims for changing the company BM and new product launch. (Ries, 2011 pp.61-63) The first activity would then be to find the *early customer* that has the problem or need that company starts to solve. When the early customer is found, the product is built by following the B-M-L cycle.

During *the growth hypothesis* is the testing how the product is spread from early adopters to the mass markets. In this phase, the BM and customers are already validated, and the focus is on marketing and sales. (Ries, 2011 pp.61-63; Ghezzi 2018). The *the growth hypothesis* phase is near to the execution-phase as Ghezzi & Cavallo (2018) calls it.

2.3.3 Experiences in implementing the LSA

A large number (227) of case studies has evidenced how digital start-ups adopted and implemented LSA addressing opportunities and issues that entrepreneurs faced during the study. The study was conducted between 2012 and 2017 with Italian start-ups that received funding from "formal investors." (Ghezzi, 2018)

Table 5 shows interesting results that Ghezzi (2018) found in his study. The first notion in this table is the enormous interest in LSA. 97% of the companies in this study adopted LSA and more than half of these companies said that the reason was the need for fast achievement of product-market fit (33%) and avoiding waste of scarce resources (21%). From the set of the remaining 7% who did not adopt the approach, 45% (25%+20%) had either inability to adapt the LSA or considered the process too complicated. Another interesting finding is the sources of information and training start-up companies received. Only 16% relied on own reading without external training. The table also lists the main concept tools and models these start-up companies adopted. Only 11% of the start-ups took all the LSA tools, but, e.g., 91% of the study group adopted BM. (ibid.) The research did not reveal whether the BM was introduced as a result of LSA or was it already in use.

Table 5. *Quantitative results on LSA adoption (adapted from Ghezzi, 2018).*

Research item	*Results*	*%*
Adoption of LSAs by digital startups	Yes	93
	No	7
Main reason for adopting LSA	Need to achieve product-market fit fast	33
	Need to avoid waste of scarce resources	21
	Need to organize startu's development	17
	Need to find alternatives to traditional business planning	8
	Need to please investors	3
Main reason for not adopting LSAs	Product-Market fit already achieved	45
	Perceived inability to apply to the startup's business idea	25
	Perceived complexity of the process	20
Sources of information and training on LSAs	Incubators/accelerators	32
	Workshops	22
	Universities	19
	Own reading	16
	Investors	5
Main concept tools and models*	Business model canvas	91
	MVP	64
	Build-Measure-learn loop and pivoting	38
	Earlyevangelists and trial users	14
	Falsifiable hypothesis	11
	All LSA tools	11
Stages of LSA adoption**	Early stage	58
	Late stage	32
	early and late stage	25
	seed stage	6
	seed , early and late stage	3

* tot. % >100% as up to 5 alternative selectable
** tot % > 100% as up to 3 alternative selectable

Table 6 presents other exciting findings from Ghezzi's (2018) study. Table shows that implementation of LSA took approximately 8.2 months to go from the first set of falsifiable hypothesis to first reasonable product-market fit. The shortest implementation duration was 4.1 months and the longest 13.5 months. The overall satisfaction of LSA was slightly poor as it gained only 2.8 in average in four points likert scale. That result is not encouraging even most of the digital start-ups used the approach and saw something in return. Start-ups saw that main outcomes of the LSA implementation were the discovery and validation of the BM and the identification of the needs of target market. The LSA assisted start-ups to evaluate, and verify the BM elements, e.g., channel and revenue model. The adoption of LSA also helped start-ups to obtain external funding. (Ghezzi, 2018)

Table 6. *LSA Implementation time and cost (adapted from Ghezzi, 2018).*

Research item	*Results*		
LSA implementation process length	Average:	8,2	*months*
	Upper bound:	13,5	*months*
	Lower bound:	4,1	*months*
LSA implementation process cost	Average:	34,000	*USD*
	Upper bound:	180,000	*USD*
	Lower bound:	19,000	*USD*
LSA implementation process cost	Average:	24	*%*
	Upper bound:	43	*%*
	Lower bound:	18	*%*
LSA adoption overall satisfaction		2,8	4-point likert scale (1.Dissatisfied - 4.Fully satisfied)

Anyhow, implementing the LSA processes and tools was far more complicated than entrepreneurs had initially thought (Ghezzi's 2018). Setting the hypotheses and design on the initial BM, shaping the correct MVP and prioritization of the MVP tests, and identifying and engaging the early customer, (i.e., early adopters or trial user), were seen the most problematic for the entrepreneurs. Some users also were afraid that they might have missed other market opportunities and threats. (ibid.)

3. RESEARCH DESIGN

This chapter introduces the research philosophy, the selected methodology, and methods and connects them to the research design and processes. In addition, this chapter portrays the data gathering methods and explains how the literature in this thesis is gathered. Finally, the applied research design is described.

3.1 Philosophy, methodology, and methods

Research projects are always different, especially when it comes to qualitative research (Morse 2009). Regardless, what is the philosophy, research strategy or methodology, it is essential to ask, what is the truth, and then to strive as close to the truth as possible. The fundamental idea behind this thesis is the philosophy of constructivism, which means that reality is relative. Experiences by different individuals are situation dependent even they have some common elements in experienced reality. The ontology for constructivism is relativism where the reality is constructed locally and specifically. The epistemology is transactional, and subjective, and methodology is hermeneutical, and dialectic. (Metsämuuronen 2008, pp. 6-13)

Qualitative research often aims for getting the better internal insight of the studied subject (Kiviniemi, 2018, p.79), and to “give a voice” to the studied audience (Hakala, 2018, pp. 21-22). Arranged test conditions are not applicable if the interest is in individual experiences in detailed structures of situations, and causal relationships (Metsämuuronen, 2008, pp. 14). The qualitative analysis aims to contemplate the research material as a whole, and to reflect the internal logical structure (Alasuutari, 2001. p. 33-39). Normal for qualitative research is that it does not follow any typical research process, but it intertwines in various phases (Alasuutari, 1995 pp.252-257), and the data collection, and theoretical frame is often developing during the research process (Kiviniemi, 2018, pp.73-78).

The case study research is an intensive study of a small number of cases, or a single case (Flyvbjerg, 2006), and the case can be studied by using qualitative, and/or quantitative evidence which are gathered from fieldwork, archival records, verbal reports, and/or observations (Yin, 1981). Case study is especially good strategy when studying a real-life situation, and when the boundaries between phenomenon and context are not clear (Yin, 1981). According to Yin (1981) case study is either exploratory, descriptive or explanatory. The advantage of using the case study method is that it enables to approach the real-life situations, and test views directly to the phenomena as it appears in practice (Flyvbjerg, 2006). A case study is empirical, with the aim of obtaining information in versatile, and several ways (Metsämuuronen, 2008 pp. 16-18), and it answers questions

such as what, how, what is it about, and why (Vilkka et al., 2018 p.192). It is more about examining, learning from the existing case in a particular situation, and aiming to understand the phenomenon deeply, more than intending to generalize the result (Metsämuuronen 2008, pp. 16-18). On the other hand, Morse (2009), and Vilkka et al. (2018. p.199) do not exclude the possibility of generalization when utilizing the case study approach. Flyvbjerg (2006) does not see case study summarisation and generalization desirable but speaks about reading the case study as narratives. Versatile breakdown of case gave the potential for generalizability of case studies if the research and its conceptualization are well described, and performed (Vilkka et al., 2018. p.199).

The case selection can be practical or theoretical and the choices must be relevant to the studied subject, and information sought (Vilkka et al., 2018, p.192). Case study selection criteria by Vilkka et al. (ibid.):

- typical as possible, the possibility for generalization
- borderline case, theory testing
- unique, exceptional or educational, learning the phenomena
- revealing, getting into unknown phenomena
- exemplary.

Qualitative research has limited data collection strategies (Morse, 2009) where its data collection, and analysis are often connected (Hakala, 2018 p.20). Its main methods are observation, content analysis, interview, and transcription (Metsämuuronen, 2008, p. 14). The strategy in data collection, and analysis method is close to ethnographic, where the interest is in understanding the values, believes, and practices of the studied issue (Metsämuuronen, 2008, p.45), and when the intention is to reveal everyday activities, and systematically conceptualize them (Paloniemi & Collin, 2018, pp. 232-233). Typically, the research material is gathered until the saturation point is reached, which is the moment, when the theoretical, and empirical research material is not bringing up that much new information regarding research subject (Vilkka et al., 2018, p.195).

3.1.1 Content analysis

Collection and analyses of documents belong to content analysis, and when conducted qualitatively, the focus is on the manifest, latent, and content-dependent meaning, and not in statistical findings. (Rapley & Rees, 2018). Qualitative content analysis can utilize deconstructive reading which may offer different perspectives, reveal invisible, avoided topics, and conflicting matters in the text by comparing different theories with the text (Niikko, 2018, pp. 96-97). Anything, which are not clear or are inconsistent in the writing must be paid special attention (Niikko, 2018, pp 93-103).

3.1.2 Interviews

Interviews are relatively conventional methods for gathering data, and used in various fields to understand experiences, interpretations, and spatiality of social life as well as shedding light on issues of concern (Dowling et al. 2016). Seeking out an open attitude towards another by numerous interactions is typical for hermeneutical research as the interviewee answers, and expressions need to be explained (Laine 2018 pp.33-38).

The thematic interview should be perceived as a situation, where the interviewer, and interviewee produce research material (Alasuutari 2001, pp.142-156; Hakala 2018 p.28-29). As well as understanding the interview methods, it is essential to understand the execution - how the themes are selected, what is their relation to the theory, and other interview practicalities. It is essential to choose an interviewee who has been involved in when information, and experiences, data, have evolved. (Hakala 2018, pp.28-50) The number of interviews is case specific. As the interview is a social event, the age of the participants may affect the situation as well as the interview location. (ibid.) If the facilities are familiar to the interviewee, the interview has a better chance of succeeding. It must be agreed in advance if the conversation is recorded or if there is a need to send advance information about the interview subject. (ibid.) For the studied subject, the themes must be chosen either based on previous literature, theory or intuition. Regardless of what is the way of selecting the themes, the research problem must be kept in mind. (ibid.) When basing the interview on the previous literature, the study results can be utilized, and compared to the earlier studies. Themes can also be derived from theory when the theoretical concept is transformed into measurable form, i.e. themes. Although, themes may also rely on intuition, while it is riskier as it often remains incomplete, and easily based on researcher preconceptions. (ibid.) According to the Sadler-Smith & Shefy (2004), the intuition relies on expertise, and feelings but its logical relation is not clear. However, the intuition may form into insight that is conscious, and explicable. (Sadler-Smith & Shefy, 2004)

The interviews can be divided into three categories; structured, semi-structured, and unstructured interviews (Alasuutari, 2001, pp.145-156; Metsämuuronen 2008, p.38). An example of structured interviews is a pre-defined mass-questionnaire that is performed by an unknown or anonymous interviewee. A structured interview, however, is not a right approach to study experiences (Laine, 2018. p.39). A thematic interview can be categorized in unstructured (Alasuutari, 2001, pp.142-156) or semi-structured interview (Metsämuuronen, 2008). For example, the thematic interview is semi-structured if the interview topics are structured, and the interview itself is conducted in an unstructured manner (Metsämuuronen, 2008). Un-structured interview method does not have any closed questions the way, e.g. structured or semi-structured have (Alasuutari, 2001, pp.142-156; Metsämuuronen, 2008, pp. 40-41). The unstructured interviews are somewhat close to natural conversation situations, where interviewee, but also the interviewer reactions may be part of the study material (Alasuutari, 2001, pp.142-156;

Metsämuuronen, 2008, p. 41; Laine, 2018, p.39; Hakala, 2018 p.28-30). Unstructured interview method can be used to encourage to speak without restriction, in which case the information form is the integral component of the study (Kent, 2014). In general, in an unstructured thematic interview the interviewee does not respond to any question without trying to understand why the question is asked, what is the aim of the subject, and what is the background of this question. This kind of interpretation models, and assessments of the situation are orientating the interviewee, which may lead to the embellishing the answers. (Alasuutari 2001, pp.151-155) There is often an intention to establish a sense of commonality with the interviewee to build trust, and genuine interaction (Manderson et al. 2006). Though, it cannot be assumed that a faithful research relationship would necessarily produce better research data because it seems to depend more on question layout (Alasuutari 2001, p.148).

3.1.3 Triangulation

Triangulation suits for both, quantitative, and qualitative research, but also for multi-methodological research (Vilkka et al., 2018, p.195). The concept of triangulation means that the research issue is contemplated from at least two points or perspectives, and traditionally that is done at the end of the study when its validity is assessed (Figure 12). According to original conceptualization, these perspectives were theoretical, investigator, data, and methodological triangulation. (Flick, 2018) However, the focus in using triangulation has moved to the direction where triangulation is combined with ongoing research, and especially when collecting new qualitative data using several perspectives. Triangulation will enable data resulting from different methods to confirm and support the same conclusions mutually, but more interestingly, the triangulation may cause different aspects on the same issue, and by that complements on the matter, and gives a fuller picture of it. (ibid) Naturally, the triangulation may bring up diversification, and contradictions of data, which may be exciting finding. (ibid)

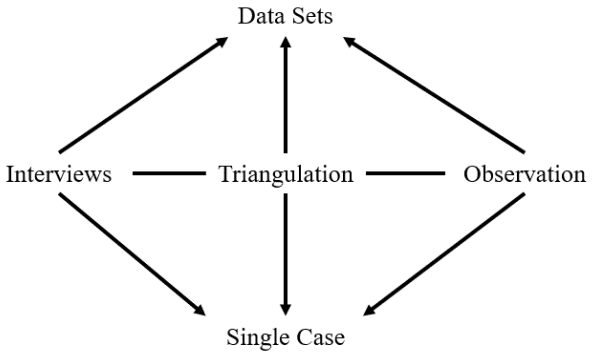

Figure 12. *Levels of triangulating data in qualitative research (Adapted from Flick 2018).*

3.2 Literature review

This chapter introduces the literature review method employed to this thesis. The literature review started with using the snowballing method (Wohlin, 2014). The selected search database was ScienceDirect as it covers broadly social science literature. One of the snowballing examples is shown in Table 7. *ID* 4 search terms produced 22 search results, and based on the context of the abstract, five of the articles were selected for closer reading. If the article consisted potentially good references, which may reveal more insight on the studied phenomenon, the references were selected for further reading, etc. However, this method produced either an impractical amount of articles for manual reading or when limiting the search results, and the articles did not cover the topic in the desired manner. Furthermore, Jörgensen & Sheppard (2007) have made the same observation. Too narrow use of substitutes for the terms (key-words), may cause lack of essential papers in the research results, but the too vague use of key-words, may cause a tremendous amount of search results which is too large set to be meaningful to analyse (ibid.).

