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The Business Model Innovation Process in High-Tech Start-ups:

When, What and Why Changes in a Business Model occur

by

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Abstract

As the process of business model innovation has not been highly researched on and as start-ups face the threat of failure due to a lack of a suitable business model, the purpose of this master thesis was to describe and visualise the process of business model innovation of start-ups as well as to discover the patterns within their processes. Thereby, we aim to provide a better understanding of the process and managerial implications. To achieve the purpose, we examined (1) how often changes of the business model occur, (2) how many building blocks in the business model changed per event, (3) what parts of the business model changed, (4) what caused these changes and (5) how change in one building block of the business model effects the other building blocks. To observe the business model innovation process, we collaborated with five high-tech start-ups and therefore conducted a qualitative research in form of a multiple case study. In our research study, we identified that changes occur three times within the first year of the business model innovation process with a sequence of three to five months. Further, we can conclude that the iterative process is characterised by a slightly declination trend. The parts that change in the business model depends on the antecedents and the effects between the building blocks. Nonetheless, we observed that the first changing event includes changes in the building blocks ‘customer segments’ and ‘value proposition’. In regard to what caused the changes, we observed that the most significant antecedents are customer feedback and need of knowledge which have the greatest impact on the building blocks ‘customer segment’ and ‘key resources’. Outstanding effects between building blocks of the business model canvas included the positive interrelations between ‘customer segments’ and ‘value proposition’ and between ‘value proposition’ and ‘key resources’. In total we concluded, that the creation of the fit between the two building blocks ‘customer segments’ and ‘value proposition’ are the most crucial and should be created early in the process. Further, in order to provide the potential to identify as many errors within the business model and the opportunity for strong changes, customers and other stakeholders should be included in the process of business model innovation to allow the appearance of as many as possible antecedents. Finally, we suggest keeping a balance between how often changes occur and how many building blocks are modified per change.

Keywords: business model innovation, business model development, change of business model, business model, start-ups, entrepreneurship

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Tack så mycket!

Isabell Behnke and Florian Kibbel

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1. Introduction

1.1. Background

Start-ups are seen as innovative and flexible in the accomplishment of their operations but still nine out of ten start-ups fail, with eight within the first 18 months (Roth, 2016; Griffith, 2014; Wagner, 2013). According to the diagram of CBinsights, that summarises an analysis of 101 start-ups about the reasons of venture failure, the need or lack of a business model, being on the 7th position in the ranking, is one of the top ten reasons why start-ups fail (Griffith, 2014). In addition to these difficulties, high-tech companies are confronted with rapidly moving markets, emerging new technologies and changing customer demands, causing the need for those companies to become more flexible and adaptive towards change (Sur, 2016; Trimi & Berbegal-Mirabent, 2012; Demil & Lecocq, 2010; Mitchell & Coles, 2003).

As technological innovations, especially radical ones, do not generate value by themselves, firms need to design a suitable business model that commercialises innovative ideas and technologies (Chesbrough, 2010; Teece, 2010; Demil & Lecocq, 2010). As a business model supports the fit between a firm's value proposition and the customer demands, it achieves customer satisfaction and value capture (Teece, 2010; Chesbrough, 2007; Chesbrough & Rosenbloom, 2002). Therefore, capturing value from a highly innovative created technology, that does not fit into the current corporate or industrial business model, requires the execution of business model innovation to generate the fit (Trimi & Berbegal-Mirabent, 2012; Teece, 2010; Chesbrough & Rosenbloom, 2002). Taking the market conditions into account, Trimi and Berbegal-Mirabent (2012) further state that a flexible business model, that constantly performs business model innovation to easily adapt to market and customer demand changes, is the ideal one. This flexibility is especially key for start-ups as they are in the process of testing different business models to find one that will successfully commercialise their innovative product or service (Trimi & Berbegal-Mirabent, 2012). In contrast to this flexibility, start-ups face resource limitations (Sosna, Trevinyo-Rodriguez, & Velamuri, 2010), meaning start-ups need to perform an efficient and effective process of business model innovation to not run out

of resources. In reference to this, running out of cash is the second most common reason why start-ups fail (Griffith, 2014). Trimi and Berbegal-Mirabent (2012) also state that for start-ups it is not about finding the "perfect" business model but rather a flexible one.

To sum it up, high-tech start-ups face a substantial risk of failure due to a lack of a flexible business model that needs to be developed in a short period of time to keep up with market developments. As start-ups also face resource limitations, they are in the need to perform an effective and efficient process of business model innovation, to be able to create a business model that will commercialise their innovation and to keep them adaptable to market changes.

The literature does not provide an exact definition of business model innovation, but generally it is understood as the creation of a new business model, depending on the level of novelty it can be a total reinvention or partly adaptions (Cucculelli & Bettinelli, 2015; Khanagha, Volberda & Oshri, 2014; Teece, 2010; Mitchell & Coles, 2003). Business model innovation is also recognised as an entrepreneurial activity and in many studies referred to as the outcome of innovative new ventures (Trimi & Berbegal-Mirabent, 2012; Chesbrough & Rosenbloom, 2002). Therefore, the testing and creation process of start-ups to find a suitable business model is business model innovation (Foss & Saebi, 2017; Trimi & Berbegal-Mirabent, 2012; Teece, 2010). In our thesis, we view and refer to business model innovation as a process. In this context, we understand business model innovation not as the outcome of an innovative business model but as the process of changing the business model. Moreover, just as the process of product innovation is referred to as product development we also include the term business model development in the process of business model innovation (Brown & Eisenhardt, 1995). Consequently, we understand the development of a business model in start-ups as the process of business model innovation.

1.2. Aim and Objective

Most literature about the process of business model innovation includes the development of broad plans, frameworks or guidelines that identify specific steps or stages that are developed for managers of established companies (Khanagha, Volberda & Oshri, 2014; Cavalcante, 2014; De Reuver, Bouwman & Haaker, 2013; Frankenberger et al. 2013; Girotra & Netessine, 2013; Teece, 2010; Osterwalder & Pigneur, 2010). Concerning the characteristic of this process

several scholars found that the nature of business model innovation is iterative with loops between the various stages (Dmitriev et al. 2014; Frankenberger et al. 2013; Pynnonen, Hallikas & Ritala, 2012; Chesbrough, 2010; Osterwalder & Pigneur, 2010; Sosna, Trevinyo-Rodriguez & Velamuri, 2010; Teece, 2010; Chesbrough & Rosenbloom, 2002). Nonetheless, there is no study that takes a closer look on this iterative character by examining the exact changes within the process of business model innovation in terms of when, what and why changes occur. Moreover, to our knowledge Dimitriev et al. (2014) is the only study that observes the process of business model innovation in start-ups. However, established companies face different barriers than start-ups and are mostly better supplied by resources, providing them with beneficial preconditions (Sosna, Trevinyo-Rodriguez, & Velamuri, 2010).

Therefore, the aim of our thesis is to fill this gap in the literature by extending the knowledge on the process of business model innovation in start-ups regarding its characteristic in terms of when, what and why changes occur. Besides contributing to the literature on business model innovation, we also intend to provide start-ups with managerial implications on how to improve the process. Thus, our objective is to facilitate start-ups on their journey to success and reduce their threat of failure.

1.3. Research Purpose

The purpose of our thesis is to describe and visualise the process of business model innovation in start-ups and to discover the patterns in it. In order to visualise the process and identify these patterns, we examine (1) how often changes of the business model occur, (2) how many building blocks in the business model change per event, (3) what parts of the business model change, (4) what caused these changes and (5) how change in one building block of the business model effects the other building blocks. Hence, our research question is "How is the process of business model innovation in high-tech start-ups in Sweden characterised in terms of when, what and why changes occur?". We conduct our research project by undertaking a multiple case-study with five start-ups from the high-tech industry in Sweden. We, then, describe and visualise each single process in a within-cases analysis and identify patterns within the data in a cross-analysis by comparing the five cases. The visualisation is provided in the 'BMI process Diagram' that we developed based on the literature of process of organisational change and the business model canvas, created by Osterwalder and Pigneur (2010).

This research is relevant as the visualised processes and identified patterns enhance the knowledge on the changes start-ups undertake within their business model, providing more information on the characteristic of the process of business model innovation. These insights contribute to the literature on the process of business model innovation, such as the process frameworks that define the different steps, and to a better understanding of business model innovation (Foss & Saebi, 2017). Moreover, the results of our study can provide start-ups with the knowledge on how to perform business model innovation to prevent excessive use of resources but also improve learning during the process, resulting in an increasing chance of success and survival of the start-up.

1.4. Research Limitation

Limitation in our research can be identified in the restriction of time, as our master thesis project is only given nine weeks. Although, multiple case studies support the understanding of a phenomena in-depth as well as in a contextual setting (Yin, 2014), these features also constrain the research to explicit settings and circumstantial factors, as described under chapter 4.3. Therefore, the scope of our research projects is limited what also causes limitations on the generalisation of our findings from the five high-tech case start-ups, across different start-ups in the same industry as well as across industries. Due to this, case study methodologies have been criticised for lacking generalisability as explained in chapter 4.7 (Eisenhardt & Graebner, 2007; Eisenhardt, 1989).

1.5. Thesis Outline

Following, the thesis provides a comprehensive literature review on business model and business model innovation. The third chapter consists of the theoretical framework that includes the ‘BMI Process Diagram’ that is developed based on the literature. The methodology chapter follows providing information on the research design and data collection for conducting the research. Subsequently, the presentation and discussion of our findings follow, ending in a short conclusion chapter.

2. Literature Review

2.1. Business Model

In the literature as well as in corporate practice the term business model is not clearly defined (Trimi & Berbegal-Mirabent, 2012). Due to its misuse of the related term business strategy, there is the need to distinguish business strategy from business model before narrowing down business model in detail (Chesbrough & Rosenbloom, 2002). A business strategy defines the relationship between the company and its ecosystem, thus acknowledged as competitor and environmental-centric (Pynnonen, Hallikas & Ritala, 2012; George & Bock, 2011). In contrast to this, the business model is examined to be a tool to implement the business strategy (Pynnonen, Hallikas & Ritala, 2012). Moreover, the business model is considered as an instrument to exploit opportunities, therefore conceded as opportunity-centric (George & Bock, 2011; Amit & Zott, 2001).

According to Osterwalder, Pigneur and Tucci (2005), the research about business model became popular in the late 1990s. As this development appeared simultaneously with the emergence of the internet, Osterwalder and colleagues (2005) concluded from their study about the research origin of business model that the subject business model might stay in correlation with technology. To date, after more than 15 years of research, there is no clear and single concept of business model that scholars have agreed upon (Schneider & Spieth, 2013; Girotra & Netessine, 2013; Zott, Amit & Massa, 2011; Teece, 2010; Morris, Schindehutte & Allen, 2005). As Zott, Amit and Massa (2011, p.22) contended “business model in its current use is not one concept; it is many concepts“.

Along with Teece (2010) this ambiguity of various concepts and the understanding of the term business model steams from the deficiency of a theoretical foundation. Researchers can view the concept of business model from different theories, such as the value-chain, value system or strategic positioning from Micheal E. Porter, to determine the value creation through a business model, the resource-based view from Jay Barney as an explanation how a business model can

generate a competitive advantage, or transaction costs economics from Oliver E. Williamson to determine a firm's boundaries (Schneider & Spieth, 2013; George & Bock, 2011; McGrath, 2010; Morris, Schindehutte & Allen, 2005; Osterwalder, Pigneur & Tucci, 2005; Amit & Zott, 2001; Barney, 1991). Therefore, depending which perspective the researchers took they identified the business model as a structural template (Deshler & Smith, 2011; George & Bock, 2011; Teece, 2010; Amit & Zott, 2001), a system (Sorescu et al. 2011; Zott & Amit, 2010; Chesbrough, 2007; Morris, Schindehutte & Allen, 2005), a description (Berglund & Sandström, 2013; Demil & Lecocq, 2010; Osterwalder & Pigneur, 2010), a framework (Doz & Kosonen, 2010; Chesbrough & Rosenbloom, 2002) or a conceptual tool (Osterwalder, Pigneur & Tucci, 2005). However, most definitions cover that the business model shows how a company plans to proceed its business in order to capture value from its innovative offering (s. Table 1).

Table 1: *Selected Definitions of Business Model*

Author	Concept	Definition
Amit & Zott (2001)	structural template	"A business model depicts the design of transaction content, structure, and governance so as to create value through the exploitation of business opportunities." (p.493)
Chesbrough (2007)	system	"It defines a series of activities, from procuring raw materials to satisfying the final consumer, which will yield a new product or service in such a way that there is net value created throughout the various activities." (p.12)
Chesbrough & Rosenbloom (2002)	framework	"The business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs. The business model is thus conceived as a focusing device that mediates between technology development and economic value creation." (p.532)
Berglund & Sandström (2013)	description	"business model as: (a) a high-level description of how a firm (or part of a firm) creates, delivers and appropriates value, that is (b) centred on a focal firm, but that also (c) transcends the boundaries of the focal firm." (p.276)
Demil & Lecocq (2010)	description	"the description of the articulation between different BM components or 'building blocks' to produce a proposition that can generate value for consumers and thus for the organization" (p.227)
Deshler & Smith (2011)	framework	"The mix and alignment of strategy and processes, capabilities and resources" (p.19)
Doz & Kosonen (2010)	framework	"business models stand as cognitive structures providing a theory of how to set boundaries to the firm, of how to create value, and how to organise its internal structure and governance" (p.371)
George & Bock (2011)	structural template	"A business model is the design of organizational structures to enact a commercial opportunity." (p.99)

Morris, Schindehutte & Allen (2005)	system	"A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets" (p.727)
Osterwalder & Pigneur (2010)	description	"A business model describes the rationale of how an organization creates, delivers, and captures value" (p.14)
Osterwalder, Pigneur & Tucci (2005)	conceptual tool	"A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore, we must consider which concepts and relationships allow a simplified description and representation of what value is provided to customers, how this is done and with which financial consequences." (p.5)
Sorescu et al. (2011)	system	"A business model is a well-specified system of interdependent structures, activities, and processes that serves as a firm's organizing logic for value creation (for its customers) and value appropriation (for itself and its partners)". (p.4)
Teece (2010)	structural template	"a business model defines how the enterprise creates and delivers value to customers, and then converts payments received to profits"(p.173)
Timmers (1998)	architecture	The business model is "an architecture of the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits for the various business actors; a description of the sources of revenues" (p. 2).
Zott & Amit (2010)	system	"business model as a system of interdependent activities that transcends the focal firm and spans its boundaries" (p.216)

In addition to this, viewing the business model as a system, that connects activities and explains how firms do business, is receiving increasing support from the literature and scholars (Zott, Amit & Massa, 2011; Zott & Amit, 2010). Sorescu et al. (2011, p.4) further characterise the system as it contains "interdependent structures, activities, and processes that serves as a firm's organizing logic for value creation (for its customers) and value appropriation (for itself and its partners)". In other words, the system perspective enables to project a view of a company as a whole and thereby, values the connection between processes and activities (Ackhoff, 1994). This connection is important to create the mentioned fit between the value proposition and the customer demand to gain a sustainable competitive advantage (Teece, 2010; Demil & Lecocq, 2010; Chesbrough, 2007). Therefore, the question arises how companies are making use of the business model.

In practice, the business model is used to analyse companies in order to get a deeper insight in the firm's activities (McGrath, 2010). The core task of the business model is to commercialise the innovation in a way that the company can capture the highest possible value from it (Zott, Amit & Massa, 2011; George & Bock, 2011; Teece, 2010; Chesbrough, 2010; Chesbrough,

2007; Chesbrough & Rosenbloom, 2002). In other words, with the business model a company creates a clear link between innovation and value creation. Teece (2010) goes even further and underlines that enabling value capture from innovation is the main task of a business model as it defines how to go to the market and how to capture value. This commercialisation of the innovations value is important for companies as research has proven in recent years that it is not about technology anymore through which companies can create a competitive advantage, but a business model that ensures the fit mentioned (Teece, 2010; Chesbrough, 2007; Morris, Schindehutte & Allen, 2005; Chesbrough & Rosenbloom, 2002).