Table 7. *Example of literature review search result from ScienceDirect.*

ID	*Find articles with these terms*	*Title abstract key-words*	*Article types*	*Years*	*Date*	*Number of search results*
1	Business Model	Innovation	Review article AND Research article	no limits	18.9.2018	3224
2	Business Model	Innovation	Review article AND Research article	2010-2019	18.9.2018	2784
3	Business Model	Innovation	Research article	no limits	18.9.2018	3051
4	Business Model	Innovation AND taxonomy	Research article	no limits	18.9.2018	22

Subsequent literature searches were based on Jörgensen & Sheppard (2007) recommendation use manual search, and digital libraries, in such cases, when the completeness of search results is not essential (ibid.). Whenever the analyses showed that the subject was tackled too lightly, the content was supplemented with additional information from other sources. Even it is typical for qualitative research that the research phases are intertwined (Alasuutari, 1995, pp.252-257), it made the literature review process very fragmented, and systematic notation was impractical.

3.3 Research design of the case study

In this thesis, the aim is to get more insight into the studied case company during its lifecycle. The philosophy supports the applied research strategy, which both work as guidance for research methodology, and method selection, and implementation.

The study method should be chosen based on the problem under study, and its circumstances (Flyvbjerg, 2006), and in this thesis, it was chosen for practical reasons as the research was an assignment from the case company, and the possible methods to gathering data were interviews, and content analysis. This case study belongs to the category of "explanatory case study" (Yin, 1981), seeking for explanations, and the applied selection criteria is "revealing, getting into an unknown phenomenon" Vilkka (2018, p.192). The case study with interviews and content analysis is seen as practical methods for this thesis, as there is a need for understanding and interpretation the studied phenomena deeply.

Research design consists of (Figure 13):

1. **Data collection:** three different sources, two interviews, and documents.
2. **Preliminary analysis:** Intuitive theming for each set of material generated *initial themes.*
3. **Triangulation:** Initial theming and its contents are merged generating *preliminary theming* with one content (Appendix A).
4. **Analyses:** *Final theming* is based on the "BM elements" (Osterwalder 2004), and the content is from triangulation.
5. **Synthesis (in chapter results):** Theory, especially "Lean Startup" (Ries 2011), and analyses result are synthesized.

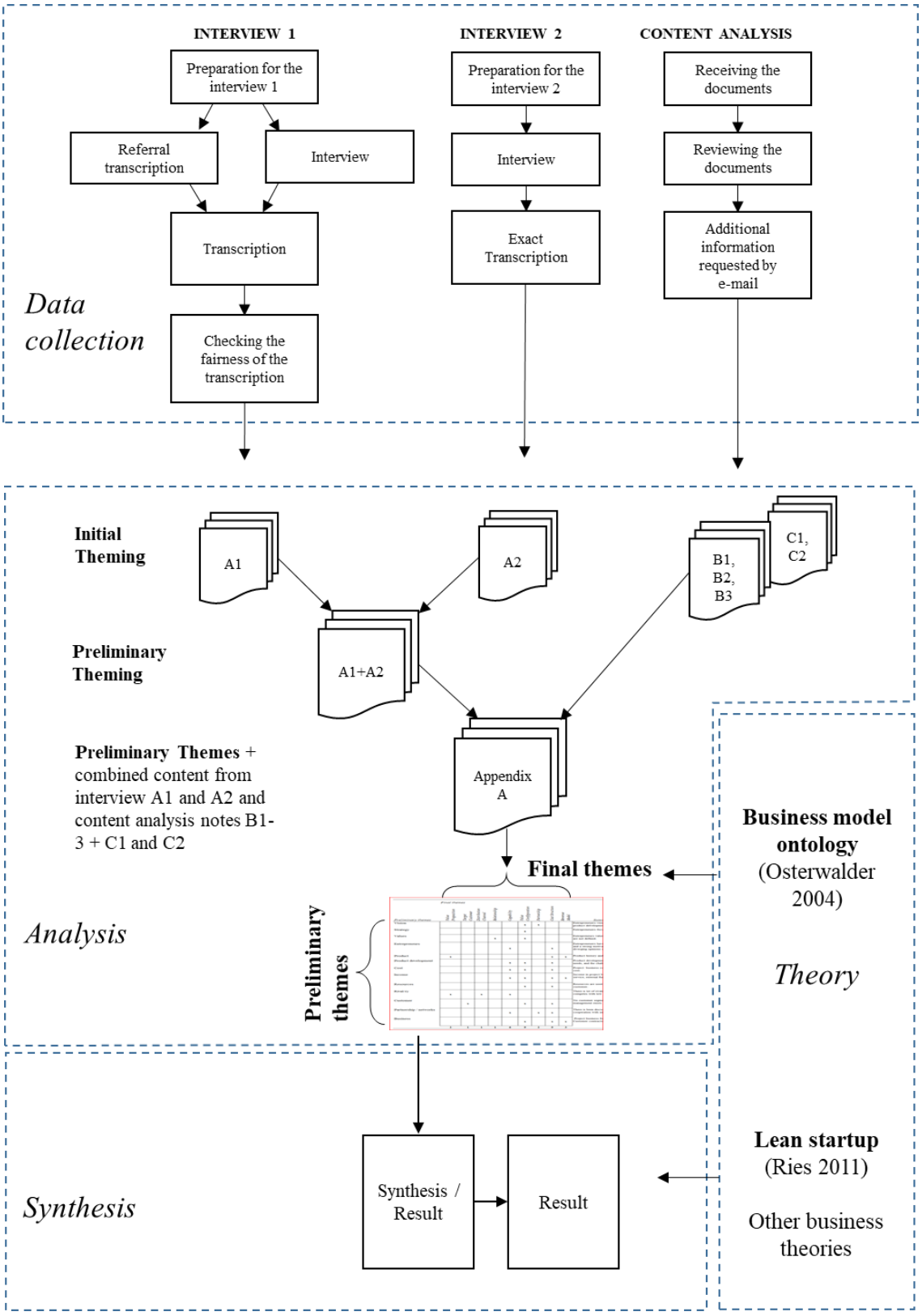

Figure 13. *Research design.*

Table 8 presents the setting for the first and the second interview, which both are using the unstructured thematic interview method. Data gathering in the first interview was using "referral transcription" (University of Tampere, n.d.) concurrently during the

interview. The content validity is ensured by providing the transcribed material to the interviewee to answer, refine, validate, and approve. The second interview uses “Exact transcription” (ibid.) that is audio recorded, so the content validity depends on the exact transcription quality. The interviewee, and the interviewer, as well as the location, was same in both interviews.

Table 8. *Setting for interview 1, and 2.*

		Interview	
Category	*Subcategory*	*1*	*2*
Interview method	Type	Thematic	
	Structure	Unstructured	
	Theme selection criteria	Intuition, main category chosen before the interview, sub-categories bases into interview context	
	Transcription type	Referral transcription	Exact transcription
Interview	Location	Company office	
	Documentation	Field notes	Audio recording
	Preparations before the interview	3 selected customer contracts provided prior the interviewer	Main theme informed to the interviewee prior the interview
Interviewee basic information	Theme	Project business and customer relationship, selected based on pre-material submitted to interviewer prior the interview	Case Company background and product
	Interviewee	1 person	
	Position	Company founder, engineer,	
	Gender	Male	
	Age	40-50 years old	
Interviewer	Interviewer	1 person	
	Position	Not known conflicts of interest, no previous positions or connections in company business nor the industry, no previous relationship with the interviewee	
	Gender	Female	
	Age	40-50 years old	

The content analysis in this thesis has applied parts from theming the document text, and from deconstructive reading. The analysed content is a collection of contract documentation from three different projects, which the case company representative (interviewee) selected. The interviewee was asked about the documentary related questions afterward via email, and those e-mails are part of the content analysis. The first interview also took advantage of the content analysis documents. There are three different types of documents used in the content analysis (Table 9). The primary documentation consists of contract and project documents, and its appendices. E-mail threads and other supplementary material are used as additional information explaining some particular topic when required.

Table 9. *Content analysis document categories.*

Content category			*Date*
Contract documentation with appendixes	Number of contracts and naming	3	
	Received		1.6.2018
	Contract identification	I, M and F	
	Number documents	I=5, F=4, M=5	
	Selection criteria	Selected by case company representative	
	Principle of publicity	Confidential documents	
e-mail	Participants	researcher and interviewee	
	Number of e-mail threads total	8	
	Number of e-mails selected for content analysis	4	
	Selection criteria	Topic is related to the research	
	Topics	Contract papers	10-11.6.2018
		Agenda for 2nd interview	16.8.
		Additional questions 1	23.8.2018
		Additional questions 2	23.8.2018
	Principle of publicity	Confidential documents	
Supplementary material	Research diary field notes	1	
	Field notes	3	
	Principle of publicity	Confidential documents	

The aim of theming is to address the research questions, and to find candidate explanatory factors to explain the studied phenomenon. The content analysis documentation, and interviews 1, and interview 2 are used as background material, and those are reviewed, validated, themed (initial and preliminary), and summarized. Initial theming was conducted separately for both interviews. Content from the content analysis was added on merged interviews that have generated preliminary themes. Appendix A contains the summarization of the preliminary themes and its content. Preliminary theming is based on intuition, and insight as the author has a strong practical experience from the industry as well as theoretical understanding from industrial management studies. Final theming consists of preliminary theming, and during the analyses its content was combined with the "BM elements, and segments" (Osterwalder 2004).

Interviews are identified with coding A1 and A2, where the "A" refers to the method of data gathering "interview," and number 1 and 2 are separating the interviews in chronological order. Content analysis is coded B1, B2, B3, which refer to the analysed customer contract documents, "B" indicating the contract, and its appendices, and number the order of the contract in alphabetic order. Content analysis also includes also the e-mail conversation "C1," which is identified with the same logic, "C" refers to the e-mail, and the number to the e-mail chain in chronological order.

4. ANALYSES

The analyses aim to portray the research material (Appendix A) in relation to Osterwalder (2004) BMO segments; value proposition, customer interface, infrastructure management, and financial aspects.

First subchapter of the analyses outlines the theming method explaining how the research material content, and preliminary themes are derived into final themes. Furthermore, subchapters 4.2, 4.3, 4.4, and 4.5 incorporates the research material with the BMO segments. Last subchapter 4.6 will summarize a range of different findings of the analyses.

4.1 Final theming of analyses

Table 10 presents the link between preliminary, and final theming. The preliminary themes are derived from the content of the Appendix A, and final themes uses the BMO elements. The BM elements are shown in columns, and preliminary themes in rows. If the preliminary theme content reveals linkage to the BM elements, it is marked with “x” in the table. The content of the preliminary theming may not have an unambiguous term, which links the preliminary theme to the final theme, but the connection can be found in the substance. The content in next chapters exploits this theming.

Table 10. *Preliminary themes connected to the final themes.*

Preliminary themes*	Final themes**											Summary of the preliminary themes content
	Value proposition	Customer interface			Infrastructure management			Financial aspects				
	Value Proposition	Target Customer	Distribution Channel	Relationship	Capability	Value Configuration	Partnership	Cost Structure	Revenue Model			
Vision				x		x	x			3		Entrepreneuers vision on profitable growth by doing profitable business and product delvelopment. Visions in partnerships exists.
Strategy	x			x		x				3		Entrepreneuers focus is on engineering activities and not in strategy.
Values	x			x		x				3		Entrepreneurs values are in customer satisfaction and honesty, company values are not defined.
Entrepreneurs	x	x			x			x		4		Entrepreneuers have a good understanding on customer opeartional environment and a strong motivation in improvement and development. diverging opinions on the business strategy
Product	x							x	x	3		Product history and features description.
Product development	x				x	x		x		4		Product development includes the future visions, development and customer needs, and the challenges in it.
Cost					x	x		x		3		Project business cost contains sales leads from partners, engineering, development and components cost.
Income	x				x	x		x	x	5		Income in project business comes from components, designing, consulting and service, external funding needed for product development
Resources	x			x		x		x		4		Resources are used in R&D, sales, project business activities and goodwill to the customer.
Rival/ry	x		x	x	x					4		There is lot of rivalry and sales is based mostly on sales leads. Case company competes with low price, good quality (skills), and customer service.
Customer	x	x		x		x		x		5		No customer segmentation is made.no systemized customer relationship management exists. Customer is valued highly and serviced well.
Partnership / networks					x		x	x		3		There is been discussion on partnerships with some of the competitors. Some cooperation with university is tried earlier with no success.
Business	x				x	x		x	x	5		Project business follows certain process but business processes are not defined. Customer contracts are strongly back-paid.
Element appearance***	10	2	1	6	7	9	2	9	3			
Segment appearance****	10	9			18			12				

* Preliminary themes content can be found from appendix B.
** Preliminary themes content from appendix B is derived into the business model elements and areas.
*** The appearance of the preliminary themes in each business model segment is calculated
**** The appearance of the preliminary themes in each business model segment is calculated

4.2 Value Proposition

The company's value proposition element represents the value that customer gets from company's offering, products, and services, and it describes the way a firm differentiates itself from its competitors. It is also the reason why customers choose the vendor. (Osterwalder, 2004, p.50).

The company's offering carries the meaning of the value proposition. In Table 11 case company's value proposition is described, and evaluated concerning the value level, price level, and reasoning. *Description* summarizes the value proposition, *reasoning* explains in what way the feature is valuable for the customer, *value level* compares the product feature to competitor's offering, *price level* discloses the product value, and the *lifecycle* represents the product lifecycle phase when the customer receives the value. Ability to evaluate the customer value comprehensively requires the understanding of customer needs, how customer values the product, and what competitors are offering.

The interviewee did not tackle *value level* during the interview but the *customer value* was discussed. The customer contacts are based on the sales-leads (explained in details in chapter 4.3). The customer requirements are conventional for case company's industry, and therefore the requirements can be fulfilled with the value level of *me-too*, and somewhat with *innovative imitation*. The case company has a vision of new product (explained more detailed in chapter 4.2.2), which has potential to fit in value level of innovation.

The Price level can be defined by comparing the value proposition price level with the competitor's prices (Osterwalder 2004 p.53). Case company, however, is not fully aware of the competitor's prices but the interviewee assumes that their rates are reasonably low. In addition, there is a lot of rivalry in the markets. Therefore, the price level is expected to follow market prices.

***Reasoning*:** Back-paid payment terms, which case company often has in their customer contracts, are one way of creating customer value by *reducing risk.* In practice, the back-paid payment terms is a non-negotiable precondition. Merely, the reason for requiring such payment terms is not likely in risk reduction, but more in the creation of *economic value*. In recent years, companies have concentrated into the cost reduction, and invested capital. That has led to the situation, where companies require their suppliers to provide long, and back-paid payment terms. For the vendor, it means that they must either be able to finance the project or be able to transfer some or all cost to their own subcontractors or suppliers. Based on the interviews, the case company has not been able to move the expenses to the suppliers as they have not got power over the suppliers, and therefore the project is funded by the case company. This point is discussed more in subchapter 4.5 Financial aspects.

Risk reduction is an important attribute especially for software products because the integrated systems must function together, and the system security must be maintained during the system lifecycle. In the case company situation, the service period is usually agreed in the contract, and that way the customer risk reduces.