In this context, further studies contribute to the significant usage of business models by providing evidence about the positive relationship between business model and firm performance (Demil & Lecocq, 2010). For instance, Trimi and Berbegal-Mirabent (2012) point out that a good business model that ensures the fit between a company's value proposition and the customer demand has enhancing effects on the overall company's performance. The company's performance increase steams from permanent interaction of resources and competences of a firm as well as of the organisational system and the value proposition that the business model aligns with each other (Demil & Lecocq, 2010). Furthermore, a business model that creates this fit can also generate a competitive advantage that differentiates the company from its competitors and provides it with a strategic position on the market (Pynnonen, Hallikas & Ritala, 2012; Deshler & Smith, 2011; Porter, 1996). However, the business model concept is not a holistic solution for success. Due to its misconception and misuse of the term, one needs to keep in mind, that it does not cover certain strategic aspects such as "industry's structural attractiveness", "contextual opportunities and threats", "competitors' strengths and weaknesses" (Ghezzi, 2014, p.2). Therefore, the business model alone is not enough to succeed, it rather needs to be accompanied by the usage of other tools such as the SWOT analysis and other strategic planning processes (Ghezzi, 2014).

In recent years, there has been considerable interest of business models in entrepreneurship, for instance, George and Bock (2011, p.102) describe the business model as a significant part of the "entrepreneurial enactment process". However, start-up founders are often considered as "specialists in the technical area of the innovation", but lack in the design of a business model (García-Gutiérrez & Martínez-Borreguero, 2016, p.48). In this context, many frameworks for designing a business model exist. The most famous one is the Business Model Canvas from

Osterwalder and Pigneur (Spieth, Schneckenberg & Ricart, 2014). These frameworks provide insights about the business model design itself.

In this regard, Demil and Lecocq (2010) draw a distinction between a static and dynamic view on business model design. The authors (2010, p.227) characterise the business model as a "blueprint for the coherence between core business model components" in the static view, whereas the dynamic perspective of business model means "using the concept as a tool to address change and innovation in the organization, or in the model itself". This static perspective gains support of George and Bock (2011, p.102) who claim business model as a "static configuration of organisational elements", which is "inherently non-reflexive". In this static view, scholars differentiate between elements the business model consists of (Demil & Lecocq, 2010). The most common elements comprise value offering, economic model, customer relationship, partner network and connected activities to target market (Morris, Schindehutte & Allen, 2005; Chesbrough & Rosenbloom, 2002). These elements of the business model and the business model itself are seen as a major source for companies to be innovative and continuously improve performance (Trimi & Berbegal-Mirabent, 2012). Depending on the composition of these elements, Amit and Zott (2011) classify four different business model design themes according to their degree of customer lock-in, novelty, experimental and efficiency.

However, the static view scrutinizes business model as a scheme that fulfils significant functions such as enabling description and classification as well as determining choices that offer the potential for superior performance (Demil & Lecocq, 2010). In contrast to this, the dynamic view aims to understand the behaviour in which a business model develops over time (Demil & Lecocq, 2010). To achieve a sustainable competitive advantage and increasing performance, it is the companies' responsibility to strive for business model innovation (Trimi & Berbegal-Mirabent, 2012; Teece, 2010; Chesbrough & Rosenbloom, 2002). The static view of the business model as such is complemented by the dynamic view of business model innovation, to enable companies to ensure these improvements of the business model, long-term success and a sustainable advantage in the marketplace (Sorescu et al., 2011; Demil & Lecocq, 2010). The dynamic view gains support of Teece (2010) who drew our attention on the need for further development of the business model as it can be imitated by competitors overtime.

2.2. Business Model Innovation

2.2.1. Definition of Business Model Innovation

Referring to the distinction between the static and dynamic perspective, the dynamic view is applied in terms of business model innovation, as it reflects the development of business models over time, meaning using business models as a notion or device to cause transformations within the company through innovations in the product or the business model itself (Demil & Lecocq, 2010).

As the literature is lacking a commonly agreed concept for business model, there are also several concepts on business model innovation (Foss & Saebi, 2017). This results in multiple definitions on business model innovation (Foss & Saebi, 2017). Thus, researchers describe business model innovation as a replacement of an outdated business model (Osterwalder & Pigneur, 2010; Mitchell & Coles, 2003), an introduction (Berglund & Sandström, 2013) or discovery (Markides, 2006) of a new business model, the search (Casadesus-Masanell & Zhu, 2013) or modification (Cucculelli & Bettinelli, 2015; Sorescu et al. 2011) of the firm's logic, or the redefinition (Khanagha, Volberda & Oshri, 2014) of its value proposition (s. Table 2). Frankenberger et al. (2013, p.253) provide a comprehensive definition of business model innovation by determining it "as a novel way of how to create and capture value, which is achieved through a change of one or multiple components in the business model". This definition covers the creation of a new business model that replaces an old one, determines how it is created (through the modification of business model elements) and considers the redefinition of value creation and capture, the key aspect of a business model (Teece, 2010).

Furthermore, according to Trimi and Berbegal-Mirabent (2012) business model innovation can appear in three forms. First, the business model itself can be the source of an innovation. Second, a radical product innovation needs to be integrated, causing the business model to change to enhance the value capture of the innovation and third, due to changes in the demand, initiating modification in the business model to adapt to these changes (Trimi & Berbegal-Mirabent, 2012). As product innovations can alter in its intensity, ranging from incremental to radical (Stringer, 2000), also business model innovation has its own scale. Khanagha, Volberda and Oshri (2014, p.326) identified three distinct stages: "incremental evolution, directed

transformation, and radical substitution of capabilities as alternative choices in the face of discontinuous change".

Table 2: *Selected Definitions of Business Model Innovation*

Author	Definition
Berglund & Sandström (2013)	"A BMI can thus be thought of as the introduction of a new business model aimed to create commercial value." (p. 276)
Casadesus-Masanell & Zhu (2013)	"business model innovation refers to the search for new logics of the firm, new ways to create and capture value for its stakeholders, and focuses primarily on finding new ways to generate revenues and define value propositions for customers, suppliers, and partners." (p. 464)
Cucculelli & Bettinelli (2015)	"as the action of modifying the firm's existing activity system and renewing its core business logic, to enact and exploit opportunities." (p.329)
Frankenberger et al. (2013)	"business model innovation can be defined as a novel way of how to create and capture value, which is achieved through a change of one or multiple components in the business model"(p.253)
Khanagha, Volberda & Oshri (2014)	"Business model innovation concerns the redefinition of existing products or service and how they are provided to customers" (p.324)
Markides (2006)	"Business-model innovation is the discovery of a fundamentally different business model in an existing business" (p.20)
Mitchell & Coles (2003)	the execution of "business model replacements that provide product and service offerings to customers and end users that were not previously available" (p. 17)
Osterwalder & Pigneur (2010)	"business model innovation is about creating value, for companies, customers, and society. It is about replacing outdated models" (p.5)
Sorescu et al. (2011)	"business model innovation is a change beyond current practice in one or more elements […] and their interdependencies, thereby modifying the […] organising logic for value creation and appropriation." (p.7)

2.2.2. Purpose of Business Model Innovation

As the increased research on business models seems to be linked to the emergence of the internet (Osterwalder, Pigneur & Tucci, 2005), shifting the focus from product innovation itself to business model innovation might be also connected to the emergence of the internet and the availability of new technology. Consequently, the research on business model innovation was firstly related to topics like e-business, information technology, technological innovation and strategic aspects such as competitive advantage and firm performance (Zott, Amit & Massa, 2011; Amit & Zott, 2001). Osterwalder and Pigneur (2010, p.244) further mention that the aim of business model innovation emerges from four purposes: "satisfy existing but unanswered

market needs, to bring new technologies, products or services to market, to improve, disrupt, or transform an existing market with a better business model, or to create an entirely new market".

In this context, studies about the antecedents of business model innovation identified external as well as internal drivers (Sorescu et al. 2011; Demil & Lecocq, 2010; De Reuver, Bouwman & MacInnes, 2009). De Reuver, Bouwman and MacInnes (2009) highlight that especially external drivers have a profound impact on the emergence of business model innovation. They found evidence that particularly technological-driven and market-related antecedents trigger the reinvention of a business model. Also, Osterwalder and Pigneur (2010, p.244) consider external forces as reasons for business model innovation and state four drivers: "crisis with the existing business model, […] to adapt to changing environment, bringing new technologies, […], or preparing for the future […]". Further, Khanagha, Volberda and Oshri (2014) and Teece (2010) point out that specifically technological innovations have an impact on the encounter of new business models as they include the opportunity to determine new attempts to create and capture value from the innovation. However, regarding start-ups, De Reuver and colleagues (2009) detected that market-driven antecedents are more relevant than technology drivers.

Nevertheless, the main reason why the development of a new business model became so important, relates to the fact that technological innovations do not create value on their own (Chesbrough, 2010; Chesbrough, 2007; Chesbrough & Rosenbloom, 2002). It is not only about creating a disruptive innovation anymore, but rather creating a new business model that commercialises this novel invention because the right business model creates a fit between the value proposition and the customer needs. Thereby, it enables the company to capture value from its innovation as well as contains the opportunity to generate a competitive advantage and "the potential to shake whole industries" (Berglund & Sandström, 2013; Trimi & Berbegal-Mirabent, 2012; Sorescu et al. 2011; Demil & Lecocq, 2010, p.228; Chesbrough, 2010; Teece, 2010; Chesbrough, 2007; Pohle & Chapman, 2006; Chesbrough & Rosenbloom, 2002).

To preserve this competitive advantage, Teece (2010) indicates that the new business model needs to be non-imitable whereas Mitchell and Coles (2003, p.17) and Osterwalder and Pigneur (2010) highlight the advantages of undertaking continuing business model innovation, meaning ensuring an "ongoing process". Through continuing business model innovation companies can identify new competitive advantages and thereby stay ahead of competitors, especially those

that also follow an ongoing procedure (Mitchell & Cole, 2003). Further, by constantly innovating the business model it becomes flexible and agile towards market developments (Trimi & Berbegal-Mirabent, 2012). In this context, Trimi and Berbegal-Mirabent (2012) point out that this flexibility is especially significant for start-ups, as they are in the process of testing several business models to find the one that can enhance the value of their innovation. They also conduct that the survival of a new venture not necessarily depends on the discovery of a "perfect" business model but to design a flexible one that can adapt to the market (Trimi & Berbegal-Mirabent, 2012).

Besides the potential to generate a competitive advantage through business model innovation, another advantage that researchers have identified, is its positive effect on firm performance. Several studies found evidence that companies undertaking business model innovation perform better than those who do not (Cucculelli & Bettinelli, 2015; Aspara, Hietanen & Tikkanen, 2010; Zott & Amit, 2007; Pohle & Chapman, 2006; Mitchell & Cole, 2003). Mitchell and Cole (2003), for instance, concluded in their study that top performing companies frequently improve or even reinvent their business model. They findings also included that companies that made changes in their business model every second year were the most effective ones (Mitchell & Cole, 2003). Contributing to this, Cucculelli and Bettinelli (2015) observed the linkage between business model innovation and investments in intangibles and concluded that business model innovation itself has a positive impact on firm performance with a rising effect the higher the degree of novelty. Another study about this research topic has been conducted by Aspara and colleagues (2010). They examined the distinct impacts of business model innovation and replication in small and larger firms and found that large firms can improve their financial performance rather through business model replication than business model innovation, whereas small companies with the focus on business model innovation rather than replication, experience solid increasing profits (Aspara, Hietanen & Tikkanen, 2010). Consequently, business model innovation is an important activity of companies to stay competitive and increase its profitability.

2.2.3. Execution of Business Model Innovation

As business models are seen as systems, changes in them cause effects in the overall organisational system (Casadesus-Masanell & Zhu, 2013; Sosna, Trevinyo-Rodriguez & Velamuri, 2010; Amit & Zott, 2001). In addition to this, many managers see business model

innovation as a "key strategic challenge" that needs to be accomplished (Berglund & Sandström, 2013, p. 275; Pohle & Chapman, 2006). This raises the questions on how business model innovation is carried out. As a result, scholars studied different barriers to business model innovation as well as capabilities needed and the process stages of business mode innovation to overcome these barriers (Foss & Saebi, 2017; Schneider & Spieth, 2013). As the studies about obstacles to business model innovation refer to established corporations we will exclude a further elaboration on them as out research focus is on start-ups (Chesbrough, 2010; Mitchell & Coles, 2003). Instead, we proceed to review the literature on capabilities and skills needed for business model innovation.

In this context, Berglund and Sandström (2013) highlight the open system perspective companies should use when redesigning their business model. This perspective contains the participation of externals and outsiders, meaning opening up towards the environment. Pynnonen, Hallikas and Ritala (2012) contribute to this perspective as they develop a four-stage framework for customer-driven business model innovation. The authors argue to create a fit between the value proposition and the customer needs, companies need to include their customer's feedback in the development of the new business model. Another approach is presented by Girotra and Netessine (2013, p.1) who suggest asking yourself the four W-questions "What decisions are made, When they are made, Who makes them, and Why they are made" that address the business model. According to the authors, the modification of one W can emerge into a new business model (Girotra & Netessine, 2013). Furthermore, Doz and Kosonen (2010) developed an action plan based on the strategic agility framework. This framework includes the three interlinked "meta-capabilities" strategic sensitivity, leadership unity and resource fluidity, that are stated as significant to facilitate business model innovation. In regards to Doz and Kosonen (2010), a stronger focus on them can enhance the executives' capabilities to reflect on the ecosystem outside the firm's boundaries and the activity system within the company.

Other studies highlight the process of experimentation to discover opportunities for a new business model, such as the discovery-driven approach by McGrath (2010). The importance of experimentation is also accentuated by Chesbrough (2010) who proposes experimentation, effectuation and leadership as three ways to overcome barriers to business model innovation, and Achtenhagen, Melin and Naldi (2013) who studied the capabilities companies need to have to perform effective business model innovation. The findings of Achtenhagen and colleagues

(2013, p. 427) overlap with the findings of Chesbrough, as they consider "experimenting with and exploiting new business opportunities, a balanced use of resources, and achieving coherence between leadership, culture, and employee commitment" and their mutual reinforcement as crucial capabilities to perform successful business model innovation. Also, Sosna, Trevinyo-Rodriguez and Velamuri (2010), who take a learning perspective on business model innovation, indicate experimentation in form of double-loop and second-order learning as a way to perform business model innovation.

As abovementioned, besides studies about the skills needed and approaches that support business model innovation, several scholars have also already focused on the process of business model innovation itself, providing managers with roadmaps, frameworks and guidelines that mainly concentrate on the different stages companies accomplish during the creation of a new business model (Foss & Saebi, 2017). By describing the process and identifying the different steps that need to be accomplished, managers receive some guideline in how to approach business model innovation (Demil & Lecocq, 2010). In these researches, the process of business model innovation has been characterised as an ongoing process of change as a reaction to external conditions (Demil & Lecocq, 2010; Mitchell & Coles, 2003) or a learning process with double-loops (McGrath, 2010; Sosna, Trevinyo-Rodriguez & Velamuri, 2010). In the development of process frameworks scholars have identified the process of business model innovation as a cycling and iterative one (Dmitriev et al. 2014, Cavalcante, 2014; Pynnonen, Hallikas & Ritala, 2012; Chesbrough, 2010; Osterwalder & Pigneur, 2010; Sosna, Trevinyo-Rodriguez & Velamuri, 2010; Teece, 2010; Chesbrough & Rosenbloom, 2002).