Table 11. *Value proposition.*

	Life cycle Value			
	Purchase	*Creation*	*Use*	*Renewal*	*Transfer*
Customer value	Good contract terms Product demo supports customer decision making Ability to approach vendors via on channel	Customer participation in requirement engineering process The system implementation is done smoothly and in cooperation with the customer System implementation includes the user training and the training material	Benefits on value creation phase enables customer to receive what they have specified Possibility to pilot the project "cloud based" - no need for massive integration which may disturbe the operations	Good warranty handling Contractual service period Vendor will manage the cloud services (if cloud services are included in the scope of delivery)	Customer owns their data and they have the right to transfer it elsewhere if needed System transfer to third party is not allowed
Value level	Sales lead: Me-too Demo/pilot system: innovative imitation	Me-too	Me-too	Me-too	Me-too
Price level	Market price				
Reasoning	Risk reduction/ economic value: Back paid payment terms Risk and effort reduction: ability to test product demo	Use, risk and effort reduction: smooth implementation and training	Use: Value proposition matches with customer requirements	Use: Period of interruption during the production as short	Use: Data usage in other means possible

The customer value is added during the product lifecycle. The value can be received when the product is *created, purchased, used, renewed* and *updated*. Value is also added when the product becomes obsolescent, and when the value is *transferred* elsewhere. (Osterwalder 2004 p.53-54) In project business in which case company operates, purchase value comes chronologically before the value creation. The case company

exploits the *purchase value* by showing a product demo to the customer. When the client sees the key features of the system in practice, it mitigates the difficulty of decision-making. The system demo is a demonstration of the case company's skills, and it aims to convince the customer that the case company is capable of delivering the needed solution. The interviewee told that the demo had been a reason why the customer has chosen the case company's solution.

Customer will receive value during the product *creation* (development) as they can participate in the RE-process. It is about the possibility to affect the final delivery during the whole process without being charged extra. However, it is difficult to estimate how crucial this value is in customer perspective but the case company considers it as an excellent customer service. The interviewee did not say if the competitors would involve the customer in the development of the product in the same way as the case company. Therefore, it is hard to say, if the case company value creation is a competitive advantage. The value of the *use* is after the system delivery. There is a possibility to pilot the project "cloud-based" with low threshold without integration into customer's IT-systems. If the customer thinks that system is valuable, its integration into other systems is possible. Some customers the cloud-based system usage is the best option. The case company is not monitoring the customer satisfaction, and therefore, there is no certainty of how valuable the system is for the customer during its use. The customer is contacting the case company if they think that the system is not functioning well or if there arise new customer needs, which requires a system update. The lifecycle attribute, *value renewal*, consists the warranty, and after-service period, and those are included in the contract. If the customer has a problem, they contact the case company. Case company responds to the customer requests without a delay, and often it means that customer is receiving the first visit without additional charge regardless if the visit was not a warranty case. The contract with the customer prohibits the system *transfer* to the third party. The customer however has a right to move their data elsewhere if needed.

4.2.1 Customer requirements

The nature of the project business will ensure that the main customer-requirements will be fulfilled during the project. Customer needs and the system are based on the analysed data. Figure 14 shows, with dark grey and blue, all the elements that the system includes, and with light grey the needed system development knowledge. System requirement generates from the physical environment, customer operational environment, organizational practices, customer strategy, and from the technology. The developed system consists of the core system, components, system customization, and possible cloud services and integrations. The core system is the one, the case company developed in its early days. The core system is the foundation for all development projects.

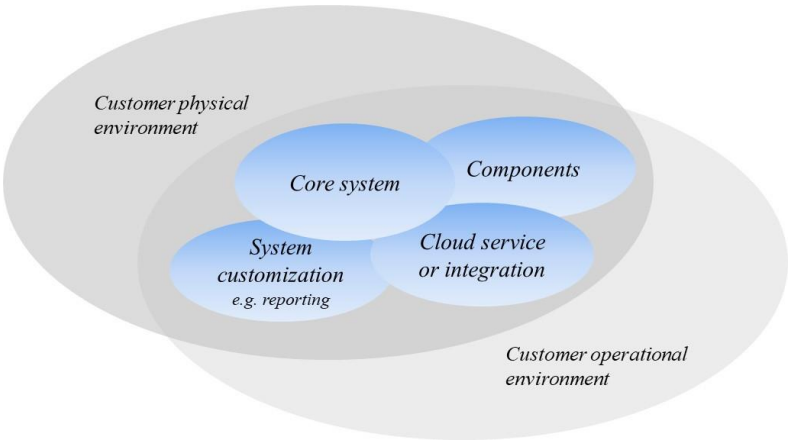

Figure 14. *Customer specific system offering.*

The customer requirements are a combination of information from *sales-lead*, request for quotation (RFQ), and new learning during the product development. Besides, there are product functionalities, which the company founders defined when they developed the first product. These product features continue to serve as the basis for most systems developed.

According to the interviews, the case company has no intentional customer relationship management processes, and regular contact to the customer after the product delivery is mostly lacking. Occasionally they call to the customers, and ask how the system works and if there is any need for the system update. Typically, if they do not hear anything from customer side, the assumption is that everything is ok. The interviewee admitted that the reality might be anything in between the satisfaction, and dissatisfaction in such cases. For the above reasons, the long-term customer satisfaction, and customer needs in the product life-cycle could not be verified reliably within this research.

4.2.2 The value proposition of the new product

The case company has a vision of developing a new generation product. The concept of the new product is aiming to deliver system, which does not require programming skills. The aim is to sell "system package" that customer can configure independently. This product idea was born from company's own experiences and in the discussions between other players in the industry. An indication of the need for a product is also that its competitors recently develop some of the product attributes, yet that development does not cover the whole concept of the new product idea. The case company has had the same idea of this particular product feature for years, but they have never managed to complete the development.

During the interview, the interviewee speaks about the value proposition; the ability to implement the system without programming skills. He also mentions the difficulties that new entrants (competitors) may face when they try to break into the industry. The

interviewee does not see the programming skills to be the challenge for them, but the primary problem would be the understanding of the technology, the customer's physical environment, and customer's operational environment as a whole.

4.3 Customer Interface

Customer interface covers all the customer related elements such as *targeting the customer, customer relationship,* and *distribution channels* (Osterwalder 2004). The customer targeting is about the customer segmentation based on specific criteria. The channel is a link between the target customer, and the value proposition. The case company has not done any customer segmentation even they recognize its importance. Reason has been practical, as the case company needed all possible contracts to secure the revenue.

In the first phase of the *customer's buying cycle* is *awareness,* which is attracting the customer. The case company's customer *acquisition* is mainly based on the sales-leads, which the case company gets from non-profitable association. This association delivers these sales-leads also to the other vendors. The customer acquisition does not include calls to new customers, and in fact, the interviewee says that product development requires so much effort that there is no time for sales work. Very rarely, the customers are contacting the case company directly and when they are, mostly the inquiry contains a quote for system components. The acquisition is shown in Figure 15 where the channel link, association, is illustrated as a one-way road.

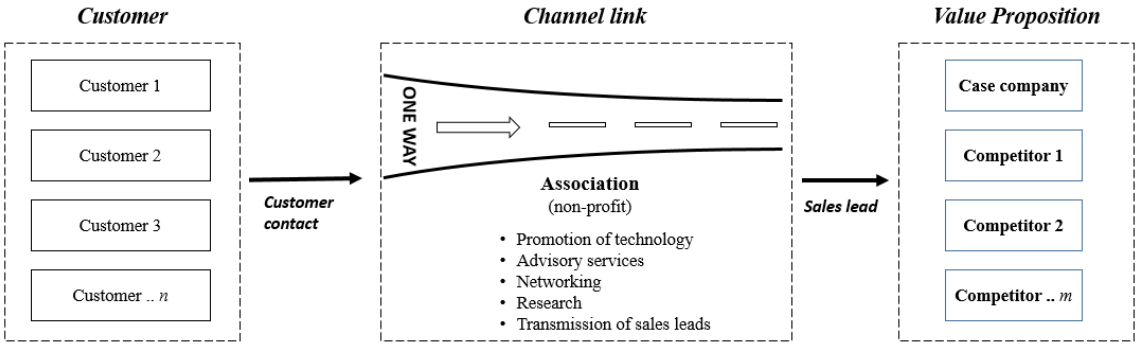

Figure 15. *Customer acquisition process where n referst to the number of customers, and m refers to the number of competitors.*

All the vendors who receive the sales-lead are in equal position. Acquiring customers by using the sales-leads reduces the need for marketing and sales work, but the competitors have the same benefit. On the other hand, the case company is also dependent on the association's ability to attract the customer in the first place. The use of "association" cannel link means competition in crowded "red ocean" (Kim & Mauborgne 2004) as there is always other competitors involved in the rivalry, and therefore there is not that much room for getting better profit margins nor increase the sales volume.

Channel link contributes to the customer value creation in three different ways; through *use,* by reducing *risk,* and/or customer *efforts* (Table 12). The channel link "association" reduces the customer's effort because, with one contact, the customer receives a tender from all potential suppliers.

Table 12. *Customer "buying cycle" phases, channel link, and the value creation reasoning.*

		Value creation (reasoning)		
Customer 'buying cycle' phases	*Channel Link*	*Use*	*Risk*	*Effort*
Awareness	Association	Source of system and service information	Reduces customer risk by providing information	Ability to reach several vendors with minimum effort via the association
Evaluation	Direct contact	-	System piloting opportunity	System demo
Purchase	Direct contact	Flexibility in contract negotiations. Project starts before contract is signed	Positive contract terms	-
After sales	Direct contact *	-	Latest system update will be automatically offered, no risk of outdated system	No need to contact the supplier

* case company is not contacting customers sytematically

The customer has an opportunity to compare different solutions, and to bargain the prices and therefore the value creation is by *use,* reduced *risk,* and reduced *effort.* The interview did not reveal anything on *brand* building, but, e.g. congruent tender material with company logo, and standard layout is one tool for promoting company brand. Although, the case company internet pages, logo, and system instructions are also a way of building the company brand.

Evaluation is the second phase in the customer buying cycle, and during that phase, the customer matches the potential solution providers with the requirements. In this point, the customer is often meeting the vendors, and getting more information about the system provider, its capabilities and the system they offer. *Personalization* is about knowing the customer, understanding the customer operational environment, and their needs. The case company has a one-to-one human relationship. The segmentation would give a more general understanding of specific customer segment needs, but the new knowledge is also a benefit that the case company has gained. The case company has a versatile knowledge of different system features, and system applications in a variety of industries, and that enable them to propose, and also offer alternative solutions that would satisfy the customer needs. The interviewee is not fully aware of the reasons why the case company wins or loses the bids, but he assumes that their knowledge is one reason for the winning. Another reason may be the system demo they are often presenting to the customers. Even the customers' awareness of the applied technology has increased over the times still the

customers have difficulties in comparing different alternative technologies. The system demo helps the customer in their decision making. The knowledge is also a foundation for the *trust* building in the sales phase when the case company can convince a customer that their solution is the best solution for the customer. The presented demo, and the opportunity to pilot the system are tools for demonstrating the knowledge and therefore building the trust.

The phase *purchase* takes place after the customer decision-making, and is not fully in sequence with the project delivery. A value *use* means that the case company is flexible towards the customer and the project usually starts before the contract negotiations are fully completed. Even the contract may not be signed, when the project starts, the interviewee sees that the contract price, and the schedule are fixed. Usually, the case company carries the additional cost due to the changed specifications even if the requirement comes from the customer. The same can be seen from the content analysis, because the offer and related contracts with the appendices are for some parts obscure and contradictory. The honesty is the case company's core value - they deliver what they promise to the customer.

The case company is building the *trust* also during the contract negotiations (purchase phase). Osterwalder (2004) acknowledges the insurances as trust building mechanisms, but also the customer contracts are aiming for the same thing. The Contract is agreed to ensure that both parties understand and commit to the contract terms. Most of the contracts include the clauses of confidentiality including contractual penalties to secure the contract breach. The maximum penalty is usually the same than the contract price. There are also agreed on certain conditions when the customer has a right to terminate the contract. The Contract is part of the customer's risk management.

Retention/add-on sales: According to the Osterwalder (2004 p.67), the phase *after sales,* is the most promising phase. However, the case company does not have any systematic process or practice to contact customers after the successful project delivery. Sometimes the customer is called and asked if they are happy with the system or if they need a system update. The Assumption is that if you do not hear any news from the customer, it is good news. The interviewee admits that it is not always the case. Many of the presented possible after sales opportunities are already included in the contract, e.g. implementation, and training.

The delivered system is one mechanism for the retention, and add-on sales, and it can be used in two different ways:

1. The case company sells pilot systems to the customers, and by that the aim is to engage the customer to extend the system for several sites or
2. the pilot system is later integrated to the company's other systems, e.g. ERP systems.

The *Add-on sales* can be made during the project as well. However, changes during the project or consultancy services are seen somewhat problematic by the interviewee. He says that mainly the changes will not be invoiced. He also told an example where the customer has called and claimed of system error of the delivered system. Eventually, the failure was not in their delivered product, but the troubleshooting requires resources, and they never invoiced the work, but the customer got it as goodwill. The interview did not reveal, whether there was an after-sales negotiation. The interviewee stated in the same context that he finds difficult to say *'no'* to the customer. Interviews revealed that being flexible, and not invoicing all the changes or small services is good customer satisfaction.

4.4 Infrastructure management

Infrastructure management describes how the capabilities are utilized to create value for the customer (Osterwalder, 2004, p.79). Osterwalder (2004) links the value creation specifically to the value customer is willing to pay for. The capabilities are a more comprehensive concept for small companies, and therefore the capabilities will be presented in this thesis according to Long & Vickers-Koch (1995).

The Infrastructure management element "capability" is presented in Table 13 listing the case company's capabilities, the skills, and systems. The list might not include all the capabilities that case company has, because it is based on the data collection.

Table 13. *Case company capabilities are categorized according criterion of Long & Vickers-Koch 1995*

*Capability Type**	*Description*	*Case company *** *Skills*	*Systems*
Support	Support services	Long experience of entrepreneurship	-
Basic	Skills and systems necessary to be in business	System knowledge: core system understanding, component knowledge, understanding on cloud services and integrations and programming skills with several different programming lan-guages	Basic systems exists for e.g. e-mail, customer relationship management (not used)
Critical	Skills and systems of todays competivie advantage - value creation	System development, service, consultancy Quality testing of new components, customisation of system and reports, programming and building interfaces	Core system System demo Experience in components (ability to use different types of components)
Cutting edge	Skills and systems of tomorrows competivie advantage - value creation	Uunderstanding on several industries Vision of new product and productization Motivation to development	-

*Long & Vickers-Koch 1995
**Appendix A

Based on the interviews, the company's core capabilities are in *human resources* in skills, and knowledge. As there are only two employees in this company, there is needed skills for a variety of activities. Figure 16 is illustrating the case company's knowledge base.