One of those frameworks is developed by Teece (2010), who created a four-step framework that describes broadly how an established company can develop a sustainable business model. The author identified "segment the market, create a value proposition for each segment, design and implement mechanisms to capture value from each segment, figure out and implement 'isolating mechanisms' to hinder or block imitation by competitors, and disintermediation by customers and suppliers" (Teece, 2010, p. 182) as the four steps. Osterwalder and Pigneur (2010, p.244) formed a designing process for business models that included the five, sometimes simultaneous, phases: "mobilise, understand, design, implement and manage". Their process design can be used by established companies but also new ventures (Osterwalder & Pigneur, 2010). In contrast, De Reuver and colleagues (2013, p.1) modelled a four-step roadmap for

executives that drafts the "transition path from a current to a desired business model" by presenting the activities and desired changes, step by step. The study from Frankenberger et al. (2013) developed an "integrative framework" that describes the four stages of the process of business model innovation and identifies the challenges in each stage by applying the knowledge about innovation processes to business model innovation. Whereas studies about innovation processes have products or services as an outcome, so has business model innovation a novel business model as a result (Frankenberger et al. 2013). Another process framework is presented in the working paper of Girotra and Netessine (2013), who generated a "systematic, stage-gate process" that offers insight in how to create, choose and narrow down an opportunity for a new business model and the structured concept for managers to identify risks that occur during business model innovation. Their framework also shows what tools can be used in each stage, such as the business model canvas in the phase "model articulation and value creation analysis" (Girotra & Netessine, 2013, p.14). Next in line, Khanagha, Volberda, and Oshri (2014) investigated the evolution of a business model from a large and established company to develop a completely new business model that can be viewed as a disruptive innovation. Khanagha and colleagues (2014) identified five phases and concluded that dynamic structural adjustments need to be made to enable experimentation which is identified as crucial to develop a radically new business model. An interesting study is also the one from Cavalcante (2014). He combined the research on the capabilities with the research on the process of business model innovation by including a "pre-stage" in the process. This pre-stage consists of experimental activities that encourage learning before beginning to design a new business model (Cavalcante, 2014).

However, all these studies have been conducted based on established companies. A study on the process of business model innovation in start-ups was, to our knowledge, only performed by Dmitriev and colleagues (2014). Dmitriev et al. (2014) created the process model for business model innovation by setting the elements of business modelling in a sequential order. This framework, therefore, shows the steps including the loops and cycles a start-up takes to create a new business model. Thus, Dmitriev et al. (2014) show the process a start-up goes through several times in their process of business model innovation, and here is where we see a contribution by looking are the specific changes in the process.

2.3. The Literature Gap and Relevance of Research

As mentioned above, current research on the process of business model innovation only considers the steps taken to get from one business model to a new one or what stages a company goes through. However, none of those studies conducted a closer observation on the iterative characteristic of the process of business model innovation. Another gap is that most literature is conducted on established company and not on start-ups, however, as many studies acknowledge business model innovation as an entrepreneurial act, start-ups can be considered as most suitable for conducting research on the process of business model innovation (Foss & Saebi, 2017; George & Bock, 2011; Zott & Amit, 2010).

Hence, we aim to fil this gap by conducting research on the process of business model innovation in start-ups regarding its characteristic in terms of when, what and why changes occur. Therefore, our research study includes the description and visualisation of the process of business model innovation in start-ups and the discovery of the patterns in it, by examining (1) how often changes of the business model occur, (2) how many building blocks in the business model change per event, (3) what parts of the business model changed, (4) what caused these changes and (5) how change in one building block of the business model effects the other building blocks.

This research is theoretical relevant as dynamic adaption processes towards environmental change, such as business model innovation, are tremendously complex (Miles et al. 1978). By observing different processes on patterns in organisational behaviour, the complexity of these processes can be diminished and the adaption process described or even forecasted (Miles et al. 1978). In this context, Langley (1999) points out that especially the research on patterns within the temporal order of sequential events is vital for the development of process theory. By providing knowledge about how these adaption processes, such as business model innovation, move and due to what reasons, decision makers receive knowledge in terms of "what to do, at what point in time, in what context" (Langley et al. 2013, p.4). Thereby, we can contribute to a better understanding of the process of business model innovation by visualising the processes of five start-ups and identifying patterns in those visualised processes and by that provide more information on the characteristic of the process of business model innovation regarding when, what and why changes occur.

Moreover, this research is practical relevant as new ventures do not face the same barriers established companies do and, as pointed out by Khanagha, Volberda, and Oshri (2014), it is important that resources are used wisely as the probability of success is rather small and the markets are moving fast. Moreover, as Langley et al. (2013) mention, time is a crucial aspect in dynamic processes as corporations act in uncertain environments and therefore need to be moving. This higher change frequency results in a higher regularity of strategic decisions about organisational change (Klarner & Raisch, 2013). Therefore, especially start-ups with their limited timeframe to find a suitable business model have an increased need to know how to execute business model innovation without risking their survival (Wagner, 2013). By visualising the five business model innovation processes of our five case start-ups, managerial implications can be made and thereby provide indications on how to improve the process of finding a business model and reduce the risk of failure.

3. Theoretical Framework

In this chapter, we developed the theoretical framework for our analysis based on the research about the process of organisational change, using the process approach and the business model canvas, developed by Osterwalder and Pigneur (2010) as the analysis tool. As a result, we created the 'BMI Process Diagram' to visualise the business model innovation process of our five case start-ups.

3.1. Process of Organisational Change

According to Stelzer and Mellis (1998) organisational change is an important constituent to ensure fruitful process efforts. The organisational entity will only succeed in the long-term, when managers have the ability to change the organisation (Tushman & O'Reilly, 1996). Especially, among entrepreneurs "most fail, a few succeed" (Tushman, 1997, p.15). To

comprehend, the process is of high importance and value for the progressing management knowledge (Langley et al. 2013).

The literature of organisational change has the tendency to focalise on two main questions, resulting from different epistemologies. Van de Ven and Huber (1990, p.213) question the antecedents that are responsible for the change in corporate structures, meaning why changes occur, and how does this "organi[s]ational change emerge [and] develop […] over time". Hereby, both questions represent two different perspectives on organisational change, but complement each other as both answers are desired to gain the inputs, processes and outcomes of the change process (Van de Ven & Huber, 1990). However, the first question implies the variance theory, which aims to determine the "conditions necessary to bring about an outcome" that is based on the research of "fixed entities with varying attributes" (Van de Ven & Poole, 2005, p.1382). In other words, this refers to "what actually changes in the organisation" (Barnett & Carroll, 1995, p.217). Contrary, the second question focusses on the process theory that aims to clarify the temporal and chronological series in which a distinct "number of events" appear due to "historical narrative" (Van de Ven & Poole, 2005, p.1381 and p.1387; Monge, 1990). Tsoukas (1989, p.559) claims underlying generative mechanisms that are "potentially responsible for the occurrence of the events", meaning the process assesses how the change appears (Barnett & Carroll, 1995). To solve the second question, Van de Ven and Poole (1990) propose to collect data on the sequential events that arose throughout the change period of an organisation. The order of these series of occasions, such as a product innovation, can be identified and contrasted with the occurrence of other event sequences" (Van de Ven & Huber, 1990; Van de Ven & Poole, 1990). In other words, process theory concerns the clarification of developments.

The two epistemological views of organisational change, process theory and variance theory, are expanded by the two different perspectives on organisations, viewing an organisation as a noun/thing or verb/process (Van de Ven & Poole, 2005). Rescher (1996) claims things as a fixed material that changes only their standing in space and time, while the initial identity of the thing remains the same. In other words, the change of things is characterised by the "development and adaption in relation to other dimensions", where the organisation is classified as noun such as a social entity (Van de Ven & Poole, 2005, p.1378). Contrary, the second perspective characterises the organisation as a verb, a "process of organi[s]ing and emergent flux" (Van de Ven & Poole, 2005, p.1387). To visualise the study of organisational change

including these different perspectives Van de Ven and Poole (2005) categorise four approaches (s. Table 3). In the typology, all four approaches adopt the variance or process method. Approaches I and II assume the organisational entity as a noun, which is regarded a "real social actor with an enduring identity", while the approaches of III and IV aim to "study the processes of organi[s]ing" (Van de Ven & Poole, 2005, p.1387).

Table 3: *A Typology of Approaches for Studying Organizational Change (Van de Ven & Poole, 2005)*

		Ontology An organization is represented as being:	
		A noun, a social actor, A real entity ("thing")	A verb, a process of organizing, emergent flux
Epistemology (Method for studying change)	Variance method	**Approach I** Variance studies of change in organizational entities by causal analysis of independent variables that explain change in entity (dependent variable)?	**Approach IV** Variance studies of organizing by dynamic modeling of agent-based models or chaotic complex adaptive systems
	Process Narratives	**Approach II** Process studies of change in organizational entities narrating sequence of events, stages or cycles of change in the development of an entity	**Approach III** Process studies of organizing by narrating emergent actions and activities by which collective endeavors unfold

As the purpose of this thesis is to describe and visualise the process of business model innovation in start-ups, we consider approach II most suitable as firstly, it provides the link between the case companies which we considered as a "real entity or thing" and our qualitative research design, described in chapter 4.2, with the epistemological method to view the changes in the business model as a "narrating sequence of events" (Langley et al. 2013; Van de Ven & Poole, 2005, p.1387). Secondly, approach II ensembles a great fit to this goal as the approach express its view on the "change in the development of an entity" (Van de Ven & Poole, 2005, p.1387).

3.2. Business Model Canvas

To execute the process method and to identify changes in the business model, we use the business model canvas. The business model canvas has been created by Osterwalder and Pigneur (2010) in 2008 and has, since then, experienced high acceptance in the research area

for business model and is an often-used tool by entrepreneurs, managers and scholars (Spieth, Schneckenberg & Ricart, 2014). The creators itself define the canvas as "a tool for describing, analysing and designing business models" and an instrument that guarantees a "shared language" during business model innovation (Osterwalder & Pigneur, 2010, p.8, p.153). It supports the communication with stakeholders and their understanding of the business model, it is "simple and easy to use" and can be used as an instrument to improve "transparency, creativity and innovation" as it enables iterative enhancements (Gracía-Gutiérrez & Martínez-Borreguero, 2016, p. 49; Trimi & Berbegal-Mirabent, 2012, p.457). Therefore, the canvas is a significant tool in the business model innovation process of start-ups (Trimi & Berbegal-Mirabent, 2012).

The canvas consists of nine building blocks that cover the four fundamental corporate sections "customer, offer, infrastructure and financials availability" (Osterwalder & Pigneur, 2010, p.15). These nine building blocks are customer segments, value proposition, channels, customer relationship, revenue streams, key resources, key activities, key partnerships and cost structure (Osterwalder & Pigneur, 2010). Each block needs to be filled as all nine elements are connected with each other (Osterwalder & Pigneur, 2010). The first building block is 'customer segment'. Here, a company defines the one or several groups of customers it wants to offer its products or services to. After defining clear and profitable customer segments the rest of the business model can be designed based on these customers (Osterwalder & Pigneur, 2010). The next building block is 'value proposition', it includes the company's offering that shall create value for the defined customers. Thereby, it provides a solution for a customer problem or need. The building block 'channels' follows as it defines how the company communicates with its customers and how it intends to deliver the valuable benefits to its customers (Osterwalder & Pigneur, 2010). The building block 'customer relationships' depicts the relationship the company wants to have with its customers. Such relationships can range from personal to automated, including for instance personal assistance, community participation, self-service or automated service (Osterwalder & Pigneur, 2010). The building block 'revenue streams' includes the pricing system per customer and consequently determines how the company plans on making money. The 'key resources' represent the essential resources a company needs to run its business and offer its bundle of benefits. These resources can be "physical, financial, intellectual or human" (Osterwalder & Pigneur, 2010, p.34). The sevenths building block 'key activities' consist of all essential activities and tasks that need to be accomplished to provide the offerings towards the defined customer segments. Under key partnership, a company lists

all its important suppliers and partners that are necessary to realise the business model. And finally, the 'cost structure' entails all expenses that arise during the operation of the created business model (Osterwalder & Pigneur, 2010).

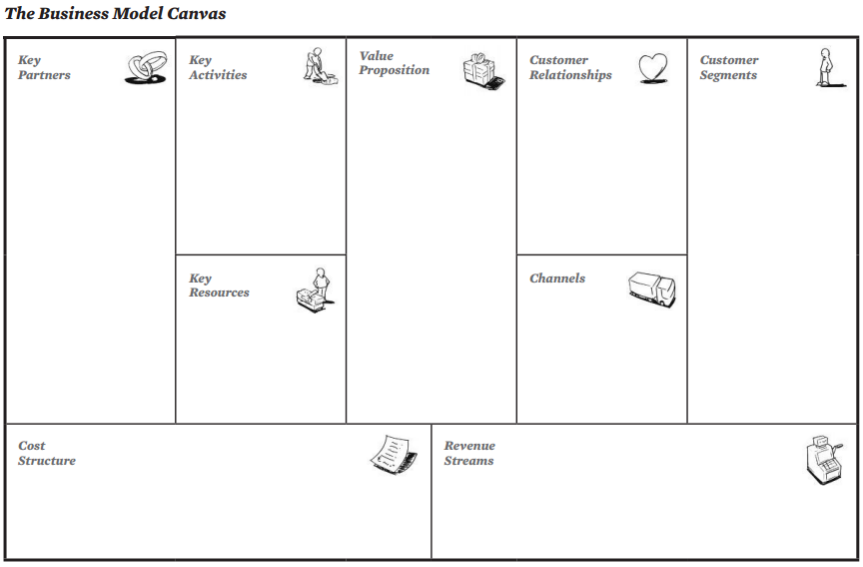

Figure 1: *Business Model Canvas (Osterwalder & Pigneur, 2010)*

3.3. Visualising the Process of Business Model Innovation

In this framework, we view the changes in the business model as the sequential events to draft the business model innovation process. As business model innovation is a continuous process we lay our focus on the first year since the draft of the very first business model. In order to visualise the business model innovation process of each start- up for the within-case analysis we created the 'BMI Process Diagram'.

The 'BMI Process Diagram' shows the amount of changes in their temporal sequence in the timeframe of one year in relation to how many building blocks in the business model canvas were modified in each event of change. The x-axis depicts the timeline in months that displays how often and in which temporal sequence the event of changing the business model occurred in the process of business model innovation of each start-up. As the business model canvas consists of nine building blocks the y-axis counts from one to nine. By showing how many building blocks changed in the business model, we can visualise how radical or incremental the

change was. For instance, slightly changes in the building block ‘revenue streams’ are less intense then changes in several building blocks. Also, radical changes in one single building block involve quite likely further changes in the other building blocks of the canvas, such as the ‘value proposition’ that then might further cause changes in the other building blocks, as the ‘customer segments’, the ‘channels’, ‘key resources’, ‘key activities’, ‘cost structure’ and ‘revenue streams’ might need adaptions. Moreover, we determine in each event of change the antecedent and the building blocks (abbreviation BB) that dominate the change. Thereby, based on this diagram we can examine how often changes in the business model occur, how many building blocks in the business model change per event, what caused these changes and what parts of the business model changed.

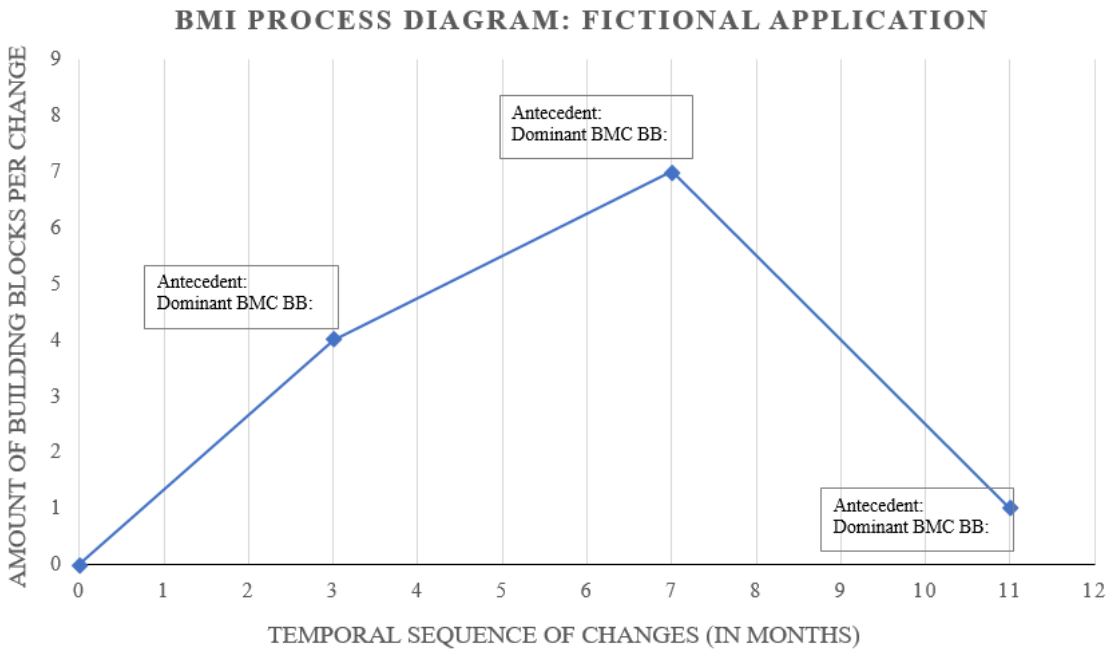

Figure 2: *BMI Process Diagram (created by authors)*

4. Methodology

4.1. Research Approach

As our research includes collection of facts and data as well as the observation of patterns based on finding similarities and differences, our research approach is the one of a social constructionist from the epistemological philosophy (Easterby-Smith, Thorpe & Jackson, 2015). As social constructionist, we aim to discover how people make sense of the world around them, meaning that there are multiple realities that are influenced by the people than by objects and external factors (Easterby-Smith, Thorpe & Jackson, 2015).

4.2. Research Design

For conducting our research about the process of business model innovation in high-tech start-ups in Sweden, we applied a qualitative research approach based on a case study research design (Gioia, Corley & Hamilton, 2013; Eisenhardt, 1989). We chose the case study method, as according to Eisenhardt and Graebner (2007, p.26) case studies support the development of an "accurate, interesting, and testable" theory. Yin (2014, p.4) indicates that case studies are used when the researcher aims to make sense of "complex social phenomena", such as process theory (Miles et al. 1978). Furthermore, case studies are especially suited for solving research questions that address "how" and "why" problems and are particular appropriate for extending the knowledge about dynamics and processes (Yin, 2014; Eisenhardt & Graebner, 2007; Eisenhardt, 1989). In this context, Gioia, Corley and Hamilton (2013) and Yin (2014) point out that especially processes are more about how actions are carried out and what experience are gained, which can only be discovered through qualitative research. As our research question concerns how the process of business model innovation is characterised in terms of when, what and why changes occur, we aim to make sense of the complexity of the business model innovation process by describing and visualising "how" and "why". Therefore, we view the case study approach as the most appropriate one.

As we also aim to identify patterns in the process of business model innovation, observing several start-ups is necessary to compare several processes. Therefore, we apply a multiple case study design to undertake this comparison. Additional advantages by applying a multiple case study approach are that the "theory is better grounded, more accurate, and more generali[s]able" (Eisenhardt & Graebner, 2007, p.27). Moreover, multiple case studies generate more robust and empirical valid theory as the theory is built upon a broader range of empirical evidence (Yin, 2014; Eisenhardt & Graebner, 2007; Eisenhardt, 1989). In comparison with single-case studies, multiple case studies appear also less vulnerable because the conclusions drawn from the analysis is more meaningful as the uniqueness of a single-case is eliminated (Yin, 2014). Therefore, a multiple case study benefits from analytical strength (Yin, 2014). As it is suggested by Eisenhardt (1989) to use a sample number between four and ten, we chose a sample of five start-ups.

4.3. Limitations of the Research Design

The application of a qualitative research design with a case study approach also comes with weaknesses and limitations. In general, qualitative research based on case studies is often criticised for its deficiencies in scholarly consistency and referred to be just "anecdotes and stories" and therefore lack intensively in validity (Gioia, Corley & Hamilton, 2013; Stuart et al. 2002, p.429). Eisenhardt and Graebner (2007, p.26) state multiple case studies are "less precise, objective, and rigorous than large-scale hypothesis testing". Yin (2014, p.19) points out that scholars see case studies as questionable rigorous because the results of case study research can be consciously or unconsciously influenced by the researcher due to the researcher performs carelessly or does not "follow systematic procedures". As we have a lack of experience in conducting research, errors during carrying out our research might therefore be a threat to the rigorousness of our research.

In combination that theory building based on multiple case studies can further end in a "narrow and idiosyncratic" theory, the theory might not be generalizable (Eisenhardt, 1989, p.547). Another weakness is that multiple case studies also generate a comprehensive amount of qualitative data that needs to be analysed what raises the difficulty in handling the data (Stuart et al. 2002; Eisenhardt, 1989). This disadvantage is especially high in multiple case studies than in single-case studies, resulting in a time-consuming research with an immense number of

documents as data (Yin, 2014). Besides this, the developed theory might also become too complex as the researcher aims to cover everything within the theory (Eisenhardt, 1989). Due to this massive amount of data also a suitable representation turns into a challenge (Stuart et al. 2002). By simplifying the data set in order to transfer it into visualisations and diagrams that provide a reasonable display, criticism, that the full connection to the raw data is not given anymore, is further valid (Stuart et al. 2002). In order to deal with the danger to create a too comprehensive theory and to reduce the amount of data, we use not more than five cases. Thereby, we restrict the amount of data and also exclude further details from additional cases. Moreover, to not lose the connection to the raw data and reduce the threat of manipulation, we describe the processes in detail including as much raw data as possible, whereas for a better understanding we visualise the processes.

4.4. Selection of Case Start-ups

In our Master thesis, the business model of the start-ups is the unit of analysis. In order to select start-ups as case studies we firstly decided about the sample universe and the sample seize (Robinson, 2014). Afterwards we applied the purposive sampling strategy (Robinson, 2014).

The sample universe from which we intend to select cases were framed and by certain factors. These factors include the market, the country and the age of the start-ups. We decided to observe start-ups in the market of high-technology in Sweden first, as the market conditions are characterised by rapid changes and dynamic developments (Sur, 2016). Thus, changes in the business model of a high-tech start-up within the first year can be certain. Furthermore, selecting start-ups from one market sector also makes the process more comparable as all start-ups face similar market conditions. Moreover, due to time restrictions of our thesis we only concentrated on the technology market in Sweden and for simplifying the research execution we focused on tech start-ups in Lund and Malmö. Besides the market as one factor, the age of the start-up was another factor. In that context, we considered only start-ups that are at least one year old and not older than three years. Companies older than three years can but do not necessarily be a start-up anymore.

In terms of the sample size, we decided to collect five start-ups. As there is no perfect amount of cases a researcher can take, experiences of researchers have shown that an amount between

four and ten cases for multiple case studies is suitable (Eisenhardt, 1989). As, again, our thesis is timely limited, we decided to keep a smaller sample size of five start-ups, to have enough time for the data analysis. In terms of the participants per start-ups we decided to only include the founders (or their representative) as they are the ones who decided about changes in the business model.

When sampling some case start-ups, we used the purposive sampling strategy, as we excluded certain start-ups that we found not adequate, for example technology consultancy start-ups, as their offering is not a technology (Robinson, 2014). Otherwise, as our sample universe were rather small with 25 identified potential start-ups, we contacted all of the start-ups because one also has to consider a certain declination rate. We contacted the start-ups per email including a cover letter, that described our research project, our aim with the research project, the benefits the start-ups can get by collaborating with us and how we intend to carry out the research project including confidentiality aspects. Further, we attached out CV's to provide the start-ups with information about ourselves.

4.5. Data Collection Method

As our research consist strongly on primary data, our method for the data collection were semi-structured interviews based on the usage of a questionnaire as a guideline[1]. The concept of semi-structured interviews was chosen, due to it is "more open" and of a "more flexible manner" to address a list of questions and enable valuable insights about the process of business model innovation (Easterby-Smith, Thorpe & Jackson, 2015, p.374 and p.375). The interviews were conducted with the founders and/or co-founders of the Swedish high-tech start-ups. Furthermore, the interview questions were constructed based on our theoretical framework, using the business model canvas to identify the business models at different points in time and the changes in the canvas (s. chapter 3). For each start-up, we scheduled two different face to face meetings. In the first meeting, we presented our research question and provided the interviewee with contextual information on our research design and framework as well as the purpose of our research. During the first and the second meeting we sent the questionnaires to

[1] The specific interview questions are provided in the Appendix, p. 70

the interviewees, enabling them to prepare for our second meeting. The second meeting had the goal to receive the answers to the questions from the respondents of the start-ups.

For the second meeting session, the questionnaire had the purpose of a guideline to create a more open interview on the one hand, but on the other hand ensure the comparability of the different interviews within the sample (Easterby-Smith, Thorpe & Jackson, 2015). Due to this, the meetings were characterised by interactivity where both parties strived to collect valuable and precise empirical data. Furthermore, this method had the advantage to allow the interviewees to specify their answers in terms of their own individual experience. Using this interview form generated an opportunity for the respondent to submit their data within the certain questionnaires scope, but also allowed room for the interviewee to provide their own explanations beyond the interview scope. This procedure of semi-structured interviews enabled us to collect valuable data for our analysis, while the usage of structured interviews would only cause limitations to the analysis as it can be inflicted with bias. (Eisenhardt & Graebner, 2007; Irvine & Gaffikin, 2006; Walizer & Wienir, 1978). Due to the usage of semi-structured interviews enabling flexibility to the interviewee, the researchers were given the possibility to modify the interview questions and technique of data collection during the process to integrate new findings and adapt to new circumstances (Eisenhardt, 1989). In summary, at total of ten meetings including five interviews within a three-week timeframe were conducted in English language. While the first meeting round had an average interview duration of 30 minutes, the second meeting session was around one and a half to two hours.

4.6. Data Analysis

The data analysis has a within-case perspective and a cross-case perspective. Both perspectives are performed with a different strategic approach. While the within-case perspective follows a narrative strategy, the cross-case perspective obeys to find patterns within the data.

While analysing the within-case data, we aim to describe and visualise the process of business model innovation of each start-up by taking precise snapshots of every business model developed within the first year of the participating start-up. The general idea of the within-case approach is to well understand each case as a single unit and gain “familiarity with [the] data” (Eisenhardt, 1989, p.533). This procedure is the first step to discover “unique patterns of each

case", while with the second step the "investigators push to generalize patterns across cases" (Eisenhardt, 1989, p.540). For the within-case analysis, we started off with a *narrative strategy*. The data is analysed by providing a detailed description of the single business model innovation process of each start-up (Langley, 1999). The narrative strategy approach aims to construct "a detailed story from the raw data" (Langley, 1999, p. 695). In other words, the process of business model innovation is refined and described chronologically in detail. To describe the chronological changes, we analyse the process of business model innovation by using the business model canvas in time and space, meaning we compare the business model canvas at different points in time of each start-up. By using the narrative strategy, for each start-up we can precisely examine how often their business model changes, how many building blocks in the business model canvas altered per change, what caused these changes and what parts of the business model changed. Finally, the narrative strategy is further supported by the visualisation of the business model innovation process of the five participating Swedish high-tech start-ups in the 'BMI Process Diagram'.

As stated earlier, the within-case perspective is necessary to enable a sufficient and fruitful cross-case pattern analysis of the data, to look beyond initial assumptions and grasp indications through multiple lenses (Eisenhardt, 1989). Therefore, besides describing and visualising the five business model innovation processes, we also observe the data on similarities and differences between these five processes and search for patterns within the data by carrying out a cross-case analysis. The data analysis method for identifying patterns within the data is in generally called *grounded theory* (Eisenhardt & Graebner, 2007; Eisenhardt, 1989). Yet, the method 'grounded theory' can be understood in two ways, in general as "creating theory by observing patterns within systematically collected empirical data" and as the so called 'original' grounded theory developed by Glaser and Strauss (1967) (Eisenhardt & Graebner, 2007, p.30). However, the grounded theory developed by Glaser and Strauss requires a large number of cases and an in-depth microanalysis but these requirements cannot be fulfilled in our limited research project (Langley, 1999). Therefore, in our research project, we apply the general understanding of the grounded theory, meaning finding patterns in a pool of data from multiple cases studies.

In order to determine patterns between the different processes of business model innovation in our cross-analysis, we "select categories or dimensions and […] look for within-group

similarities coupled with intergroup differences" (Eisenhardt, 1989, p.540). These categories are formed based on the five sub-question of our research question.

Table 4: *Data Analysis Categories (created by authors)*

Sub-questions	**Category**
How often changes in the business model occur?	the amount of change the temporal sequence of change
How many building blocks in the business model change per event?	the amount of modified buildings blocks per change
What parts of the business model changed?	the building blocks
What caused these changes?	the antecedents
How change in one building block of the business model effects the other building blocks?	the effects between building blocks

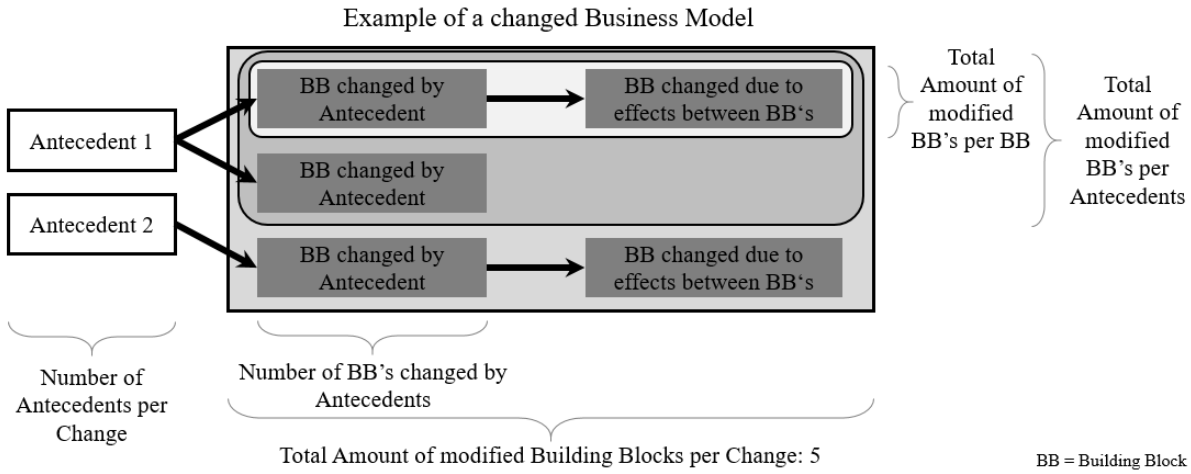

Figure 3: *Data Analysis of Relations between the Categories (created by authors)*

The analysis is then carried out in the same order. First, we observed the processes on comparable temporal sequences and amount of changes. In the next step, we investigated how many and which building blocks altered in each event of change and if there are similarities on when the same amount of building blocks or if specific ones occur. Then, we observed the identified antecedents and examine the relationships between the antecedents and the building blocks as well as effects between the building blocks, by answering the following questions: How many antecedents occurred at the time of the event of change? How many and which building blocks were altered by the antecedents and in total? Which building blocks trigger changes in other building blocks? Do certain building blocks or antecedents stand out? By this we aim to identify if there are specific antecedents or building blocks that cause strong changes

in the business model or have a significant meaning as they occur regularly. In figure 3, we illustrate the relations we examined and define the wording that we used in the cross-analysis.

4.7. Validity and Reliability

Empirical research is of high quality if it has a high degree of validity and reliability (Yin, 2014). A research study is see as reliable if the study can be replicated and comes to the same results (Easterby-Smith, Thorpe & Jackson, 2015; Yin, 2014; Golafshani, 2003). Reliability is especially significant in quantitative research, whereas in qualitative research scholars question its relevance as quantitative and qualitative research have dissimilar purposes for evaluating its quality (Golafshani, 2003). Most scholars consider rather "Credibility, Neutrality or Confirmability, Consistency or Dependability and Applicability or Transferability" as vital principles for the quality of qualitative research (Golafshani, 2003, p.601). Regarding our research project, we can say for sure that our research project is replicable, as there are no restrictions on collaborating with high-tech start-ups to investigate the changes in their business model in the business model innovation process within the first year. Concerning the part, if a replication would come to the same findings, is twofold. Regarding our findings from the cross-analysis we see our research as reliable, as these findings are supported by the literature about business model and business model innovation and because they derive from overlaps between five cases. However, in reference to the five identified processes, we have to admit that our research has a reduced reliability as in a replication of our study additional findings can be expected as the process of business model innovation is an iterative process that alters from start-up to start-up. Additionally, further reasons that can explain the discovered patterns could be observed as well. Nevertheless, the replication of our study would be rather contributable as it can extend our findings.