The Industrial and technological knowledge is the base for that knowledge. According to the interviews, the technology is not complicated, and the programming is rather simple. However, it is essential to have overall understanding of the technology, the industry, the customer physical environment, the customer operations, and the system.

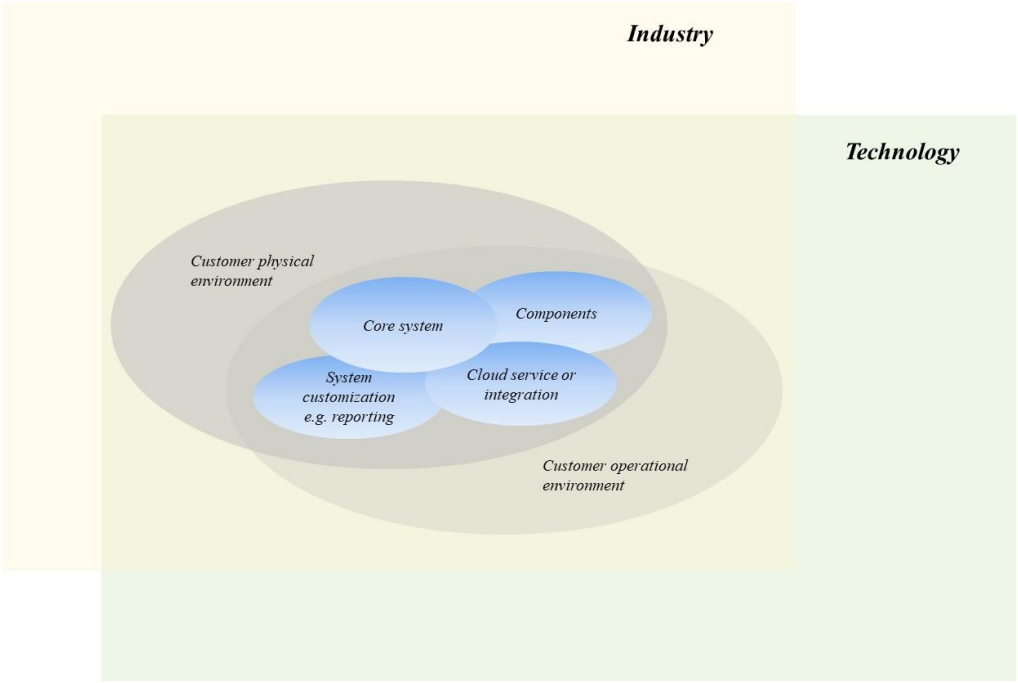

Figure 16. *Illustration of the case company knowledge base, industrial, technology and system knowledge.*

System knowledge consists of the core system understanding, component knowledge, understanding of cloud services, and integrations and programming skills with several different programming languages.

The fact that the case company has not targeted their customers has enabled them to learn from many industries. Delivering projects to several industries requires more resources (time) to develop the system, but the effort increases the knowledge base. Hence, the companies who focus on the targeted customer, and do not need time for learning in every project may use fewer resources to deliver the project.

If the capability is about the *ability* to execute a repeatable pattern of actions (Osterwalder 2004 p.80), the motivation for the work is a capability. The Case company resources have a high motivation for product development, and different engineering activities. That motivation is a driving force to complete the commitments the case company has promised to its customers. However, there is a danger that the motivation to development will endanger customer relationship management and sales work, which activities the interviewee do not like.

The case company's capabilities, i.e. the resources are minimal as only two people are working in the company, and for that reason, minor changes to the resources may affect

significantly to the value configuration. Considering the project contractual terms (see 4.5 Financial aspects) the lack of resources is a significant risk for the company revenue.

The case company follows the value configuration logic of “value network” whenever the offering is consulting, service or cloud services and “value shop” with project deliveries. Value shop is a cyclical process, and it brings the majority of the company’s revenue. Figure 17 shows a typical project flow from the received sales-lead at the end of the warranty period. The value-shop cycle phases are problem finding, problem-solving, choice, execution, control and evaluation is iterating from the beginning of the sales until the product implementation and approval by the customer. The value shop cycle is repeated (iterated) several times during the whole project because of the changed requirements.

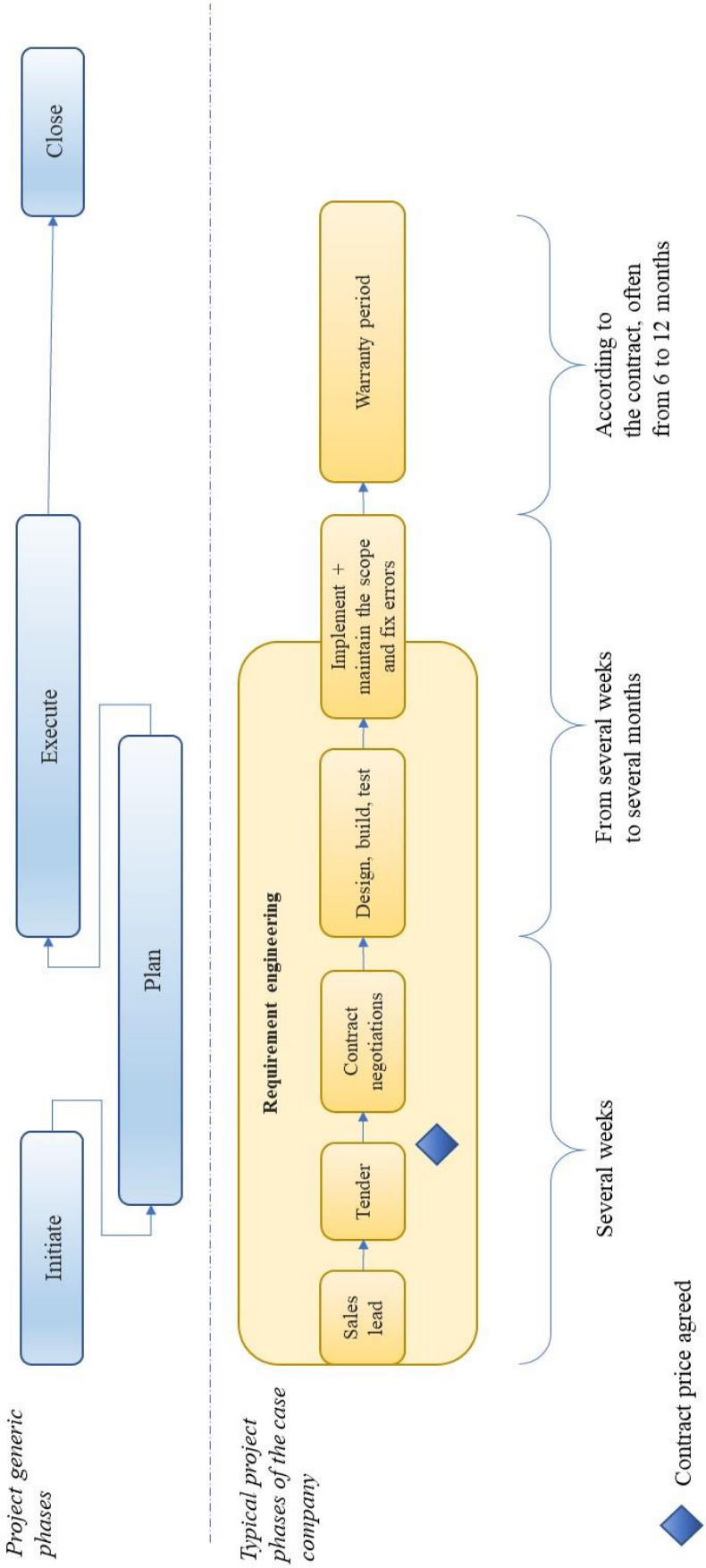

Figure 17. *Typical project flow for the case company.*

The case company's activities are the real work company does, e.g. system development, service or consultancy to create value to the customer (Table 14). The table contains activities that interviewee explained during the interviews, e.g. quality testing of new components, customization of the system and reports, programming and building interfaces.

Table 14. *The activities that the case company performs and revenue generation versus the value that customer receives.*

Case company ***		*Effect to*		*Customer*
Activity	*Explanation*	*Revenue generation*	*Customer value*	*Explanation*
System development, project delivery and implementation	Case company generates revenue according to the contract	yes	yes	Customer receives the value that they pay for
Sourcing new components from Asia and testing the components	The activity it self does not generate revenue Positive affect to the revenue generation in case, if the 'new' components improves the sales opportunities or if the case company can benefit on better sales margins.	indirectly	yes/no	Customer value is increased in case if the component quality meets better the customer needs and/or if the prices are lower.
Learning new technologies	Building 'Cutting edge capability' aims for tomorrows competitive advantage.	no	no	
Trouble shooting in case of system failure after warranty period	Considered to be 'a good customer service'	no	yes	Savings in system maintenance cost.

***Appendix A

The interviews are also exposing the case company's activities, which are not directly connected to the value proposition but increase *capabilities,* and by that build potential future value creation opportunities, e.g. the product *development,* and *learning*. There are also activities, which increase the value to the customer but do not generate revenue. That is what the interviewee calls "*a good customer service*." The research and development is not presented in a BM if it does not produce value to the customer. The case company's product development is mainly project-specific.

Based on the interviews, the case company does not have any agreed *partnerships* at the moment. There has been a partnership with a university in the past, to develop a specific system, which required specialized knowledge but the interviewee considered this partnership unsuccessful. The case company has considered starting a partnership with a few current competitors, but until now, it has not realized.

4.5 Financial aspects

Financial aspects include the revenue model and cost structure. Revenue model describes where and how the company gets the income while delivering value to the customer. Revenue streams (Osterwalder 2004 pp.96-98) the case company applies are presented in Table 15. *Selling* applies when the systems, components, and consultancy services are

sold to customers and those do not generate revenue anymore. *Transaction cut* applies with the cloud services, as there is paid a fee to use the system in *cloud* which is organized and facilitated by the case company.

***Table 15**. The revenue streams and pricing methods of the case company.*

Revenue stream and price						
Value proposition	*Stream type*	*Pricing method*	*Pricing mechanis*	*Price taker*	*Price maker*	*Financial impact*
Cloud services	Transaction cut	Differntial pricing	Volume dependant	Buyer	Seller	Medium*
Components	Selling	Differntial pricing	Volume dependant	Buyer	Seller	Low
System	Selling	Market pricing	Bargaining	Balance of power		High
Consulting services	Selling	Market pricing	Bargaining	Balance of power		Unclear

Interviewee was discussing the pricing method during the interview. The interviewee told that they do not use, e.g. value-based pricing method even the system sales could provide a possibility for that. The pricing methods (Osterwalder 2004 pp.96-98) the case company is utilizing are differential pricing and market pricing. The cloud services and component prices are purchase volume dependent. The component sale is very profitable and the margins are low. The needs of the cloud services depend on the customer and are not always part of the system sales. The cloud service prices depend on the system size. The system development follows the market prices, and especially the bargaining. The hourly rate of consultancy services follows the market prices but the interviewee thought that their prices are comparatively low.

Cost structure includes includes all the costs of the company's operations incur. Costs are divided into accounts, e.g. direct cost and running costs. (Osterwalder 2004 pp.101-102, 116) Interviewee was not asked any specific questions related to the cost, but he brought up the lack of resources or funding in several contexts. *Engineering cost* (hours spent) seems to be the prominent cost. The case company does not use hour accounting systems nor do they record the spent hours in other ways. That also leads to the problem that estimated hours, and actual hours cannot be compared, i.e., there is no reliable figures to be used in budgeting, pricing or process improvement. The interviewee evaluated how much time he spends to different types of activities. The total number of working hours per day is unknown but interviewee told that it is much more than standard eight hours per day. Estimation of time spend versus total working hours (100%):

- Sales and marketing 20-30%,
- Projects 40-60%,
- R&D 40%.

Sales and marketing cost includes the time spent on the bidding process. R&D consists of the product development but also the learning of new technologies or technics. Value-adding time is considered to be the time used for projects.

Cost of components is major cost. Regardless of the fact that the company aims to seek alternative and cheaper components, it also ties resources. In addition to the sourcing process, the component needs to be tested as well. In another instance, interviewee explained that component sale is not good business due to the low margins. Discounts and more economical prices were also partly or in full transferred to the sales prices and therefore the additional effort may not increase the profit substantially. However, the lower rates may improve the probabilities to 'win' the contract.

Cost of committed capital is a significant cost for the case company. Figure 18 explains the contract payment terms effect to working capital in the timeline. The y-axis is the working capital, and the x-axis is the timeline. In this example, the project duration from contract signature to the delivery is three months, and usually, the first invoice issue date is after successful delivery of the system (horizontal line). According to the payment terms the first payment is two months after the approved delivery. Approval, however, must happen within one month after the successful implementation. By then, the *project costs* (downward curve) have been accumulated from working hours, components and travels to the implementation site. In this illustration, there is no project cost or fixed cost and therefore the curve before the payment is horizontal. After the customer has paid the contract price (vertical line), the revenue income will again increase the working capital. In this example, the case company will receive the first (full) payment after six months from the contract signature.

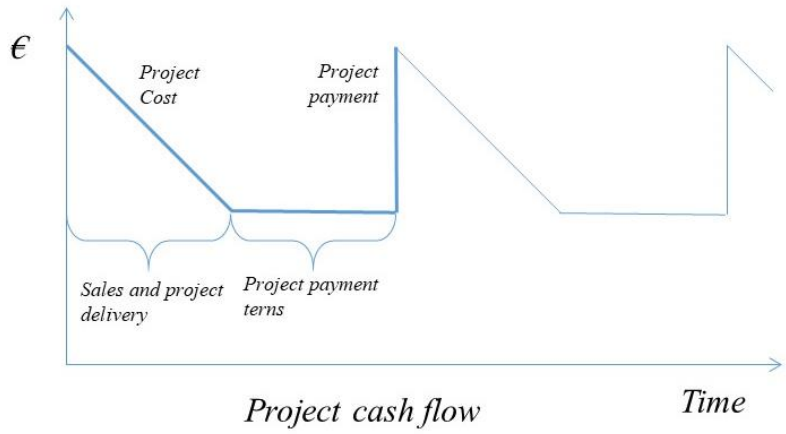

Figure 18. *A simplified illustration of project cash flow.*

Figure 19 illustrates how the different payment terms will affect to the case company's cash flow. If there are several settlements instead of one, the case company's working capital is continuously higher.