Validity concerns two aspects, firstly if the findings of the research are truthfully presented and secondly, if the right measurements were used to accurately measure what was intended to be found (Easterby-Smith, Thorpe & Jackson, 2015; Yin, 2014; Golafshani, 2003). Validity can be distinguished in internal and external validity. Internal validity refers to the correctness and truthfulness of the results and conclusions that does not allow alternative explanations whereas external validity concerns the generalisability of the results, meaning if they are also applicable in another context (Easterby-Smith, Thorpe & Jackson, 2015; Yin, 2014). As case studies are

concerned with low degree of generalisation, the external validity of our research can be put in question. However, as we use a multiple case study approach and our findings are supported by existing literature on business model and business model innovation a certain degree of generalisability can be addressed to our study (Eisenhardt & Graebner, 2007; Eisenhardt, 1989). Moreover, one also has to consider the research purpose (Yin, 2014; Golafshani, 2003). Our aim is to identify different processes and patterns within the process of business model innovation. As this process is described as an iterative process of which there does not exist the best solution we do not aim to discover the one process that can be generalised. Instead, we aim for a better understanding of the process and indications on how the process should be followed through, by discovering patterns within the processes. Further, process theory is of complex matter with several influencing factors, therefore a generalizable structure of a business model innovation process is not just unrealisable, it is also not reasonable (Miles et al. 1978).

To make our research project internally valid we use a multiple case study approach to generate a larger scope of empirical evidence that backs our findings (Yin, 2014; Eisenhardt & Graebner, 2007; Eisenhardt, 1989). Further, the approach of finding patterns within the data increases the internal validity of our research because the developed theory is grounded within the data causing a "more robust and empirical valid theory" (Yin, 2014; Eisenhardt & Graebner, 2007; Eisenhardt, 1989). Moreover, as we apply a narrative strategy for the within-case data analysis we aim to represent the raw data as original as possible what results in a strongly truthful and accurate representation of our findings (Langley, 1999). In addition, by using semi-structured interviews with a questionnaire based on the business model canvas as a guideline for data collection, we set equal measurements for each case. Finally, our research projects can be justified as internally valid as our findings can be linked to existing literature (Eisenhardt, 1989).

5. Findings and Discussion: Case Studies of Five High-Tech Start-ups

In the following chapter, we describe the five start-ups and present out findings. Due to confidentiality, we will disclose the name of one start-up, as it has been requested, and will be referred to start-up A (standing for anonymous). Furthermore, in our graphs and diagrams we will use the abbreviations of the building blocks ‘customer segment’ (CS), ‘value proposition’ (VP), ‘channels’, ‘customer relationship’ (CR), ‘key resources’ (KR), ‘key activities’ (KA), ‘key partnerships’ (KP), ‘cost structure’ (CoSt) and ‘revenue streams’ (RS). Furthermore, the term building block will sometimes be replaced by ‘BB’.

5.1. Findings: Within-Case Analysis

5.1.1. Memlin AB

Description

Memlin was founded in the October 2016 and performs on the market for event management. The company offers a cloud-based management system in form of an app that navigates meetings, courses and smaller events. The greatest value offering consists of the functionality of machine learning. Through this function, the management system learns about the repetition, frequency and locations of certain meetings and thereby can support the efficient scheduling of meetings. Moreover, the management system can synchronise the calendar of the participants of the events and thereby make suggestions for scheduling a next meeting at a time that suits all participants. The idea for the company emerged during spring/summer 2016 from the former company. The latest company, which was founded 2009, firstly offered an app for event management that could scan barcodes of event tickets, send out event information, manage event confirmations and reply forms. However, as the customers used the app not for the barcode scanning, what was the main value proposition, the founder, Christian Ramel, collaborated with his customers and developed a new idea that would fit the customer needs what resulted in the foundation of the start-up Memlin AB. As the explicit idea for founding

the company emerged in spring 2016, and therefore also the first business model, the observed timeframe is from spring 2016 to spring 2017.

Findings

The business model innovation process of Memlin within the first year includes four different models, thus three main changes of the business model in a consistent three-month sequence were observed within the timeframe of June 2016 to May 2017. The process is visualised in the 'BMI Process Diagram: Memlin AB' (s. Figure 4).

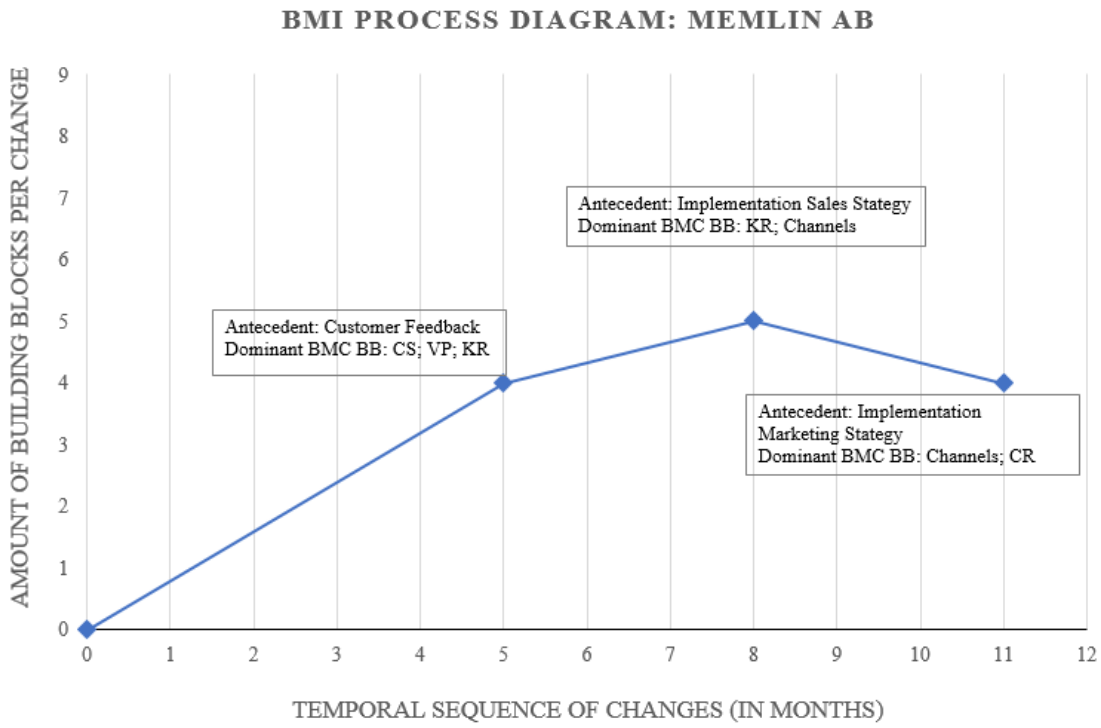

***Figure 4**: BMI Process Diagram: Memlin AB (created by authors)*

As abovementioned, the latest business model of the previous company contained an application for event management. This value proposition was mainly offered to big event organisations as target 'customer segments'. However, due to lacking marketing activities the acquired customers were governmental organisations and corporate entities that were interested in the product. The product was delivered via direct selling with low efforts on marketing and advertising communication. The 'customer relationship' was intended to be close and personal through quick and excellent support. At that time, the 'key resources' comprised of the founder himself, the software and the three 'key partners' a freelancer for software development, a part-time worker for support and an Indian software development company. The main 'key

activities' were composed of platform development, development support and contact with clients for support and problem solving. The 'revenue streams' was gained over regular subscriptions and one-time event upgrade. Further, a freemium version of the application was available. The 'costs structure' mainly included the salary for C. Ramel and the support worker as well as fees for the Indian company.

Within the business model innovation process the first change in the business model occurred in October 2016 when the company received in-depth feedback by its customers because the C. Ramel strongly collaborated with his customers to generate a fit between the customer needs and its value proposition. The feedback revealed that the customer did not use the actual value offered. Due to that feedback, the C. Ramel re-established his company by setting up a new start-up. Memlin, then, accelerated its innovation capacities within the field of machine learning causing the company to change its 'value proposition' from an event management software towards a registration system, which can be characterised as the dominant building block in the first change within the business model innovation process. The registrations systems as such has the ability to learn from behavioural meetings patterns of the past, projects it into the future and thus, optimises the scheduling of meetings within and across entities. For the identification of certain patterns the start-up shifted its focus within the 'customer segments' away from the event management companies towards the governmental organisations and corporate entities to receive more data within shorter timeframes due to a higher amount and occurrence of events. To enable the shift within the value proposition smaller adjustments such as the extension of 'key resources' can be named which included the formation of a founder team to increase the capacity of the start-up. Moreover, the first change within the business model innovation process was complemented by an adjustment in the 'revenue streams' as the company altered the 'freemium' version to a "trail mode" model that provides the customer with the ability to test the product for three days for free before getting charged.

Whilst the first change within the business model innovation process can be classified as technological and customer driven, the second change were caused due to the implementation of a sales strategy, while the third one priories the implementation of a marketing strategy. Hereby, the sales strategy affected two building blocks that dominated the change. In order to implement the sales strategy, the 'channels' were diversified as the company aimed to increase its presence in channels such as exhibitions as well as more lead generated outgoing campaigns and an increase of direct sales via phone calls. Moreover, within the 'key resources' the

recruitment of one sales representative can be mentioned. Both dominating building blocks led further to smaller adjustments in the building blocks ‘key partners’, ‘revenue streams’ as well as ‘cost structure’. These changes included the sales cooperation with an event management firm causing the integration of a provision model in the revenue stream and adjustments of the cost structure by the salary for the sales representative.

As mentioned above the third change within the process steams from the implementation of a marketing strategy, which supports the sales strategy and led to the identification of two main changes within the building blocks ‘channels’ and ‘customer relationship’. Firstly, the marketing strategy involved the development of online channels such as Google Ads, Facebook and LinkedIn Marketing campaigns. Secondly, as the company created more and more customers and thus sales, the Memlin’s ‘customer relationship’ was adapted to still ensure a close customer connection as the company could guarantee less personal contact. Both, the new online channels as well as the customer relationship adaption led to minor modifications in the ‘cost structure’ as expenses for the advisement needed to be included. Moreover, as the sales representative left, the ‘key resources’ altered slightly.

Overall, the changes were caused due to customer feedback and the implementation of a strategy based on the C. Ramel’s own development. Moreover, we can say that in each event the changing rate was rather moderate with alterations in four or five building blocks per change.

5.1.2. Start-up A

Description

Start-up A was founded during spring 2016 and performs on the market of medical technology for healthcare. The start-up offers an application that works as a training tool for detecting and analysing movement patterns for people having an asymmetric walk. The application provides workout suggestions to prevent limping behaviour and thereby facilitates to enhance the user’s every-day life. So far, the founder could not identify an equal or comparable product on the market and might have therefore discovered a gap in the market. The idea for the product emerged during talking with a friend of the founder who works as an orthopaedic surgeon. The friend asked if it was possible to detect how people were moving by the usage of a mobile phone in order to help the patent to get rid of a limping movement pattern and to avoid secondary

complications. The trigger, however, for founding the company was that the former employer released a substantial number of employees and offered those released ones to join a programme on how to found a start-up that included training and information sessions. The explicit idea for founding the company that includes the first business mode emerged in April/May 2016, and therefore the observed timeframe is from April/May 2016 to April/May 2017.

Findings

Our findings about the process of business model innovation of Start-up A included three major changes of the business model within the first year and are visualised in the 'BMI Process Diagram: Start-up A' (s. Figure 5). The timeframe between the changes is less constant in comparison to Memlin. Here, the first change occurred after around five months whereas the second change followed quite quickly one to two months later and the time until the last change took with four month again a bit long to be carried out.

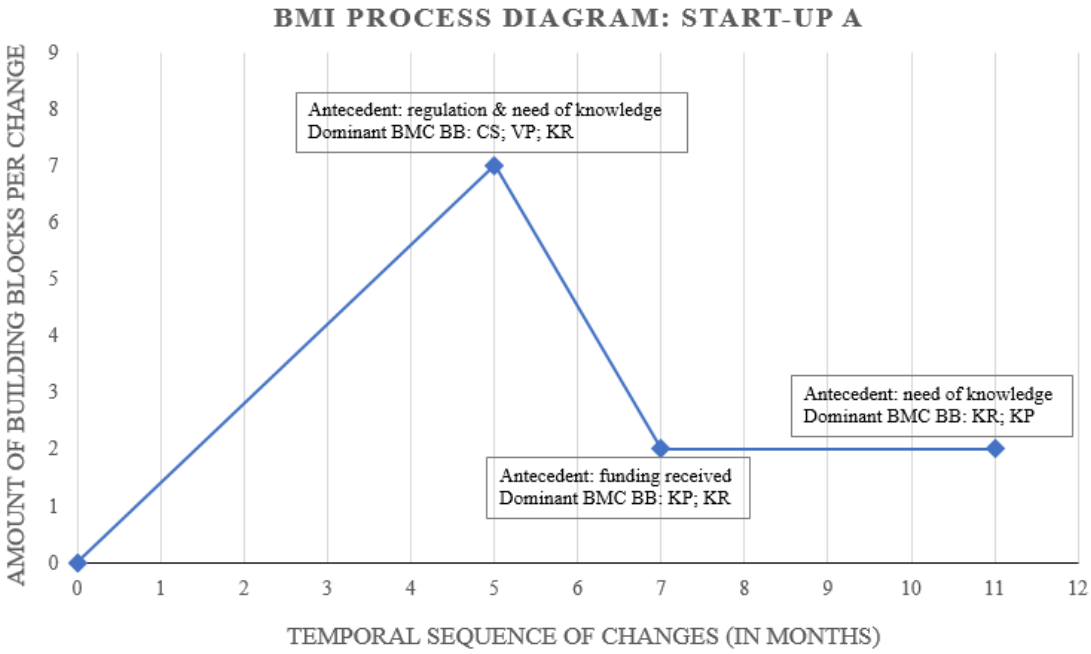

Figure 5: *BMI Process Diagram: Start-up A (created by authors)*

The first business model sketches the first idea of the business. The idea was to create an application for smartphones that can measure and record movements of patients to identify limping movement habits. Due to the identification of these movement behaviour, training and movement suggestions to prevent limping can be provided. Thereby, the 'value proposition' was identified as providing healthcare providers with a system that supports medical treatment

after hip and knee surgery to prevent secondary treatments. Consequently, the ‘customer segment’ included healthcare providers in Sweden, such as hospitals. The ‘channels’ to deliver the product to the customers would be using the healthcare system by letting doctors prescribe the app to their patients which can then get the activation code for the application at a pharmacy. The patient then would get the application for free and the ‘revenue streams’ would steam from charging the healthcare providers through the healthcare system. The ‘customer relationship’ in this business model was defined as rather distant and in order to reach the customers organisations of healthcare providers and their reputation would be used to be seen as trustworthy. The ‘key resources’ were determined to get access to knowledge and expertise for developing the application. In this context, the ‘key activities’ included developing the application, finding software developers for the development, collaborating with the healthcare system and Lund University as well as any kind of selling and marketing activities later on. The ‘key partners’, therefore, comprised the university, external consultants for software development and healthcare providers. The ‘cost structure’ consisted of costs for development of the product and fees for data base.

The first change occurred when the founder realised that he needs a medical certification for its application when addressing healthcare providers as his customers. This medical certification would cause him too much time and too much money before he could receive any revenue and as a start-up with low resources this could be a threat for survival. Therefore, the founder decided to alter his approach on selling his innovation. This decision resulted in the modification of the building block ‘customer segments’ by exchanging the healthcare providers with the end-user of the application. ‘Customer segments’ dominates this change and caused a chain of reaction in other building blocks. Thus, the ‘value proposition’ changed from providing support for medical treatment to a training tool to facilitate the user on their day-to-day life. Furthermore, the ‘channels’ and ‘revenue streams’ altered by now using Google Playstore and the App Store from Apple for the end-user to download, first as a timely limited test-version and later on as a charging app. These changes also appeared in the building block ‘cost structure’ as now fees for the Play- and Appstore needs to be paid as well as costs that occur in relation with customer services. Moreover, the ‘customer relationship’ altered from staying rather distant with healthcare providers to close relationship to the end-users. And finally, the ‘key resources’ need modifications as additional expertise in patterns engineering were necessary.

The second change included only a low amount of modified building blocks. The change happened because the founder was able to receive funding for the development of the application. The founder had first planned to get software developers on his team in exchange for their knowledge, however this did not work out and so the 'key resources' alter from getting software developers on board to the need of financing for paying the software developers who then became 'key partners'.

Finally, the third change were initiated when the founder discovered that he needs more 'key partners' and team members for access to more knowledge and expertise.
Overall, the changes were mostly caused by the need of knowledge, regulation and the need for funding and the process shows a peek in the beginning with a strong change in the business model as seven out of nine building blocks were modified.

5.1.3. BjörkströmRobotics AB

Description

BjörkströmRobotics was founded in the beginning of 2016 and performs on the market for construction, architecture and real estate development, offering technology that eases the way of measuring and scaling the building as well as provides the possibility to see the building as a digital visualisation placed in reality. Their product comprises augmented reality glasses that combine the real world and the digital visualisation of the building. Thereby, it creates a 3D experience of the real estate which includes not just seeing the building from the outside but also to stay within the building and look outside (BjörkströmRobotics, 2017). The user can then conclude if the construction needs further changes such as scaling up, moving windows and other features. According to Kristofer Björkström, the entrepreneur, the product is entirely new as the augmented reality technology is just beginning to spread, therefore the product can offer a real new value proposition on the market. K. Björkström had the idea the first time several years ago when he built his own house. At that time, he discovered the need to be able to get an easy overview of the construction site to make the work more efficient. However, back then he never thought about founding a company with this idea. The reason for the foundation of company was that the former employer of the entrepreneur decided to release around thousand employees and offered a programme to the released employees on how to found your own company for those who had business ideas. As the explicit idea for founding the company

emerged in September 2015, and therefore also the first business model, the observed timeframe is from September 2015 to September 2016.

Findings

In our analysis of the process of business model innovation of BjörkströmRobotics, we observed three major changes in the business model within the first year, all in three to five months' sequence. The process of business model innovation is visualised in the 'BMI Process Diagram: BjörkströmRobotics AB' (s. Figure 6).

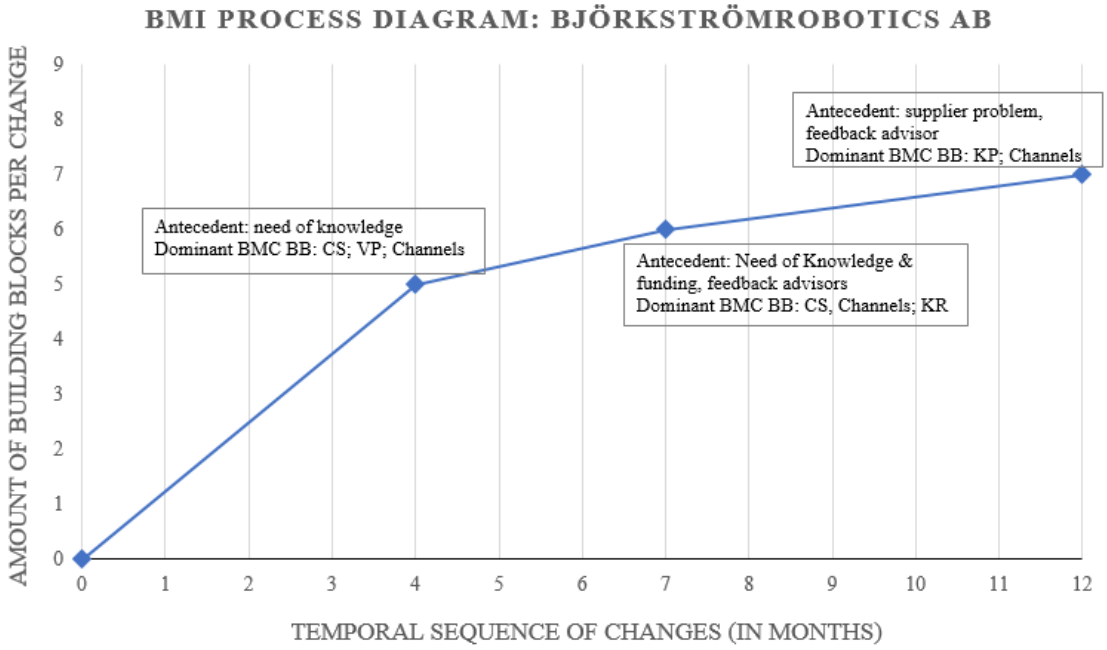

Figure 6: *BMI Process Diagram: BjörkströmRobotics AB (created by authors)*

The first business model drafts the first idea of the business which contains the value proposition in form of augmented glasses that can be connected to construction machines to simplify the way of measuring of distances and thereby provides a faster process to know where exactly to excavate. The 'customer segments' were identified as construction companies, resellers for measurement tools and producers of construction machines. The plan for getting in contact with the customers ('channel' building block) was to work closely with Skanska, a big construction company in Sweden, to receive contacts to their sub-contractors. The 'key activities' comprised the development and testing of the product. For those activities, the 'key resources' were identified as materials and knowledge for the product development, knowledge about the market and potential customers, how to run a company as well as financial resources.

The building block ‘revenue streams’ consisted at that point of just a fixed price. The building blocks ‘customer relationship’, ‘key partners’ and ‘cost structure’ were not further elaborated at that time.

The first change occurred after four to five months when K. Björkström concluded that he needs more expertise and knowledge about the industry. To fill the lack of knowledge and expertise a new team member joined the start-ups. This new member caused that the ‘customer segments’ changed by including also architectures and construction companies that focus on building design. Further, the new team member advised K. Björkström that the offering is to complex and the envisaged channels not reasonable. Therefore, the ‘value proposition’ moved its focus to the visualisation function of the glasses so it can be used by more people and detached the glasses from the machines to make the glasses more mobile and independent. Further, the ‘channels’ altered as the glasses would not be sold per company anymore but per project and using Skanska to find customers became redundant. Moreover, as the value proposition changed, modifications in the ‘key resources’ followed. In addition, K. Björkström altered the price, for which no clear cause exists. In general, in this event of change the building blocks ‘customer segments’, ‘value proposition’ and ‘channels’ can be described as the dominating building blocks of the change.

After around three month the second change occurred as a result of feedbacks from pitches and advisors and the identified need for further knowledge and expertise to increase the capacity of the start-up and get more insight in the architecture industry as well as the need for funding to be able to develop the product. These antecedents caused changes again in the ‘customer segment’ as well as in the building blocks ‘channels’, ‘key resources’, ‘key partners’ and the ‘cost structure’ with the first three dominating the change. Due to the feedback they received on pitches, the team decided to add real estate developers to their customers. The identified need for further knowledge and expertise about the market resulted in an extension of the team by including more developers and an expert from the architecture industry. Thereby, the ‘key resources’ changed. Moreover, they modified the ‘channels’ by selling the product via resellers. Therefore, the idea of direct selling to construction projects became redundant. Furthermore, as they chose a supplier for the components for the product development, the ‘key partners’ changed. In order to finally develop the product, the need for funding occurred which trigger the creation of a cost structure to apply for funding from Almi Foretagspartnen.

The last change within the first year came to pass mainly because of problems with the chosen supplier, but also because of further feedback from advisors. The problems with the supplier caused again several modifications in the business model with ‘channels’ and ‘key partners’ being the dominating building blocks that caused further modifications. These changes started with the decision to develop the augmented glasses themselves by combining virtual reality glasses with their own hardware and software, effecting the building blocks ‘key partners’, ‘key activities’ and ‘key resources’. As they develop their augmented glasses themselves they were able to create the best augmented glasses that are available on the market at the moment, including the effect that the ‘value proposition’ is enlarged. The feedback from the advisors concerned the ‘channels’ again, as they recommend selling the product firstly themselves and not over the resellers, as gaining customers is then easier due to a closer relationship with the customers. Therefore, also the building blocks ‘channel’ and ‘customer relationship’ were modified.

Overall, we identified that the main antecedents were the need of knowledge, the issues with the suppliers and feedback from advisors. In general, the changes in the business model increase per change, starting off with five modified building blocks in the first change and seven altered building blocks in the last change, showing that the issue with the supplier in combination with more feedback caused strong changes.

5.1.4. Palago AB

Description

Palago was founded in in December 2015 and addresses technological and business solutions with “possibility to supply smart wearable devices to finance, transportation, access and event industries as B2B2C offering” (Palago, 2017, 07.05.2017). The offering of Palago is two-fold, as the company provides both devices as well as services. Hereby, the ‘Smart Wearable Device’ supports contactless transactions to ensure the customers cashless, keyless and cardless experiences. Furthermore, the firm offers “solution consultancy service packages” on a B2B2C basis to enable their customers to commercialise on new market trends (Palago, 2017, 07.05.2017). To ensure this procedure the company provides a five-step approach to give the customer information about contactless technology and services as well as field trials to demonstrate the opportunities of mobile and wearable dispositions (Palago, 2017, 07.05.2017). The idea for the product emerged during a corporate innovation project at the former employer

that dealt with smartwatches and wristbands. The two founders, Göran Andersson and Patric Lind, of Palago have a similar background as start-up A and BjörkströmRobotics, as all founders were former Sony Ericsson/Sony Mobile employees and part of the start-up programme with entrepreneurial training. Therefore, the motivation to found a company were initiated due to the opportunity of that start-up programme. As the explicit idea for founding the company emerged in the end of 2015, and therefore also the first business model, the observed timeframe is from the end of 2015 to the end of 2016.

Findings

In our analysis of the business model innovation process of Palago we observed four changes of the business model within the first year with a sequence of two to three months. The changes in the business model innovation process are visualised in the 'BMI Process Diagram: Palago AB' (s. Figure 7).

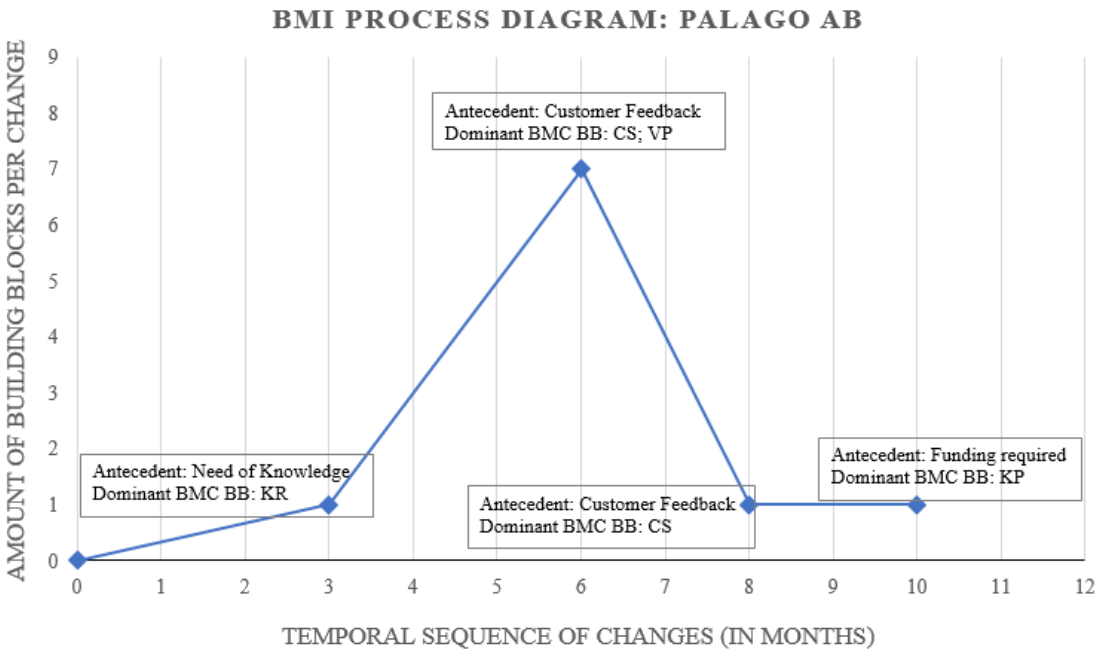

Figure 7: *BMI Process Diagram: Palago AB (created by authors)*

The first business model was developed in December 2015 in collaboration with the 'key partners' with Sony, NXP Semiconductors and VISA Europe. Hereby, the initial 'customer segment' was defined very broad as access, transportation and finance companies. The main focus was on finance e.g. large multi-national banks due to key partner VISA Europe. The

‘value proposition’ comprised the offering of a wireless and contactless system solutions in form of a wristband in combination of consultancy and training services. The ‘revenue streams’ would therefore mainly steam from selling training packages and consultancy services. At that time, the ‘channels’ consisted so far only of ways how to sell the product and services to their customer, which were identified as promoters, social media, face to face meetings and workshops as well as commercial and networking events. An exact plan on how to deliver the product has not been established. The defined ‘relationship with the customers’ aims for long-term and sustainable business relations with key customers and short-term relations with any customer. The identified ‘key activities’ included product development, search of new customers, creating customer relations and generating the first revenues. To be able to perform these activities ‘key resources’ contained diverse knowledge in system technology, management, software development, trail units as well as external funding. Concluding from all eight building blocks, the ‘cost structure’ consist mainly of fixed costs such as salary, establishment costs and development expenses.

The first change in the business model innovation process was caused by the antecedent of the lack of knowledge and expertise in the finance industry and especially the network to the large banks was not established. Due to this lack of knowledge, the first change in the business model occurred in around March 2016 and the building block of ‘key resources’ dominated the change as three additional team members joined the start-up. All three new board members were able to consult due to their expertise in banking, connections to telecommunication companies, experiences in entrepreneurship, networking and business management. As a team, they further outlined the business idea.

Three months later the founders started to gather customer feedback, which in turn was the antecedent of the major change (seven building blocks changed) in the business model innovation process of this start-up. The customer feedback initiated changes in the two dominant building blocks of ‘customer segments’ and ‘value proposition’ which then caused further changes in other building blocks. Within the ‘customer segment’, we detected a change from large banks to smaller fin-techs which goes hand-in-hand with the change in the ‘value proposition’ which shifted its focus from consultancy service to the hardware offering. These significant changes in the two building blocks, that dominated the change, resulted in further adjustments in ‘key resources’, ‘key activities’ and ‘key partnerships’ as new materials and high-tech expertise is needed to produce the device. As a conclusion of this, VISA Europe as a

partner has left the network, but was replaced by Amotech, which is supporting the development of the device. Other changes due to these adjustments especially from the decisions to develop devices, were also identified in ‘revenue streams’ and ‘cost structure’. For example, the ‘revenue streams’ have doubled to 25 million SEK through the estimated sales steaming from the devices.

The third change in the business model innovation process occurred two months later in August due to the feedback from the last changes, causing further slight modifications in the building block ‘customer segments’. Hereby, the focus on fin-tech companies which combine the devices and service with the transportation industry was achieved by a cooperation with the public transport system of the city of Valencia, Spain.

This event, can be seen as an important factor for the next antecedent for the change within the company’s business model innovation process. As the device of the company received positive feedback, the new focus moved towards funding. In other words, it was in November / December 2016 when the company’s interest shifted to attract capital for further development of their product. This initiated a change within the ‘key partners’ as the new ‘key partnership’ Venturus complements the start-up’s business model with its expertise in software development and provided the start-up with funding.

Overall, the business model innovation process of Palago is characterised by four changes with three changes consisting of only one modified building block. The second change on the other hand was of more radical nature as seven out of nine building blocks changed which was triggered by customer feedback.