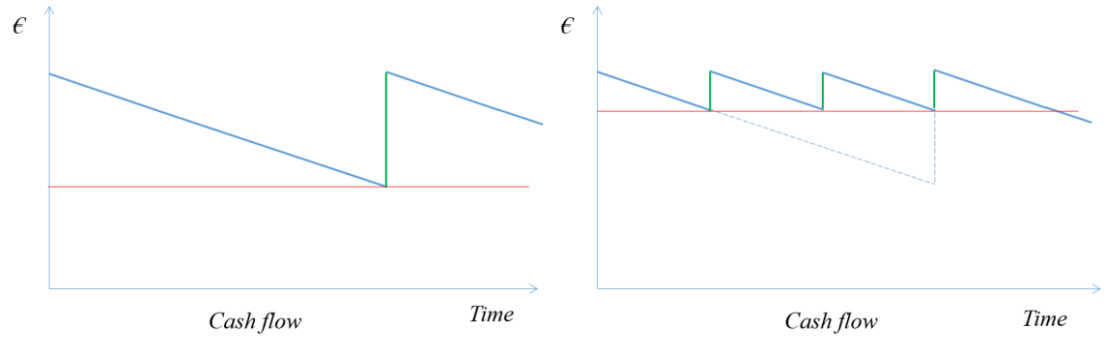

Figure 19. *The payment terms affect in the working capital.*

4.6 Summary of the analyses

The BM analyses made it possible to identify the main challenges that the case company has. These problems are discussed in the previous chapters but summarized in Table 16 and in APPENDIX C. Foundation of this table are the *Observations* that are found during the analyses. The observations are categorized based on the BM element, in which context this challenge was addressed. The column *Outcome* is derived from the observation. The reason, why the case company has the observed challenges is explained in column *Underlying reasons*.

For example, (*Observation*) when the case company value proposition was analysed, it was discovered that the product price level follows the market prices. (*Outcome*) Because the product follows the market price, for this case company it means that there is no possibility to increase the prices even if there was a need. (*Underlying reason*)The underlying reason for market prices is that the case company has only "one way" channel to reach the customer. i.e., the customer contacts the association that distributes the sales leads, the association distributes the sales leads to the appropriate system vendors. Because the customers have the possibility to bargain among the vendors, it will put pressure to the cost.

Appendix C is presenting the linkage between the different findings, which are presented in the table. The relation of the finding (Table 16) and BM elements is not defined for two reasons. Firstly, because the figure was too indistinct after the connections between the elements and the finding. Secondly, as Foss & Saebi (2018) wrote, the BM is a conceptual abstraction of theoretical construct, there is risk that the causal logic will get wrong as the theory is still lacking the clear definition for BM.

Table 16. *Summary of the business model analysis.*

BM element	*Observation*	*Outcome*	*Underlying reason*
Value proposition	Product price level follows the *market prices*	No possibility to increase the prices	Single channel link which is used by competitors as well
		No possibility to affect to the volume	
	Product value level follows mainly *me-too*	High rivalry	No differentiation from the competitors
Target customer	No focus to specific customer segment	Capabilities; skills and knowledge strengthens	Willingness to develop a product that fits for all purposes
Relationship building	Customer acquisition relays on association that delivers the sales leads	No possibilities to affect to the volume - depends on the number of sales leads	Saving resources by not doing the customer acquisition
	Monitoring the customer satisfaction is not systematic after the product delivery	No reliable information of product usage or customer needs during the product life cycle	No time
Channel	Use of single channel link	Channel works in "oneway", customer contacts the association and association delivers the sales leads	Saving resources by not doing the customer acquisition
Capability	Low resources	Missed sales opportunities	No time for sales work
		Risk of delays (e.g. sick leave or accident may delay the project) and contract penalties	No substitutes available
	Much of the time is spent on product development and learning new techniques	Case company's capabilities are the skills and knowledge of the various industries and the technologies	Motivation to develop
Value configuration	Product development is mainly project specific	Limited possibility to modularisize or differentiate	Customer segmentation is not made
		Each project needs time to learn the customer specific requirements	
Partnership	No current partnerships	No possibility to benefit on partners capabilities or economies of scale	Bad experiences in the past with some partners
Revenue stream	Low volume and low sales prices	No growth	
	Some of the customer value is provided as a goodwill and it is not generating revenue	Resources used in work which is not generating revenue	willingness to serve the customer well
	Contract payment terms are backpaid	Cost of committed capital is high	Nature of the project business
	Low sales prices due the high rivalry	Low profit	Only one channel link to aquire customers and that is used by competitors as well
Cost structure	Operating cost is high	Cost affects on sales prices and/or profit margin	Nature of the project business
			Time spent in non-value adding work
	Cost of components is high	Cost affects on sales prices and/or profit margin	Components are needed in system development
	Cost of committed capital is high	Cash flow fluctuates	Customer contracts has back-paid payment terms

5. RESULTS

In practice, the BM is always exposed to external forces. Within this study, the content for following external forces, as shown in Figure 20, could be identified. Factors threatening the BM are presented in red color, and the factor that the company can turn into strength is displayed in green. In addition, the BM is affected by business strategy, business organization, and ICT.

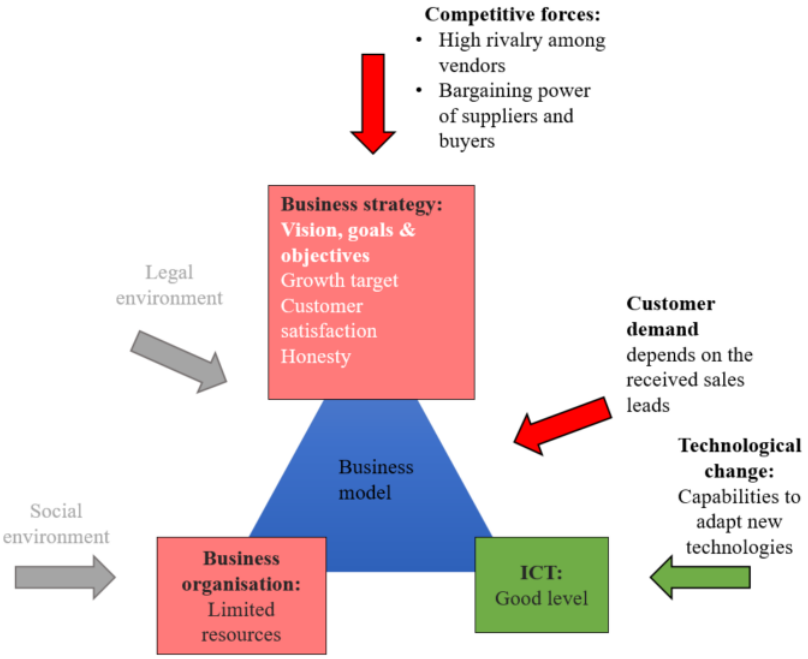

Figure 20. *The forces that effect in the case company business environment (adapting Osterwalder, 2004, p.16).*

The Business organization is marked red because the case company low resources came into attention in many different occasions during the interviews. ICT, however, is green because the company capabilities are enabling to take advantage of any technological change in the industry. The company's strategy consists of a vision that in this thesis uses Collins & Porras (1994) definition. The vision explains the entrepreneur's intrinsic values and motivation. The core values are customer satisfaction and honesty. Enthusiastic passion for product developments seems to be the organization core purpose and the reason for being. The product development interests entrepreneurs more than the money, as the enthusiastic relation to product development has often led to unprofitable business. Envisioned future includes the vision of growth, but it has been a dream and a hope more than a strategy that can be executed.

5.1 Business model evolution

This chapter explains what was identified as a turning point of business in the company's lifecycle. In addition this and next subchapter together answers to the second research question of how did the BM evolve in a start-up company.

Figure 21 illustrates the identified features that may have affected the case company during its lifetime. The x-axis illustrates the strength of that feature, and y-axis presents the time-line. In addition, there are identified events that seem to have influenced the features. These events are in chronological order, the establishment of the company, innovation award, negative funding decision, and official start of project business. Different features are uncertainty, investment in product development, interest, rivalry, and growth. There cannot be drawn any conclusions based on the levels, where these curves exist in the graph but they are rather only illustrative as such.

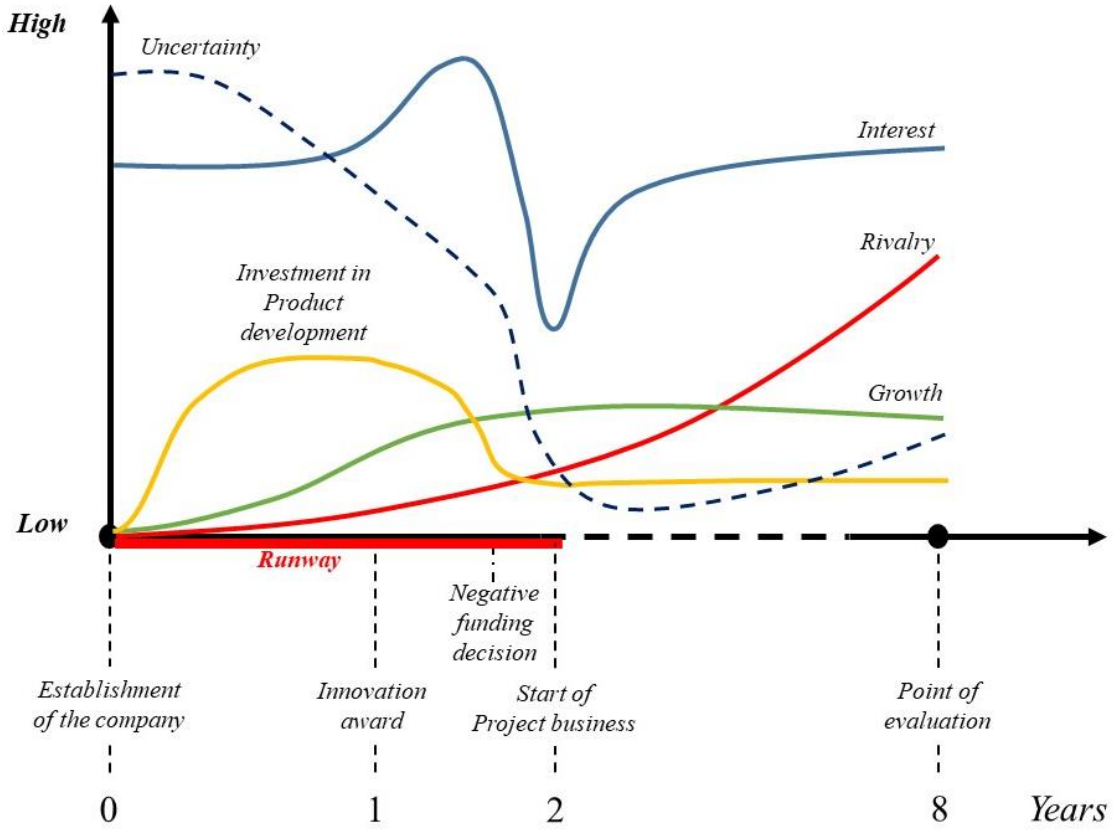

Figure 21. *Case company development presented in different perspectives.*

In the early days, there was barely any rivalry in the markets. However, the uncertainty of business was affected by other factors, such as immature BM. The *growth curve* is one of the premises of this study, yet it is only pictorial, and it is not based on exact statistics. The entrepreneurs' ambition for growth and correct attitude are seen important for company growth (OECD, 2010; European Commission, n.d.). *Interest* is a combination of *core purpose*, and the feeling that the interviewee uttered during the interviews when

he told about the company history. Instead of interest, the curve could have also illustrated the motivation but the methods of this study, would not produce reliable, and valid results for measuring the motivation. The interest was high after the company establishment. Most rewarding thing for the interviewee has been the moment when the case company was recognized with the innovation award. That moment can be found from the timeline as the highest peak in the interest curve. At that moment, the case company has achieved the first development phase of the product. Unfortunately, the time was running out, and more funding was needed to continue the product development. The period before the money was supposed to end, can also be called "a runway" (Ries 2011). Due to the diminishing cash, the company applied for funding from Tekes (currently Business Finland), but they received a negative funding decision which can be seen as a drop in interest curve. This single, external decision influenced in company future substantially. The case company founders had different views on acquiring capital from venture capitalists, as they did not share the same opinion on the risk it carries, and therefore, they abandoned that option. Because the cash was running out, the case company decided to start operating purely in project business to secure its revenue income. Due to the limited resources, the investments in product development stabilized, but the total amount of development hours decreased significantly from the early days. Since then, the product development was mostly project-specific, and it was based on customer requirements. Soon after the company started to operate in project business, the interest began to rise again. That can be explained by interviewee enthusiasm for product development as he told that each delivered project is rewarding. Slowly the rivalry started to increase as new entrants came into the markets, and business mergers brought big players in the competition. Partly due to the used channel link, but also because of rivalry, the company operates in crowded "red ocean."(Kim & Mauborgne, 2004) Tightened competition has also increased the perceived uncertainty.

Thus, it can be summarised that the case company's BM is not described explicitly, but it has evolved "implicitly" (Teece 2010). The evolvement in this context means that company operations can be explained, (i.e. execution of BM), in terms of BM elements describing the emergent strategy. The consolidation of the BM happened after the negative funding decision when the working capital was ending. In that time, the case company decided to start operating in project business. That single decisio**n** is also a turning point for the case company.

5.2 Business model formalization

This chapter will supplement the answer to the RQ2. It describes the project business in terms of TLS, and explains what the features that affected BM stabilization are.

Figure 22 shows the uncertain and immature BM with dark orange, the BM consolidation period is shown in gradient orange and mature BM with beige colour that is explained in this chapter. How the BM has consolidated was explained in the previous chapter, this

chapter will tell what happened after the BM settlement. This consolidation of the BM was possible to perceive with hindsight.

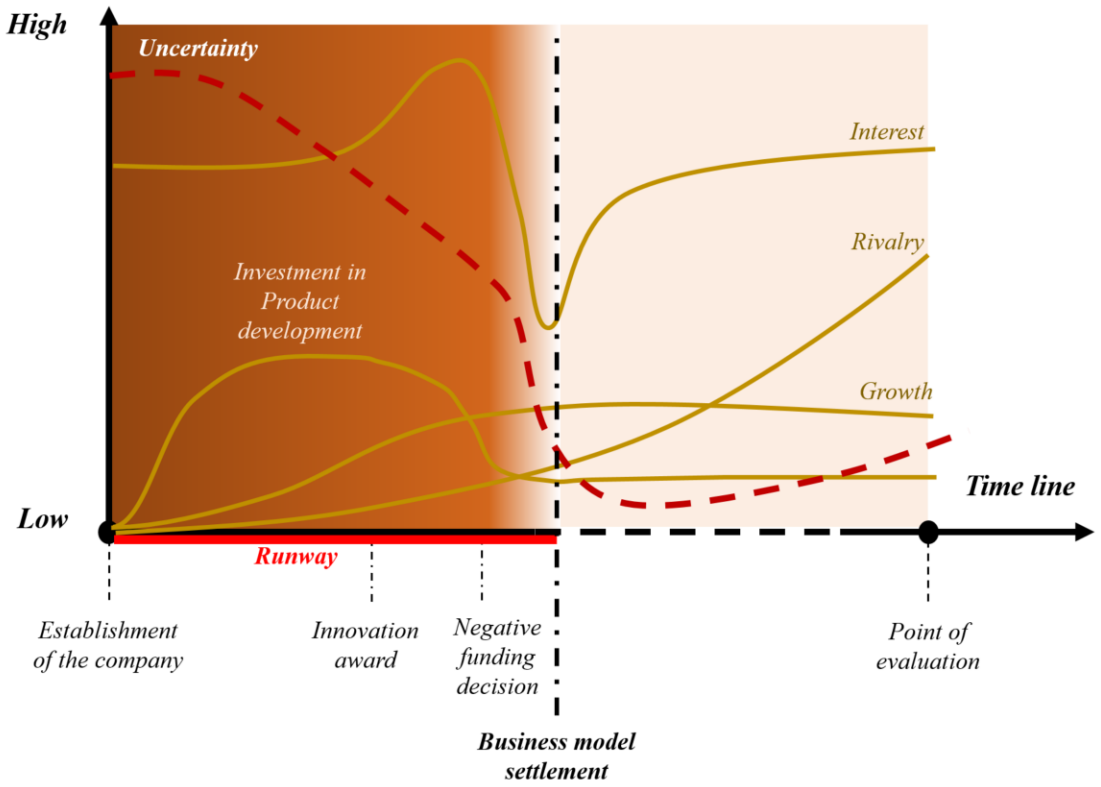

Figure 22. *Business model settlement.*

Uncertainty, investments in product development, and interest curves show a change during the BM settlement. This chapter explains how the BM has kept stable after its consolidation, and in a similar manner responding to the *RQ2*.

The interviewee told that project requirements changes during the project, and these changes will be applied to the system even they are not included in the contract. The reality is that the customer is not aware of all the needs they have or the system capabilities in the initial phase. In Figure 23, customer initial requirements are shown as “planned solution”. The initial system where the development starts is in the middle of the circle. The system development is iterative, and these iterations are illustrated with dotted circles. The direction where the solution is heading, changes according to scope change. That path is applying the B-M-L loop, and fits with this type of project business. What so ever, project has the goal, which should be the “tested solution” in the outer circle, and that is achieved after the project implementation. In the case company situation, the next project development starts again from the middle of the circle.

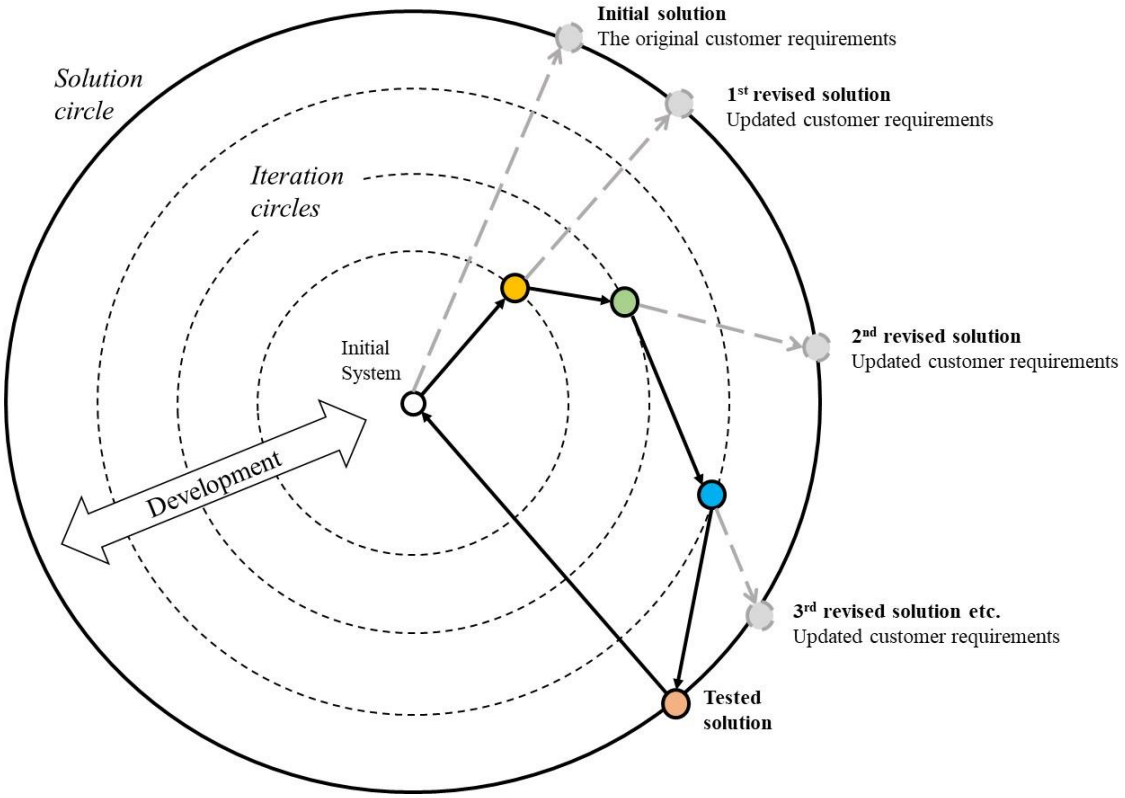

***Figure 23**. Case company's project specific product development is iterative (adapted from Fredriksen & Brem 2017 with modifications)*

The company after each delivery is in pivot phase, where they could evaluate their BM, and reach into the markets, find if the product-market-fit is achieved, and by that scale their business. Nevertheless, what makes the assessment difficult, is that there is uncertainty, and therefore risk, as the case company:

- Needs to secure the continuous revenue,
- Tested product-market fit only with one customer (at the time),
- Has not segmented their customers,
- Has no channel to reach other similar customers,
- Does not know, how the system fulfills the needs of the customer during the product lifecycle,

The problem with any development is the lack of resources. Whether the decision is conscious or not, the case company has *decided* get back in the middle of the B-M-L loop - "circle" as Fredriksen & Brem (2017) says. After each project delivery, the situation is the same. However, after each project, the case company has increased the intellectual capital, and by that, it supports future business. As a conclusion, the BM change would have required orientation for wider markets but that has never happened. This decision of returning to the starting point and that the company is still operating in project business demonstrates that the BM has never changed.

5.3 Practical implications

While answering the research questions *RQ1* and *RQ2*, the case company's project business and the project development were introduced. The following subchapters explains what further actions case company could take based on findings, analyses, and *RQ1* and *RQ2* responses.

5.3.1 Fix the basics

Underlying reasons in Table 16 together with Appendix C, are the foundation for the initial suggestions. Each of the Underlying reasons needs cross-validation to see, where it affects. E.g., Low revenue could be emphasized because the case company is seeking for the growth. Better income requires either more sales volume or higher prices. However, lack of resources conflicts with it. Higher sales volumes are not realistic with current resources and activities that the company does. On the other hand, if the channel link is improved, it conflicts with low resources again because the improvements in channel aim to boost higher sales volumes.

When cross-validating each line, we found priority list for improvements:

1. Resources
2. Customer segmentation
3. Channel link
4. Value Proposition

As the case company is doing a lot of work that is not generating revenue, the focus should be on value-adding work. The case company should reduce the non-value-adding work that it is currently doing. The released resources should be used for improving points 2, 3 and 4. In addition to lowering the non-value-adding work, the extra resources can be acquired by establishing partnerships. Summarization of this proposal for further actions is; focus to value-adding work and use released resources in BMI.

5.3.2 Define customer problem, need, and requirement

The previous chapter was named "fix the basics," because it aims to free company's resources and improve the streams of revenue. This and the following two chapters introduces an approach to identify potential customer segment and an early customer for a new product that the case company aims to develop. The identification of potential customer belongs to the *value hypothesis phase* of TLS.

The terminology that is used in this chapter:

- "Need" is something that a person needs either consciously or subconsciously.

- "Requirement" is a need that customer is able to put in the explicit form/terms.
- "Problem" means that customer has a problem or an issue, but they do not have the solution.

Customer needs are based on individual and organization needs. These needs occur in two different forms tacit and explicit. In the project business, these needs are 'translated' into requirements. The problems are:

- Tacit information is difficult to be expressed in the explicit form, i.e. putting needs into requirements.
- The requirements are often misunderstood.
- Not all needed people are heard
- Requirements are a collection of different requirements from people operating at various levels in an organization.
- The ways the users, business processes, and devices function are typically complex.
- Understanding the requirements evolves as the design and development proceeds.

Understanding the customer needs during the whole product life-cycle requires the understanding of product usage, renewal, and transfer in addition to the value creation. Customer relationship management and value proposition from the product life-cycle is connected in this context (Figure 24). The figure aims to show how much of the customer needs are unclear, e.g. information, the case company is missing when they do not contact the customer after the project delivery. As a proposal, frequent contact with the customer would give the company a possibility to after-sales as well as gaining valuable information of the newly emerged customer needs.

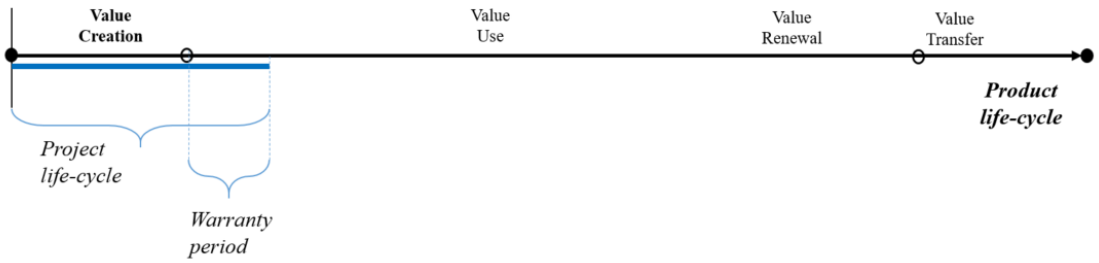

Figure 24. *Product life-cycle and customer requirements demonstrated.*

5.3.3 Explicate product idea

This chapter demonstrates how to evaluate the early customer and the customer segment based on the product idea. As Ghezzi explained, the early customer has problem or need (i), they are aware (ii) of it, and they are actively (iii) trying to solve it or trying to find a solution. Therefore, this group of early customers is willing to buy the solution that is

available. It is crucial, as one of the reported problems in Ghezzi's (2018) study, was that early customers were not easy to identify and their engagement in testing the solution was challenging. What we know, is that:

> *a set A is a subset of a set B. If all elements of A is included in B, all elements of A are also elements of B (Wikipedia_b n.d.).*

A is an early customer that want to use for testing the product. We want to test the product with the real customer that eventually would *use* the product. Therefore, *A* must be a subset of *B* that is the customer segment. Therefore, if we are able to find the early customer, we are also able to define the customer segment. This approach is opposite to the situation, where the customer segment is known, but the problem is to find the customer who is willing to test the product.

Analysis introduced briefly a new potential product that case company has ideated. From that chapter and Appendix A, there is derived few notable pieces of information of the origin on the product characteristics and customer needs:

- Product idea was born from company's *own experiences* and
- From the discussions between *other players* in the industry.
- Competitors recently *develop some of the product features*.

The three bullet points are connected to the Ghezzi's (2018) recommended way of finding the early customer. The case company, as well as its competitors, have addressed the need for this system, they are aware of the need and they are actively trying to solve it. These are the the potential "early customers" that benefits on this product.

Next subchapter explains, why there is a need for experimentation instead of trusting only the previous knowledge from the industry and this analyses results and how to evaluate the customer value.

5.3.4 From 'Leap-of-faith' to learning

Ries (2011) used the expression of leap-of-faith when the customer needs are predicted and there is no evidence. In that case, there is a danger that the developed product does not meet the customer need. Figure 25 demonstrates that by adapting Seppänen (2018 pp.30-31 see Kostamovaara 2007) and supplementing it with an additional characteristic.

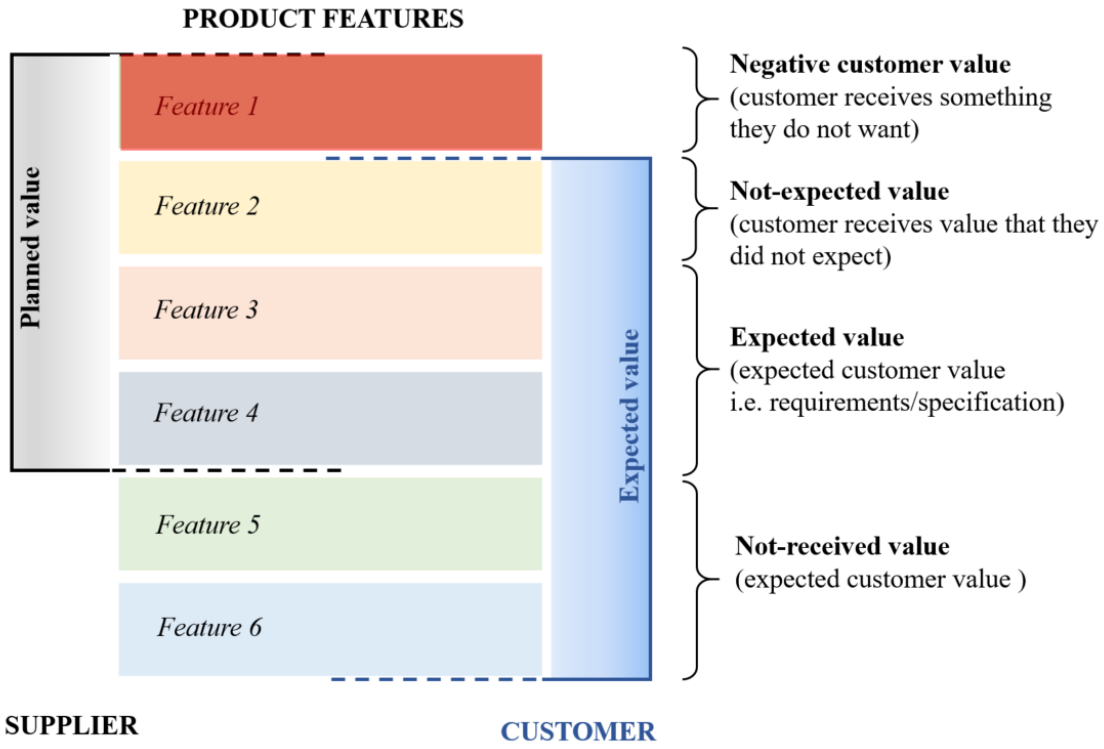

Figure 25. *Value assumption versus customer expectations (adapted from Seppänen, 2018 see Kostamovaara 2007 with modifications)*

Figure shows five types of values; planned value, negative customer value (waste /warning), not expected value, expected value and not received value. The balance in between the values can be affected by experimenting with the product before releasing it to markets. Planned value is what supplier designed for the customer. Negative customer value is waste because it is a product feature that customer does not like. That may affect the purchasing decision and/or customer satisfaction. Not expected customer value is a positive value. The customer did not specify it, but in some point of the product life-life-cycle, the customer enjoys the product feature. The expected value is somewhat neutral value. The customer needs that feature and possibly defined it as a requirement. Not-received customer value is also a damaging value. It is an expectation that was not fulfilled.