5.1.5. Storvix AB

Description

Storvix was founded in August 2016 and operates in the field of “computer storage and enterprise storage management” (Minoja, 2016, p.1). The offering contains data protection as well as data storage software and hardware. The product range is divided into three main product lines: ‘STORViX OS’, ‘CloudSight’ and ‘Engineered Filer Appliances’. ‘STORViX OS’ includes solutions for intelligent data reduction features, flexible storage space management, best data integrity and smart data protection. ‘CloudSight’ is an application to

visualise the processes within the data storage system while the 'Engineered Filer Appliances' is assisting the "multi-protocol data storage environment with the needs of extreme efficiency, strong data protection and high performance" (Storvix, 2017a, 2017b, 2017c, 20 May 2017). According to the entrepreneur, Luca Minoja, the main idea for the product offering was driven by a direct demand inside his former company where he was working in the research and development department. Moreover, L. Minoja saw an opportunity as the data storage demand was growing fast and each year the potential customers were asking to optimise the resources to be more efficient with less resources. This led to a pilot project within the previous company first and the foundation of Storvix as a spin-off of L. Minoja's former company in the second step. The product of Storvix aims to enable their customers to utilise less resources to achieve more results and save precious time to focus on the core businesses. As of today, the main target market is Europe, with the focus on medium and large businesses rather than small enterprises. As the first business model emerged in August 2016 the observed timeframe is from August 2016 to August 2017.

Findings

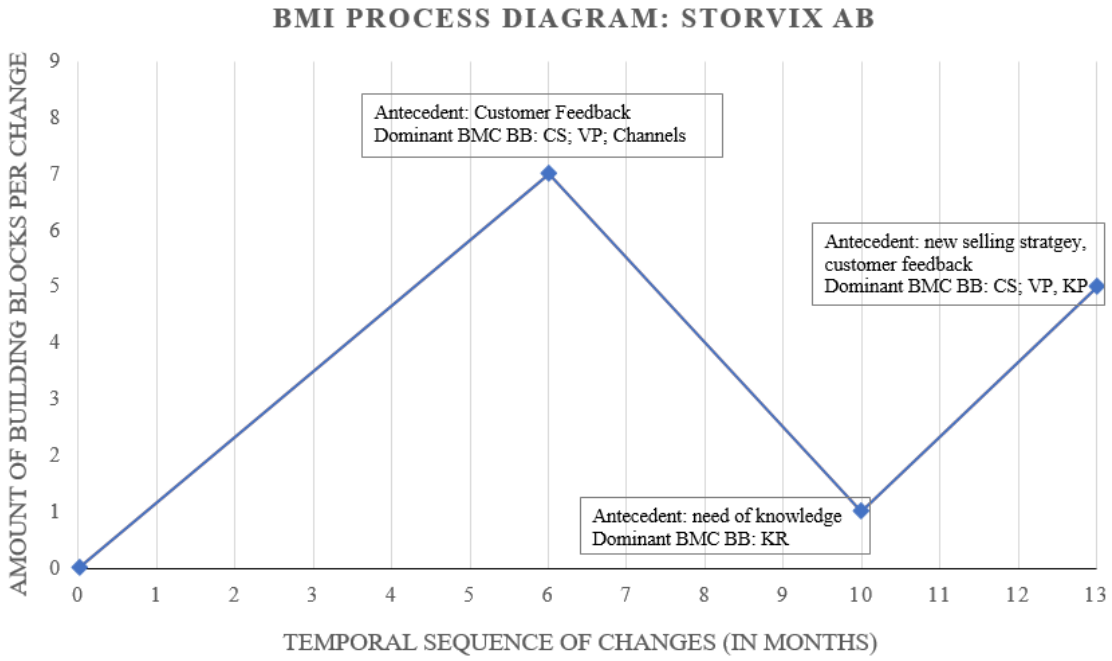

Figure 8: *BMI Process Diagram: Storvix AB (created by authors)*

The business model innovation process of Storvix includes the creation of four different models, thus three main changes were observed within the timeframe of August 2016 to August 2017. The sequence of change became shorter over time, starting with six months going down to three

months. The changes in the business model innovation process are visualised in the ‘BMI Process Diagram: Storvix AB’ (s. Figure 8).

The very first business model of the start-up has its focus on the ‘value proposition’ of data protection and software define storage. This product had no clear ‘customer segment’ as its target were all major industries in Europe at that stage. At that time the team, as the ‘key resource’, consisted of five members (two developers, one sales person and two consultants) and the main ‘key partner’ is the holding company, that performs merely as an investor. Main ‘revenue streams’ was guaranteed through a discount system in order to capture customers in the early stage of the company. Highly important for the founding team was to have a close and trustworthy ‘relationship towards their customers’, therefore direct sales were identified as the ‘channel’. The ‘key activities’ included the development of the product and approaching the customers. And finally, the ‘cost structure’ consisted of mainly two costs positions, salaries and expenses for development.

After around six month the first and most significant change (seven building blocks changed) were caused by direct customer feedback of the large corporations. Although these big corporations were interested in the start-up’s products, the start-up lacked credibility and size to win a deal. Due to this feedback, three building blocks ‘customer segments’, ‘value proposition’ and ‘channels’ were modified and dominate this change. Hereby, ‘customer segments’ were narrowed down to small and medium enterprises (SMEs), which caused the company to change their ‘value proposition’ as the SMEs were lacking the hardware to use the software of the start-up. Therefore, the start-up decided to offer both since that stage: hardware and software. Furthermore, due to these changes the company chose to alter its ‘channels’ from a one-tier model to both a direct sales approach as well as indirect sales, including a reseller. In fact, the new defined ‘customer segments’, ‘value proposition’ and ‘channels’ led to new ‘key resources’ as new material for the hardware war needed and to new ‘key partnerships’ as resellers needed to be identified. Furthermore, every mentioned building block in the first business model innovation process resulted in adjustments in ‘revenue streams’ and ‘cost structure’ as the launch of hardware plus software included a price raise as well as modifications in the development costs.

In September 2016, the second change in the business model of Storvix is just a small adjustment in the ‘key resources’ that steams from the lack of knowledge in the high-tech field

of data storage (one building block changed). The start-up included two additional programmers with different expertise and more experience in this field.

Three months later, the last change of the business model occurred with a moderate intensity (five building block changed). The customer feedback as the antecedent of this change is characterised by the high complexity of integrating the software and hardware in SMEs, which led the start-up to turn back to its initial customer target group of large corporations and medium sized companies as their 'customer segment'. This change led to the simultaneous adjustment of the 'value proposition' as the product configuration was reduced from seven to three configurations to ensure scalable and efficient product with reduced maintenance, which can be offered to the new 'customer segment'. Independent of this, additional customer feedback led to the transformation of the discount base payment in the building block 'channels' to a pay-per-use sales model, which offers the customers to pay only the amount of data storage that they actually use. Due to all changes within the third change in the business model innovation process, the 'cost structure' is characterised by decreasing costs due to the more scalable and efficient product offering.

Overall, the business model innovation process of Storvix consists of three changes of which customer feedback occurs in correlation with moderate to high changes in the business model as five and seven buildings blocks were modified. The lack of knowledge on the other hand came with low changes.

5.2. Findings: Cross-Case Analysis

In the following, we analyse the collected data based on (1) the number of changes of the business model, (2) the amount of building blocks modified per change, (3) what building blocks changed per event, (4) the antecedents of the changes and (5) the effects between building blocks. By analysing these five aspects we aim to find patterns within the data. The relations we examine are, as describe in chapter 4.6, visualised in Figure 3 to ease the understanding of our cross-analysis.

5.2.1. Number of Changes of the Business Model

Firstly, we identified that four out of five start-ups changed their business model three time within the first year (s. Table 5). Only one start-up had four changes, of which however, three changes were merely low incremental adjustments. Consequently, the most changes, with twelve out of sixteen, occurred in a sequence of three to five months (s. Table 5). Based on these results we can conclude that after implementing the changes in a business model the new business model is tested at least three months before another change is made. The only changes that happened after one to two months were twice caused by the need of funding and once by further narrowing down the customer segments without strongly changing them. Consequently, in total we can say that there seems to be a consistent frequency in the appearance of changes and formulate the following proposition:

> *Proposition 1: "In the first year of the business model innovation process changes in the business model are most likely to occur in a sequence of three to five months."*

Table 5: *Temporal Sequence of Change (created by authors)*

Start-ups	1. change after	2. change after	3. change after	4. change after
Storvix	6 months	~ 4 months	~ 3 months	
Palago	~ 3-4 months	~ 3 months	~ 2 months	~2 months
Björkström	4-5 months	~ 3months	~ 5 months	
Memlin	4-6 months	~ 3months	~ 3months	
Start-up A	~5 months	~2 months	4-5months	

time range	frequence
1-2 months	3
3-4 months	6
4-5 months	6
6-7 months	1

5.2.2. Amount and Identification of modified Building Blocks per Change

When reviewing the business model innovation process of the five start-ups, it shows that all of them changed different amounts of building blocks at different points in time (s. Table 6). However, the first change seems to be characterised by stronger changes in the beginning, as four out of five start-ups changed four or more building blocks and therefore more than half of the total amount of building blocks of the business model canvas. The following changes seem to be represented by a decreasing trend of changing many building blocks. Hence, we conclude the following proposition:

Proposition 2a: "In the first year, the business model innovation process seems to be characterised by stronger changes in the beginning, including a higher amount of modified building blocks per change, and a slight declination in the following changes."

Table 6: *total Amount of modified Building Blocks per Change (created by authors)*

Start-ups	1. change	2. change	3. change	4. change
Storvix	7	1	5	
Palago	1	7	1	1
Björkström	5	6	7	
Memlin	4	5	4	
Start-up A	7	2	2	
total	24	21	19	1

In the next step, we examined what building blocks changed when. We observed that the 'customer segments' and 'value proposition' were the two building blocks dominating the first change (s. Table 7). Four out of five start-ups altered first their 'customer segments' and 'value proposition', independent or interrelated, with the latter being mostly the case. Furthermore, when comparing Palago's time sequence and what building blocks changed with the other start-ups, then the change of the 'customer segments' and 'value proposition' occurred in all five cases after around five months (s. Table 5 and Table 7). Therefore, we can make the following proposition:

Proposition 2b: "In the first year of the business model innovation process the first change includes most likely changes in the building blocks 'customer segments' and 'value proposition'."

Table 7: *Building Blocks dominating the Change (created by authors)*

Start-ups	1. change	2. change	3. change	4. change
Storvix	CS, VP, channels	KR	CS, VP; KP	
Palago	KR	CS, VP	CS	KP
Björkström	KR, CS, VP, channels	channels, KR	KP, channels	
Memlin	CS, VP, KR	channels	channels	
Start-up A	CS, VP	KR, KP	KR, KP	

Furthermore, we can say that the building blocks ‘channels’ and ‘key resources’ are most likely to follow as building blocks that dominate the change, as two out of five start-ups altered their ‘channels’ and three start-ups changed their ‘key resources’ solely, in combination with the ‘channels’ or ‘key partners’ (s. Table 7). In addition, ‘key resources’ seem to be an important building block that can change several times as modifications in it appear in all stages of change (s. Table 7). Therefore, we can state the following proposition:

> *Proposition 2c: “In the first year of the business model innovation process the second and third change of a business model includes most likely changes in the building blocks ‘channels’ and ‘key resources’.”*

5.2.3. Antecedents

When analysing the antecedent, we observed how many different antecedents occurred in the first year of the business model innovation process, what building blocks they effected and how many building blocks they changed per event.

Table 8: *Frequency of Antecedent (created by authors)*

Stage of Change / Antecedent	1. Change	2. Change	3. Change	4. Change	total
Customer Feedback	2	1	2		5
Need of Knowledge	3	2	1		6
Feedback pitches/advisors/investors		1	1		2
Receive/need for Funding		2		1	3
Problems Supplier			1		1
Regulation	1				1
New Selling Strategy		1	1		2
New Marketing Strategy			1		1
No Reason	1	1			2

Firstly, we identified nine different antecedents, as shown in Table 8. Reflecting on the antecedents for all 16 changes, customer feedback and the need of knowledge are the most often appearing antecedents (s. Table 8). Customer feedback occurred five times and the need of knowledge six times as reasons why the start-ups carried out modifications within their business model. Therefore, we can state the following propositions:

Proposition 3: "In the first year of the business model innovation process customer feedback and the need of knowledge are the antecedents that presumably appear most often."

Table 9: *Building Blocks changed by Antecedent (created by authors)*

Building Block / Antecedent	CS	VP	channels	CR	KR	KA	KP	RS	CoSt
Customer Feedback	5/7	1/7						1/7	
Need of Knowledge			1/8		6/8		1/8		
Feedback pitches/advisors/investors	1/3	1/3						1/3	
Receive/need for Funding					1/3		1/3		1/3
Problems Supplier							1/1		
Regulation	1/1								
New Selling Strategy			1/4		1/4		2/4		
New Marketing Strategy			1/3	1/3	1/3				
No Reason					1/5		1/5	3/5	

Moreover, when comparing the antecedents with the specific building blocks, we found that out of the five times the antecedent customer feedback impacts seven building blocks directly in total, and 'customer segments' five times out of the seven (s. Table 9). This indicates a linkage between customer feedback and changes in the building block 'customer segments'. When reflecting on the antecedent 'need of knowledge', we examined that all six times this antecedent caused changes in the building block 'key resources' (s. Table 9). This can be explained as in most of the cases, when the founders came to the conclusion that they need more knowledge in certain fields, they got further people as team members on board to get access to their knowledge and expertise. Therefore, we can make the following two propositions:

Proposition 4a: "In the first year of the business model innovation process the antecedent customer feedback causes most likely changes in the building block 'customer segments'."

Proposition 4b: "In the first year of the business model innovation process the antecedent need of knowledge causes seemingly changes in the building block 'key resources'."

After comparing what specific building blocks are altered due to which antecedent, we examined the relation between the specific antecedents and how many building blocks in total

are modified per change. Based on this, we found, as illustrated in Table 10, that no specific antecedent stands out that clearly causes changes in multiple building blocks that would cause a tremendous change of the business model. A high amount of building blocks was just twice caused by one antecedent, as show in Table 10, and in both cases customer feedback was the antecedent for those changes. However, as the antecedent customer feedback also causes three times changes in just a low amount of building blocks, a clear statement that customer feedback can cause radical changes in a business model cannot be made. Nevertheless, what we can say is that the antecedent need of knowledge seems to initiate changes in a low amount of building blocks. Therefore, our next proposition is:

> *Proposition 5: "In the first year of the business model innovation process the antecedent need of knowledge causes most likely changes in a low amount of building blocks."*

Table 10: *Total Amount of modified Building Blocks per Antecedent (created by authors)*

	total Amount of modified Building Blocks per Antecedent			total
Antecedent	**1-3**	**4-6**	**7-9**	
Customer Feedback	3/17	0/5	2/2	5
Need of Knowledge	5/17	1/5	0/2	6
Feedback pitches/advisors/investors	2/17	0/5	0/2	2
Receive/need for Funding	3/17	0/5	0/2	3
Problems Supplier	0/17	1/5	0/2	1
Regulation	0/17	1/5	0/2	1
New Selling Strategy	1/17	1/5	0/2	2
New Marketing Strategy	0/17	1/5	0/2	1
No Reason	3/17	0/5	0/2	3

Table 11: *the Number of Antecedents and the Amount of modified Building Blocks per Change (created by authors)*

Number of Antecedent per Change	**total Amount of modified Building Blocks per Change**			**accumulated Antecedents**
	1-3	**4-6**	**7-9**	
one	6/6	2/6	2/4	10
two		3/6	2/4	10
three				0
four		1/6		4
sum				24

Based on this examination, we observed in the next step the relationship between the total amount of building blocks modified per change and the number of antecedents. We found that changes in a low amount of building blocks were always caused by just one antecedent, whereas

changes in more than three building blocks were caused by one or more antecedents (s. Table 11). Therefore, it stays unclear how many antecedents are needed to initiate radical change in the business model, due to our data shows that one but also two or even three antecedents per event of change cause stronger changes. Therefore, we can only state the following proposition:

> *Proposition 6: "In the first year of the business model innovation process changes in a low amount of building blocks are likely to be caused by one antecedent."*

5.2.4. Effects between Building Blocks

Reflecting on the different building blocks, the changes in the building blocks 'customer segments', 'key resources', 'key partners' and 'value proposition' occur the most often, as illustrated in Table 12. Taking a closer look on these building blocks, when the building block 'customer segments' is modified then also changes in the building block 'value proposition' most likely occur (s. Table 12). In the sixteen changes, the building block 'customer segments' dominates seven times the changing event and out of these seven times four times the building block 'value proposition' is consequently modified and two times 'customer segments' and 'value proposition' alter mutually (s. Table 7 and Table 12). Subsequently, we state the following proposition:

> *Proposition 7a: "In the first year of the business model innovation process changes in the building block 'customer segments' seems to include the likelihood to cause further changes in the building block 'value proposition'."*

Another finding is that the modifications in the building block 'value proposition' most likely effect the building block 'key resources', causing changes in it (s. Table 12). Also other building blocks can be effected but changes in 'key resources' appear more often. Alterations in the building block 'key resources' on the other hand have no correlation with other buildings blocks. Some building blocks can be effected but most often no building blocks were modified. Furthermore, as shown in Table 12, also changes in the building block 'revenue streams' cause no further modifications in the other building blocks. Thus, we can formulate the next two propositions:

Proposition 7b: "In the first year of the business model innovation process changes in the building block 'value proposition' causes most likely modifications in the building block 'key resources'."