The analyses revealed other factors that supports the proposal of offering the system to the competitors. The interviewee told that the system can be *implemented without programming skill which makes the system implementation faster.* In other context, however, did not see the programming as any issue for new entrants, because it is easy. Yet, an *understanding of the technology, customer physical and operational environment as a whole* is difficult.

Before starting the B-M-L loop, it is essential to *evaluate*, how the new value proposition may affect to the customer experience of value, i.e., how the new value proposition affects

to the BM. Following example shows, how the BM can be utilized in front end of innovation.

Table 17 includes two new potential early customers that were identified in previous chapter as well as the case company's current customer. The new value proposition, "ability to configure the product," is assessed in each phase of the product life-cycle in relation with the potential early customer. If the early customer benefits on the configuration possibility, it is marked with '*x*'. As Seppänen (2018, pp. 30-31) said, the "customer job" should not be forgotten, and therefore also that is included in the evaluation. If the customer job is related to the "ability to configure the product," it is marked with '*x*'. E.g., the end customer job is to serve their own customers, therefore, the assumption is that the "*ability to configurate"* does not add value to their customers. As Also the company vision is included in this table. It is important in every improvement to keep the vision in mind. The growth is evaluated medium, if the business does not require that much resources as previously and there is potential to sell more. The growth is evaluated high, if there is option for scalable business.

Table 17. *Example of how different potential customers may perceive the customer value.*

	Life cycle value					*Customer value*	*Vision*
Early customer	*Create*	*Purchase*	*Use*	*Renewal*	*Dispose*	*Customer job*4*	*Growth*
End customer	x			x	x	*1	medium
Competitor	x		x	x	x	x	high*2
Internal customer	x		x	x	x	x	medium*3

* end customer needs internal resources in product configuration
*2 requires change in Business Model
*3 company can serve more customers with same resources
*4 New product feature usage supports the "customer job", value creation for its customer

The table results support the same early customer as previous chapter 5.3.3, i.e., Competitor. Therefore, all the competitors may be the customer segment, including the case company itself. When the early customer is found, the Ghezzi's (2018) suggested B-M-L cycle can be started. That is however, out of this thesis scope.

5.4 Summary of the results

The answer to the first and second research questions is explained in chapter 5.1 and 5.2. For analyses, there was used BMO (Osterwalder 2004). The final results were obtained by synthesizing the TLS, BMO and other business literature with the analyses results.

The turning point was defined to the point when the case company decided to start doing project business. The decision was mainly affected by dwindling working capital, and negative funding decision.

The BM formalization was a consequence of the decision of starting the project business. By describing the project business in which the case company has operated, evidenced that BM has remained the same until today. The consolidation could not been verified at the point of settlement of the BM, but it can be evidenced with hindsight.

The chapter 5.3 proposes one potential approach for the further actions. It starts with fixing the basics, which aims for releasing resources for further actions. The following two steps are for evaluation of what are the customer needs and who is the potential early customer. The last step is to verify that company vision, value proposition and customer needs are not in conflict.

6. CONCLUSIONS

This chapter summarizes the most important implications of this study for academics and practitioners. This chapter also presents an overview of the results and assesses the research and its limitations. In addition, at the end of this chapter, proposes suggestions for further research are addressed.

6.1 Overview of the key results

We know that start-ups in the social economy and employment are of great importance and we know that innovation is essential for growth. The start-up of business success factors and the causes of failure are studied a lot. Yet, the concept of a start-up company lacks a general definition. Without an understanding of the start-up evolution, and the turning point when the high uncertainty decreases, a start-up cannot be defined reliably. This study evidenced the turning point to the moment when the start-up company decided to start the project business. This decision lead to the BM formalization, which decreased the uncertainty. Within this study, the start-up phase continues until to the turning point that led to the BM settlement. This argument is in line with Casadesus-Masanell & Ricart (2010) BM definition of a BM: “a business model, [ ], is a reflection of the firm's realized strategy.” However, this thesis disagrees with Teece (2010) argument that each company has a BM. Instead, this study demonstrated that there is no formalized BM in a start-up phase.

Even though the case company did manage to settle the BM and invested in innovation, the growth has not yet been flourishing. This study could have been claimed that limited resources in a small company could be an obstacle for growth, as the lack of resources was raised in many different occasions during the interviews. Although, if the limited resources may not be the root cause. All the work case company does, is not value adding or at least supportive activity. This study provided the means to free up resources for the implementation of the growth strategy.

Management skills and processes should improve the company's business (Ries 2011, pp.8-9, 15; Sutton, 2000; Carmine et al. 2014). As Ries (2011, p.15) says, small businesses are not eager to take the processes into use. This study showed that processes are seen to be too restrictive and partly unnecessary for a small company. In Ghezzi’s (2018) study, only 16% of the companies who took the LSA's skills to study independently and a large number of respondents said after the survey that the method was somewhat tricky to use in practice. Therefore, more simple practices are needed for small companies to support their business.

This study utilized the BMO by describing the case company business. BMO however, is portraying more or less a snapshot of the current situation. This thesis introduced a new approach to obtain a clearer picture of the decisions that the company does in daily project business. This approach utilizes TLS-thinking and the illustration of "Effectual-thinking" (Fredriksen & Brem 2017). This description shows the effect of learning of customer needs during the project and the decision-making points that follow from the learning. By identifying decision-making points, it is easier to assess whether the following decision is subconscious or conscious. This new approach to depict the learning is interesting as it may help the stakeholders to understand how the learning may affect in project business. By understanding and accepting that all project stakeholders learn during the project can be taken into account already in the sales phases and initial stages of the project.

This study also highlighted the importance of understanding the real needs of the customer by describing it from the point of view of the supplier and customer. The proposal was utilizing "expected and received customer value" (Seppänen, 2018, see Kostamovaara, 2007) illustration by supplementing it with negative customer value. This negative customer value follows the TLS principles where all unnecessary work should be avoided.

6.2 Research assessment and limitations

For academics, this research strategy may be fascinating in many ways. The research perspective and approach is different from most of the studies that concern start-up companies. In addition, how the study results are displayed is divergent from what the author has come across in other studies.

The selected research approach, enabled the description of the company extensively the company's premises are taken into account, and external influences were eliminated as well as possible. While the data-collection provided a very subjective view on the business, the applied theoretical framework provided an objective approach for analyzing the data. According to the principles of constructivism, the object of the study is to be understood, and through its idea of reality was described, i.e., the case company business. It might have been interesting if the interviewed emotions in the different interview moments could have been analyzed with greater accuracy than what was now achieved. However, that approach is suggested for further studies.

This study described the research and its results visually. The illustrative graph with selected variables is a new way to depict the BM establishment, company evolution, and the project business and customer needs. These illustrations support the reader to get an overall understanding of the studied phenomenon than only by reading the text.

The philosophy where this study belongs to and its research strategy orientates the validity and reliability assessment. The single case study has its limitations in the generalization

of the research results. The subjectivity and interpretations are pre-requisite and inevitable but necessary part of this research approach. Regardless of the subjectivity of the research, the detailed description of the research process gives an opportunity to use the same approach in further studies. There are, however, certain limitations, which next chapters will explain.

The researcher's intuition, interpretation, reasoning and classifying skills affect qualitative research process (Metsämuuronen 2008, pp.6-8), and therefore the researcher and the stakeholders (i.e., interviewee) of the study must be noted as a specific source of error. Author of this thesis was aware of the study limitations, but because for human nature, reflective self-management is impossible (Laine 2018, p.37), and it is possible that the author has not noticed all the limitations or biases of what she has. However, to improve the validity of the study, the author has unfolded in the text the essential interpretations she had made during the research. Therefore, already while reading the thesis, the reader can make the judgment on the validity and credibility of the content.

Some constraints occur due to the reason of interviewee, the interviewer, and the interview material handling. The interviewer subjectivity exists in the question selection, analyses, and synthesis, which in this thesis one author conducted. Instead of using pure intuition, the insight on the studied phenomenon improved the validity. The gained insight is from the studies of the industrial, and software engineering management and the practical work experience of over a decade in the industry.

For practical reasons, only one of the two founders of the company was interviewed in this research. Yet, the subjectivity of the interviewee is seen in answers, as only one interviewee is telling his experiences and various reasons may bias that. It is also possible that interviewee may modify truth intentionally or unintentionally (Moilanen & Räihä 2018 p.64). This kind of interpretation models and assessments of the situation are orientating the interviewee, which often lead to the embellishing the answers (Alasuutari 2001, pp.151-155). Also, Laine (2018 pp. 40-41) highlights that human perception and experience of things may not be the same and there is not always even link in between them. The case-company will benefit the quality of the research, and therefore the assumption is that interviewee did not intentionally modify the truth. Also, due to the nondisclosure agreement, the interviewee was able to speak confidentially. The material The interviewee has checked and approved the content that is used for this thesis, and it does not contain confidential material. Reliability on what comes to the moment of the research (Saaranen-Kauppinen & Puusniekka, 2006b) is a limitation, yet it is not a vital source of error in this research. If the research were conducted at a different time, the study results would have differed, but it is very typical for this research strategy. The selected methods affect the reliability as well (Saaranen-Kauppinen & Puusniekka, 2006b), but without subjective research data (i.e., interview and content analysis documentation), the objectives of the research were not possible to achieve. On the other hand, the selected methods improved the overall understanding and consistent depiction

of phenomena, which is according to Saaranen-Kauppinen & Puusniekka (2006b) also a measure of reliability. The fact that the decision was to portray the phenomenon in case company perspective is also a limitation for reliability. However, it is a matter of trade-off, if the research data was also acquired from external sources that may have affected in authors ability to depict the phenomenon on case company's perspective.

The interview material transcription level also affects the reliability and validity of this study. A referral transcription is not a useful method if the intention is to reuse the material (University of Tampere, n.d.). The first interview was not recorded which affected its reliability to some extent. Even though the interview was conducted carefully, and the interviewee checked the accuracy of the data, further use of the data is not suggested. The recording and exact transcription that the second interview applied enable diverse re-use of material as it aims to capture the speech in detailed, e.g., including emotions and hesitations (University of Tampere, n.d.). The exact transcription writing was the first one for the author, and therefore the risk for the failures is higher than from professionals. However, the data have been analyzed and synthesized systematically, and the results seem valid and reliable, yet not fully repeatable. When comparing these two types of transcriptions, the exact transcription is much more labor intensive than referral transcription. It is difficult to say why the second interview produced more availed research material than the first one. A subjective conjecture is that listening to and transcribing the recordings affected the quality and amount of material positively.

There is always a possibility for errors in when doing the literature review. The systematic literature review was not practical as the search produced an absurd amount of articles to be reviewed. On the other hand, when narrowing the search, the result seemed inadequate. Therefore, the decision to use manual search and digital libraries was a trade-off.

The use of BMO (Osterwalder 2004) has limitations. Firstly, the BMO is not Osterwalder's recent BM study, and therefore he may have improved his work later. The decision of using the BMO was made based on the BMO structured and well-described framework which reduced the possibility of interpretation. Combining the preliminary themes into the final themes were created intuitively through the tabulation, which is a limitation for repeatability. Although, when conducting the synthesis, the detailed description of themes yields good results by making possible to bring up the most relevant themes that eventually revealed improvement opportunities.

The use of TLS thinking has limitations as well because it lacks theoretical grounding. Although, the TLS has roots in different research streams (Ghezzi, 2018; Fredriksen & Brem, 2017) which gives some evidence for the usability of TLS thinking. In turn, it is possible that the researcher who has created a new theory that TLS applies does not get the recognition through this work as Ries (2011) barely mentioned the original studies that affected TLS thinking.

For the question RQ1 and RQ2, the central limitations concern the subjectivity and especially the subjective interpretation. With RQ3 there also exists a constraint, as the research result can be reasoned, but not evidenced within this study. It cannot be stated that there was a causality between the proposed method and company growth. Therefore, the result of RQ3 must be considered with caution and only as one possible, but not evidenced, way to strive for growth.

While the different perspectives of studies of start-up companies give valuable information that deepens the understanding of start-up companies the fragmentation of different definitions prevents to see the relation between the different characteristics and factors. This study suggests approaching the creation of a definition of a start-up company via the company evolution and the identified turning point that result in the BM settlement. The approach enables to get a good insight of the company underlying factors that affect the business.

Fredriksen & Brem (2017) and Ghezzi (2018) all found connections from TLS to the other disciplines and research streams. TLS is an entertaining book including a lot of narrative examples and personal experiences of start-ups, which Ries linked to the TLS method evidencing its usability. In turn, Ghezzi (2018) studied start-up companies that had in deliberately used this LSA method. The method or methodology as Ries (2011) calls it cannot, in general terms, indicate whether the method is functional or not but the study Ghezzi (2018) conducted gave some validity for it. Therefore, case studies that could provide more information on TLS's suitability for practice could be appropriate for future studies.

This thesis revealed some important decision points that companies do deliberately or unconsciously. For example, the decision, i.e., the turning point in the company life cycle that leads to the formalization of BM is extremely important, and it affects significantly to the company future. According to the theory, it seems that decisions that people make are biased (Johnson et al. 2013), it would be fascinating to study how the biased decisions appear in business context.

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APPENDICES (3 PCS)

APPENDIX A: PRELIMINARY THEMING OF RESEARCH MATERIAL

Summary of the case company

Case company is a Finnish micro size of a firm that operates in the domestic market. The main revenue comes from the software project business, but the company also sells consultancy services. (A1, A2)

Vision

Case company has had a vision of growth from the beginning (A1, A2) but the vision has not materialized (A1). Profitable growth is explained by doing profitable business and avoiding too much dept (A2). There are several visions on product development presented under preliminary theme “product development”.

Strategy

At the time of establishment, the case company didn’t have a strategy, or the clear business plan (A1, A2). The focus has always been more in basic engineering activities, which merges in several contexts and various ways during the interview (A1, A2).

The case company founders had a different view of how growth should be pursued (A1). Both founders were not willing to take a risk which in interview opinion is required when aiming to the growth (A1).

Values

Case company values are not discussed among the case company founders (A1, A2). When discussing the topic around values, interviewee identifies two actualized values; customer satisfaction and honesty. Customer satisfaction as a value refers to good customer service and the interviewee estimates that the customer is served even too well. There are many cases where the customer could be invoiced, but the service is offered free of charge. In the same context the honesty is discussed, the company does what they promise to the customer. (A2)

Entrepreneurs

Two founders of the case company have met each other in the previous company where they both worked. They had a common interest in technology which case company currently applies. One had experience in entrepreneurship and the other did not have any experience in it.

During the interview, the different views of the founding members often came to light (A2). There was a partial disappointment in the tone of the discussion, but the disappointment was not pointed to anyone, it sounded more like frustration on the situation where the company currently is. (A2) The interviewee is willing to take the risk (A2).

The capability or skills in applying the technology lays on the overall understanding on the customer's operational processes, operational environment (e.g., temperatures), and system integrations, and how these different external factors and variables affect to the system design. (A2) The fact that customers came from many sectors, increased the diversified expertise. (A1)

Interviewee finds the motivation from improvement and development (A1, A2). His most rewarding moment in the entrepreneurial career has been the innovation award, but interviewee sees delivered customer projects also rewarding. He describes the development so that; "there is so much to develop in the world and things which are unfinished. Every time when you reach the goal, you again notice that there is a next goal to be achieved. The knowledge and skills are increasing, and you notice how much is still undone and you will invent new ideas." He seems impatient to answer when asking if he finds product development motivating. He says that his strength is in product development portraying some examples how it has appeared in his previous career. At the same time, he criticizes how product development is not appreciated in Finland and it must be made alongside the project. (A2)

The sales work does not motivate the interviewee, despite the fact that he likes to be in interaction with the customers. The case company has good knowledge and skills and customer problems are also understood. The interviewee does long hours which means more than eight hours per day yet is not seen problematic. A shorter day would mean that the learning would continue at home and therefore interviewee sees the work more as a hobby in that sense. (A1)

Product

Soon after the case company was established, the company developed a software product which is part of a wider software system including required components. With the product, the company won an innovation award (A1, A2) and at that time the company categorized them self as a start-up company (A2). The core product is still in use by some of the customers and the core product features are still used in projects as a base where applicable. (A2) Yet, each project has some degree of customization such as different components, reports, interfaces, and software languages as the scope depends on the customer physical environment, system integration needs and different operational requirements. (A2) The original vision on the core product is never fully finished and therefore the productization is also on hold. We just have not had time. Now it seems that

some of the competitors are bringing features, which originally were ideated already by the case company, but not implemented (A2, C2). We are in the same position we were in the beginning. We have to have projects to guarantee the income. (A1)

Product development

Case company has the core system developed eight years ago, after the company was founded. Now they have ideated the product even further (A2, C2). For this new idea, the customer needs are gathered based on the own experience, other stakeholders and competitors in the industry. The solution would solve the problem case company has in its daily operations. This new solution would reduce the need of understanding the systems and component so deeply. (Detailed explanation of functionality is classified information). It would ease the implementation and also the system would be cheaper to be produced. Basically, the product could be used by customers, competitors who suffer the same problems as the case company or are wondering if the system should be taken in use. (C2) According to the interview, case company would continue the project business but also would do the consultancy and product sales (A2).

The company monitors the future development of the industry and technology from one to three-year time frame. When discussing the possible alternative technologies which could endanger the case company's own technology, interviewee gave very detailed reasoning why it is not a threat. Although, there did not arise any points in any of the discussions, where the interviewee was evaluating possible improvements in other technologies which may endanger the case company's current technology in the future. (A2)

There have arisen some alternative or supplementary technologies to the market. Case company has the capability to apply these new technologies as well. (A2) (A2) R&D consists of new product development, improvements, but also the search for better and/or cheaper parts (A2) R&D however, is nowadays done in connection with project design in connection with actual customer needs unlike the time of the company establishment, when the 'core product' was developed, the R&D was based on the assumed customer needs. (A2) The development in early days was seen riskier. (A2)

The technology case company applies to their system is widely standardized which is why they see the thread of substitute technology small. In the category of applied technology, there are sub-categories that are legacy technologies and will be replaced.

The product development is a risk, as it requires resources and there is a possibility that the investment is not successful. Naturally, the company can reduce the risk by doing research on markets, customers etc and by leveling the R&D at a certain level. But the question is if the risk is high, meaning possible bankruptcy or low which does not harm the business. But there is always a risk in R&D. Of course, there is a possibility to do

R&D inside the project (project funding), but if there have not been any sales, then the risk is all In the case company. (C3).

There were several occasions during the interview, where interviewee refers to productization (A2). There has been an interest for productization by the interviewee for a long time but so far it has not led to action. The interviewee estimates that finalizing the product would take approximately five months. (A2) There is less coding needed by the system supplier when using the core product, but there is also a lower threshold by the customer to try the technology. In addition, unlike with other similar systems, this system enables customers to enter data into the system without coding. (C2, A2)

Cost

Component prices have decreased over the years and depending on where to by the components that will affect the costing as the components from China are much cheaper. (A2) The company is constantly seeking alternative components which are good quality, but also cheap to purchase. (A2) When using components from China, resources are needed for testing the components. (A2) Which components to apply is about comparison and compromises between the cost and benefit. (A2) For some applications, components are too expensive. (A2) Because industries values change and there becomes new security needs, companies are willing to apply the technology in totally new sectors. (A2)

Having customers from different sectors, made the development slower, as they need to study the project requirements and the environment more. (A1)

Sales-leads costs money. (A1) After the project delivery, the customer has 30 days time for accepting the delivery. (B1a) Payment terms are 60 days from the date of receipt (B1a). Cloud service (C2c) that case company offers costs as well as the service, which requires resources at least in case of failure.

Income

Selling the components is merely a volume business and not that profitable as selling the software engineering work. (A2) In addition to that, case company receives income from the cloud service. (C2c)

Yet, the product was seen as innovative and promising by the innovation award jury, the external funding for product development has not been successful. The reason for negative funding decision by Tekes was that funder didn’t see the innovativeness in the product and there was also different views on customer segment. (A2) The original vision of a product is that customer could take the product in use or test it without risk because it will not require any integrations (A2).

Resources

Approximately 20-30% of the working time is spent on sales and marketing. (A1) Indeed, case company invests in innovation and R&D approximately 40% of the time spent.(A1) 40-60% percent of the working time is spent on the projects. (A1)

Estimated hours are not compared with the actual hours. The projects are sold too cheaply if it is compared to the actual work. It is because of the market position. If you want to serve the customer well, it will produce the loss. (A1)

The possible failure which system indicates may also be caused by any change in integrated systems, environment or another external factor. Detecting the problem requires resources and it may be challenging to demonstrate the root cause especially when the system includes integrations with other system providers. These situations occur mostly during the warranty period or even afterward. Especially, when the failure is caused by an external party but discovered by, e.g. case company, the question is who is responsible for covering the cost of resources and if the cost is covered. Case company often provides this as goodwill to the customer. (A2) This question about the coverage of the utilized resources also arises when offering the consultancy services free of charge, e.g. by e-mail or phone. (A1)

Customer

There were no guaranteed customers when the company was founded, but there was seen a clear need by some companies which indicated potential customers (A2). The company didn't focus into any customer segment but sold the systems to anyone who was interested in buying. (A1) It was also needed, to secure the income. (A1) Customers are companies from different industries and mainly customer acquisition is based on sales-leads. (A1. A2) These sales-leads are received from the association which delivers the sales-lead als to the case company's competitors (A1, A2). In addition to leads, although rarely, the customer is directly contacting the case company. (A1) If the customer is contacting for quote purposes, often the reason is that they are questing for system components and not fully implemented systems. (A1) Case company is not calling to its customers, because there are no time for that, because the R&D takes all the available time (A1). The customer segmentation is not made. (A1) Customer satisfaction or dissatisfaction is not monitored systematically (A1). If nothing is heard from the customer side, the assumption is that everything is ok (A1). Sometimes the customer is called and asked how the system works and if there is any a need for a system update (A1). These calls however, are not scheduled or recorded to any system even company has tools for that (A1). Company business is seen so little with low resources that it is not seen needed (A1). If the customer is not called, the reality may be anything in between the satisfaction and dissatisfaction (A1). Sometimes it is heard from the third party how the customer had further challenges or dissatisfaction. (A1)

In a customer perspective the purchase of the system is seen as an investment, which has certain payback time (A1). Savings may be big, but not critical considering the company size (A1). The customer awareness of the applied technology has increased over the times. It is difficult to compare different alternative technologies. (A2) From a customer perspective, the criticality or the risk of the project is typically low as the systems do not normally directly affect the core operations of the company. Agreement with a small company with few resources is not a major risk for the customer. Penalties in customer contracts are small and as a maximum the contract price. (A1)

Rival/ry

The case company does not win all the tenders. (A1) In some cases when the bidding is lost, customer informs the reason, but there are cases when that information is received from elsewhere. (A1) There is no systematic approach to check why contracts are lost. (A1) Sometimes the reason has been the price and in those cases the factor for estimated project cost has been too high. (A1) Some customers define in RFQ, which of the costs can be included in the contract. (A1) E.g., travelling cost may be excluded, but still the cost must be covered from elsewhere which is basically the hourly cost rate. (A1) Additional hours outside the contract are informed separately in the contract. (A1) The tender includes the deviation list, listing everything outside the project scope. (A1) Hourly rate is less than what other competitors have and testing may be cheaper as well. Our estimated project hours may also be smaller than the competitors. (A1) The margin depends on how important the customer is for the case company in the long run. (A1) There is a mention in contract B1 that the project case company was selling, was piloted earlier in one of the customer's sites. (B1b)

Indeed, there is a lot of competition in the domestic markets where the company operates, but most of these companies are small or medium-sized companies (A2). The company mainly competes with low price, good quality, skilled work and customer service (A2), but often the contract is won because case company has managed to present a demo in the first meeting or they have managed to propose correct solutions and also the price is seen correct (A1). The competition is not always fair (A2). For example, the case company has discovered that its competitor also used the core product but that information was received from their customer (A2). The competitor also requested some consultancy for product usage which was under the circumstances offered in an additional charge. Still the competition is not seen that problematic (A2). Yet, the new entrants increase the competition in the markets, but settling in the industry requires some basic knowledge (A2). The basic technology is simple, and the coding can be done by anyone who understands the coding language (A2). In addition to that, knowledge, from a number of other related engineering disciplines with the combination of project-specific external factors are needed (A2). Skills and learning from past experiences are needed (A2). In recent years, mergers and acquisitions have been made among the competitors and one of the competitors is listed on the stock market (A2). The company also expects that even

more new entrants are coming to the play (A2). This technology sector is wide, and it is a lot of what the company is focused on. (A2)

Partnership / networks

The case company has discussed of the partnerships. Discussion is held with competitors. Other companies, which could complement the case company offering or vice versa is not considered. There has also been the discussion of taking some external investors along. Earlier, there were more dissenting opinions having external investors, but currently both of the company owners see potential in it. (A2) Cooperation with the university has not been successful either (A2)

Business

The case company does not follow any pre-defined processes even they see some advantages in it. On the other hand, processes are also seen as factors that make work more difficult or slow.(A1)

The sold projects to the customers have typically short duration. The time from signed contract to the system delivery is from several weeks to a few months and in addition the warranty period which depends on the customer. The contract signing precedes the bidding process, which starts with received sales-lead and duration is approximately four weeks although it is customer dependent. Project scope develops from the received sales-lead until implemented and fully functioning system. In other words, the customer requirements will be specified during the development project. Cost of the project will change as well, yet, the contract price is agreed well before the contract signature. (A1)

The interviewee understands the change management and what should be done even if the case company admits that they are poor in bringing up the discussion if the scope change would affect the contract price. Saying no, is seen difficult. The interviewee sees the situation so that customer has better negotiation position. In addition, case company wants to keep the customer satisfied. (A1)

The contract price is based on the cost and margin and there is not considered the value the customer receives when implementing the system. The contract payment schedule is challenging as the ideal would be 14 days, the most often customer requires 30 days payment schedule. Sometimes the payment schedule is even 60 days. Splitting the payments are not supported by customers. (A1)

Final signed customer contracts are stored in the archive and those were not studied in this work, instead, the final versions before the contract signature are studied. (B1, B2, B3) Contracts were drafted by the customer with the exception of the scope of work/ specification document. (B1, B2, B3) Contracts contained contract template information and the language was not grammatically correct. (B1, B2, B3) The set of documents were

the contract and contract appendixes, but not all the appendixes were listed in the contract and documents didn't have a reference to the contract. (B1, B2, B3) There is often different person signing the contract from the customer side than the project stakeholder. (C1a) Contract prices were hidden by the case company, so those are excluded from this research.

General terms and conditions contain customers standard general terms and conditions (C1, C2). Some notions on the document; maintenance and support services availability are warranted for 2 years of time after the project delivery with additional contract (C1). After the project delivery, the customer has 30 days' time for accepting the delivery. (B1) Payment terms are 60 days from the date of receipt (B1). If there is a significant change in the vendor's ownership, the customer is free to cancel the agreement. (B1). Code of conduct; supplier shall ensure that all its sub-suppliers recognize and respect the requirements of the code of conduct. Future development is an additional charge. Implementation support is specified (hours to be spent and days and travel). Travel cost is chargeable, but not before all sites are implemented. (B1). The implementation period is 4 month. Project plan and the schedule is provided by the customer (4 months). (B1). General terms also state the contract cancellation clause, which enables the customer to cancel the contract at any time (C2).

The technical specification is a description of the scope of delivery. (C1) The scope definition requires resources but customers are not willing to pay for that. In that regards, the scope definition should be drafted as well as possible and quickly. Case company finds this challenging. (C1)

Product liability in the contract states that if the third party suffers any loss due to the product, the vendor is responsible for covering that cost to the customer. That is the same sum that customer is obligated to pay according to the product liability law (C3).

APPENDIX B: DEFINITIONS & CHARACTERISTICS OF START-UP COMPANY

Author	***Definition / definition criterias***
Business Finland (2018)	Young, innovative, promising, rapidly growing, less than 5 years old, small company (less than 50 empl.) max turnover 10 milj. balance max 10 milj.
Investopedia (2018)	A startup is a company that is in the first stage of its operations. These companies are often initially bankrolled by their entrepreneurial founders as they attempt to capitalize on developing a product or service for which they believe there is a demand. Due tho limited revenue or high costs, most of these small-scale operations are not sustainable in the long term without additional funding from venture capitalists.
OECD (2007)	The emergence of a new unit. This can be either due to a (real) birth of the unit, or due to other creation by a merger, break-up, split-off or discontinui-ty point according to the continuity rules.
Wikipedia (2018a)	Startup company (startup or start-up) is an entrepreneurial venture which is typically a newly emerged business that aims to meet a marketplace need by developing a viable business model around a product, service, process or platform. A startup is usually a company designed to effectively develop and validate a scalable business model
Katila et al. (2012)	limited resources
Bartz W. Winkler A. (2014)	small size, young age, entrepreneurial ambitious. Start-up phase
Shontel (2014)	a start-up is a company working to solve a problem where the solution is not obvious and success is not guaranteed. an organization formed to search for a repeatable and scalable business model
Zaech and Baldegger (2017)	young firm (5 to 12 years), which have limited processes, structures and routines.
Eloranta (2014)	a temporary organisation designed to search for a repeatable and scalable business model
Silva et al. (2016)	an organization in first stages of development with high level of innovation, inherent risk, extreme uncertainty and scalable business model
Bajwa et al. (2017)	Startups are human institutions that create innovative products or services and search for sustainable business models under extreme uncertainty
Ries (2014)	a human institution designed to create new products or services under conditions of extreme uncertainty.

APPENDIX C: IDENTIFIED CHALLENGES OF THE CASE COMPANY