Proposition 7c: "In the first year of the business model innovation process changes in the building block 'key resources' and 'revenue stream' initiate little or no changes in other building blocks."

Table 12: *Effects between Building Blocks (created by authors)*

Building Blocks changed by Antecedent	Building Blocks changed due to effetcs between Building Blocks									
	CS	VP	channels	CR	KR	KA	KP	RS	CoSt	none
CS		4/12	2/12	1/12	0/12	0/12	1/12	1/12	1/12	2/12
VP					3/6	1/6	1/6	1/6		
channels				1/4					1/4	2/4
CR										1/1
KR	1/12	1/12	1/12	0/12		0/12	1/12	0/12	2/12	6/12
KA		1/2							1/2	
KP					1/8	1/8		2/8	2/8	2/8
RS										5/5
CoSt					1/1					

After showing that there are interrelations between the building blocks, we evaluated the potential of the single building blocks to cause changes in multiple building blocks. Here, we observed that there is no single building block that definitely initiates changes in a high amount of building blocks (s. Table 13). What points out is that 'customer segments' seems to be the only building block that has at least the potential to cause changes in a higher amount of building blocks. Therefore, our next proposition is as followed:

Proposition 8: "In the first year of the business model innovation process changes in the building block 'customer segments' seems to obtain the potential to cause further changes in a high amount of building blocks."

Finally, we then examined how many building blocks need to be changed by one or more antecedents to initiate a high amount of modified building blocks per change. As illustrated in Table 14, there is no specific amount of building blocks changed by one or several antecedents that would initiate a high amount of modified building blocks per change. Moderate change

with four to six altered building blocks in total per change is caused by more than two building blocks changed by antecedents. However, stronger changes with seven to nine modified building blocks per change can be initiate by just one or more building blocks changed by antecedents. What we can see in the data is merely that there is a higher likelihood of a high amount of changed building blocks per change if the antecedent(s) effect more than one building block. Otherwise, five out of six times one modified building block effected less building blocks, resulting in a low amount of altered building blocks per change. Consequently, our last proposition states:

> *Proposition 9: "In the first year of the business model innovation process stronger changes due to a high amount of modified building blocks, most likely occur with a higher likelihood if the antecedent(s) effect at least two building blocks.*

Table 13: *Building Blocks changed by Antecedents and the total Amount of modified Building Blocks per Building Block (created by authors)*

Building Blocks changed by Antecedent	total Amount of modified Building Blocks per Building Block		
	1-3	4-6	7-9
CS	5/7	1/7	1/7
VP		1/1	
channels	4/4		
CR	1/1		
KR	9/10	1/10	
KA			
KP	4/5	1/5	
RS	5/5		
CoSt	1/1		

Table 14: *Amount of Building Block changed by Antecedents and the total Amount of modified Building Blocks per Change (created by authors)*

Number of Building Blocks changed by Antecedents	total Amount of modified Building Blocks per Change		
	1-3	4-6	7-9
one	5/6		1/4
two	1/6	1/6	2/4
three		4/6	1/4
four			
five			
six		1/6	

5.3. Discussion

Combining all propositions, we can draw the following conclusions:
In our analysis of the amount and identification of modified building blocks per change, we identified that the building blocks 'customer segments' and 'value proposition' should be the two building blocks that alter first, as it is important to get the fit between them right in the beginning. Not until then actions in communication and marketing strategies should be carried out. Besides this, also building up the resources, the start-up is lacking, could be identified as significant.

These results align with the in the literature highlighted importance of the fit between value proposition and customer demand (Zott, Amit & Massa, 2011; Goerge & Bock, 2011; Teece, 2010; Chesbrough, 2007; Chesbrough & Rosenbloom, 2002). It seems logical to first change the 'customer segments' and 'value proposition' to create this fit between these two building blocks and afterwards adjust the other buildings blocks to support and enhance the fit. Therefore, we can say that in the process of business model innovation the first change should lay its focus on the alignment between customer needs and value proposition. This finding is also presented by Dmitriev et al. (2014) in their conceptual model of business model innovation in start-ups. In their model, they also show that the vale proposition and customer segments (in their model called market segment) are the first elements in the business model to change due to technology or market drivers (Dmitriev et al. 2014).

The identified importance of 'key resources', such as extending the team to receive more knowledge and expertise, can be underlined by the literature about generating a competitive advantage based on unique resources, such as the resource-based view introduced by Jay Barney (Schneider & Spieth, 2013; George & Bock, 2011; McGrath, 2010; Morris, Schindehutte & Allen, 2005; Osterwalder & Pigneur & Tucci, 2005; Amit & Zott, 2001; Barney, 1991). As a start-up lacks in resources, it needs to establish those to achieve a competitive advantage through scarce resources such as in-depth knowledge of an expert (Schneider & Spieth, 2013; Sosna, Trevinyo-Rodriguez & Velamuri, 2010; Griffith, 2014; Barney, 1991). Moreover, as mentioned in our literature review, depending from what angle scholars conduct research, the business model can be also understood as a tool to create a competitive advantage by aligning "strategy, processes, capabilities and resources" (Deshler &

Smith, 2011, p.19; Morris, Schindehutte & Allen, 2005). Therefore, we can conclude that during the process of business model innovation, the fit between customer segments and value proposition to commercialises the innovation as well as gathering resources to support the generation of a competitive advantage are crucial aspects and play a significant role in the beginning of the process.

Reflecting on our analysis about the antecedents, we identified that the antecedent customer feedback has the strongest impact on the building block 'customer segments' and can be identified as the driver for finding the right customer. As the business model innovation process is characterised by a declining trend in modified building blocks per change, it is suggested to start early with customer collaboration to get as much feedback in the beginning, like our case start-ups did. Moreover, the building block 'customer segments' is rather the building block that triggers changes in the value proposition, to generate an alignment between the both to create the fit. Therefore, we can conclude that customer feedback is of good usage to find the fit. Moreover, when the fit is identified early in the process the antecedent 'need of knowledge' can be faster solved as the needed key resources can be determined early based on the 'value proposition' that aligns with the 'customer segments'.

This finding is supported by Pynnonen, Hallikas and Ritala (2012) who claim that business model innovation needs to be customer driven, as the involvement of customers is essential for creating a fit between the value proposition and the customer needs. Based on our findings, we can draw a chain of reaction that starts with the antecedent customer feedback causing changes in the building block 'customer segments', with further alteration in 'value proposition' that then causes change in the 'key resources', as further knowledge is needed.

However, customer feedback is not the antecedent that causes radical changes due to there is no specific antecedent that could be identified that causes radical change for sure. Therefore, in order to test and initiate the potential of radical change in the business model, that guides the start-up in the right direction, openness to the external environment of a start-ups, to provide the opportunities for further antecedents, can be determined as necessary. We, here, state the assumption that receiving customer feedback in combination with other antecedents is the aimed condition for testing the business model with the opportunity to initiate radical change, if errors in the business model are identified. This indicates the importance to interact with the external environment, to be able to test and experiment, find the fit, and identify the needed

resources. This finding aligns with the study of Berglund and Standström (2013) about performing business model innovation in an open system that includes the influence of external and outsiders. Also the case of BjörkströmRobotics supports this claim, as the implication of supplier issues can cause strong modifications within the business model. Here, not the customer segments altered but building blocks such as 'key partners', 'key resources', 'key activities' and due to these changes the 'value proposition' was enhanced.

Besides the internal aspects of the process, we can further confirm the iterative characteristic of the business model innovation process indicated by other studies as the changes of the business model are caused by several antecedents, dominated by different building blocks and barely show any similarity in their amount of modified building blocks per change (Dmitriev et al. 2014, Pynnonen, Hallikas & Ritala, 2012; Chesbrough, 2010; Osterwalder & Pigneur, 2010; Sosna, Trevinyo-Rodriguez & Velamuri, 2010; Teece, 2010; Chesbrough & Rosenbloom, 2002). Moreover, our entire research supports the studies that highlight the importance of experimentation as the case start-ups show that they change and test different business model, react to different antecedents and also do backwards-loops, like in Storvix case when the start-up changed its customer segments from large corporations to SME and then back again to include larger companies once more (Achtenhagen, Melin & Naldi, 2013; McGrath, 2010; Chesbrough, 2010).

However, our study provides more insight as we can show that the iterative character diminishes over times as the number of modified building blocks per change slightly declines. This provides implication for this "ongoing process" of business model innovation as it seems to be decelerating. This rather raises the question if business model innovation is more like a start-stop process, meaning that on some point in time this "ongoing process" needs to be reset to go back to its starting conditions that includes experimentation, testing, openness and radical change.

Nevertheless, in this context it can also be questioned if radical change is really so important as it can also indicate that much of the previous business model was false and included the need of radical change, whereas lower change levels can also mean that the start-up is on the right track. Moreover, a start-up further faces time restrictions what suggests the acceleration of the business model innovation process through a higher number of changing events instead of strong or radical changes that include a high number of altered building blocks. In this context,

our research study further contributes to the existing literature as we showed that the frequency in changing the business model occurs in a stable sequence of three to five months. Therefore, based on our developed diagram for visualising the process, we state the assumption that the two dimensions of the diagram need to be balanced to perform a successful business model innovation process.

6. Conclusion

6.1. Research Aim and Objective

Our aim of this research project was to describe and visualise the process of business model innovation of start-ups, discover patterns within the case processes and provide start-ups with managerial implications. As we were able to identify and visualise different processes with the 'BMI Process Diagram' we can point out that we achieved our aim. Further, we discovered similarities between the processes of the case start-ups and could therefore, on the one hand contribute to existing literature and on the other hand provide managerial implications. Regarding the managerial implications, we can say that we provide a deeper insight in the process of business model innovation and make recommendation how the process can be improved by pointing out what tasks are important in the process of business model innovation. Nevertheless, we do not provide optimal process suggestions as there is no optimal process and the recommendations given in the following chapter 'managerial implications as practical contribution' does not guarantee the absolute success of the process of business model innovation. However, our objective was to visualise the process of business model innovation in start-ups and draw implications only and not providing the holy way to long-term success and survival.

6.2. Contributions

6.2.1. Theoretical Contribution

With this research study, we pursue to contribute to the literature that observes business model innovation as a process because the literature has its main focus on the stages established companies should go through in order to enable the process of business model innovation and overcome their internal barriers (Khanagha, Volberda & Oshri, 2014; Cavalcante, 2014; De Reuver, Bouwman & Haaker, 2013; Frankenberger et al. 2013; Girotra & Netessine, 2013; Teece, 2010; Osterwalder & Pigneur, 2010). Thereby, the literature also identifies that the process is iterative and included loops and cycles but no research has so far taken a closer look on this characterisation of change in the process of business model innovation (Dmitriev et al. 2014; Frankenberger et al. 2013; Pynnonen, Hallikas & Ritala, 2012; Chesbrough, 2010; Osterwalder & Pigneur, 2010; Sosna, Trevinyo-Rodriguez & Velamuri, 2010; Teece, 2010; Chesbrough & Rosenbloom, 2002). Our theoretical contribution is that our research study not just supports existing literature on business model and business model innovation but also extends the literature. We could identify the temporal sequences of change in the process of business model innovation and show how many and what building blocks changed in each event, providing an insight about the trend of the iterative character of the process. Moreover, we visualised the process of five start-ups, really showing how the process is conducted in practice.

This knowledge is relevant as business model innovation is a process of organisational change which is characterised as a complex process and due to process research this complexity can be reduced (Miles et al 1978). Our research findings thus facilitate the reduction of the complexity of this process, as we addressed ‘how’ the process of business model innovation is proceeded, regarding when and what changes occur, as well as examine ‘why’ the process looks the way it is by observing the interrelations between the building blocks and the antecedents that drive the change. These aspects provide further insight about how the process can be improved or accelerated by showing what stages should come first and therefore support the existing research that provides frameworks and roadmaps for conducting business model innovation. We, therefore, contribute to a better understanding of business model innovation.

6.2.2. Managerial Implications as Practical Contribution

Our research study further provides start-ups with the insight on how to improve their searching process of a suitable business model by identifying the building blocks and antecedents that have a significant impact on the process of business model innovation. Therefore, our managerial implications for start-up are that the involvement of customers in form of gathering customer feedback should occur early in the process of finding a suitable business model that includes a fit between the value proposition and customer needs. Besides customer feedback we also observed that the lack of knowledge is an important part in the process of business model innovation, therefore we also recommend identifying the needed knowledge and expertise early in the process. In our within-case analysis we observed that the lack in knowledge were accomplished through team building or team extension. As the identification of the needed knowledge and expertise can be difficult when the fit has not been established yet, the close collaboration with the customers becomes an even more important task to perform. However, as early feedback can support the identification of necessary knowledge and expertise, both the fit creation and resource establishment can be performed early in the process. This can increase the chance of survival as the start-up has the right resources in place. These resources then can obtain the opportunity to turn into the source of a competitive advantage.

Taking these implications into account in the process of business model innovation, start-ups can accelerate their process of finding a suitable business model. As time is a crucial factor for the survival of start-ups (Griffith, 2014; Langley et al. 2013; Wagner, 2013) these implications can be determined as a practical contribution.

6.3. Suggestions for Future Research

During our research, we identified opportunities for future research. Firstly, as our study lacks in generalisability a replication of our study that includes more start-ups also from another industry to generate more data, opens the window for another research project to see if the same results can be accomplished. Also, the conduction of a quantitative study in this matter can provide the opportunity to perform further research on the characterisation of change in the process of business model innovation. Besides the enlargement in size, an extension in time,

observing the business model innovation process of start-up in the second and or third year, provides another opportunity. It would be interesting to examine if the declining trend of the amount of changed building blocks per change remains.

Furthermore, as our study had rather a focus on the discovery and visualisation of the business model innovation process in general, we identified two more research opportunities which either focus on the input factors of start-ups in the process of business model innovation or examine the process based on its efficiency and effectiveness. Observing the influence of input factors such as entrepreneurial experience or age of founder would provide further insight why the processes are different and what input factors can result in an acceleration or enhancement of the process of business model innovation. Regarding the research opportunity in terms of the efficiency and effectiveness of the business model innovation process, a research project that elaborates more on the managerial implications by observing the processes on their degree of efficiency and effectiveness would generate further contribution to the research on the process of business model innovation.

Another opportunity that we could identify includes a research that investigates if a specific mix of antecedents exists that is highly recommendable to trigger the right changes at the right time and to achieve the right allocation between the amount of building blocks modified per change as well as the amount of times the business model is changed. Finally, observing what building blocks need to be altered and how, in order to create a flexible BM that can be easily adapted to market movements, provides an additional opportunity for future research.

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Appendix

Lund, 20 May 2017

Qualitative Questionnaires
Technology Start-Ups
Sweden

Master thesis cooperation (Business model innovation)

The following questionnaire aims to ask you general as well as specific questions towards your Business Model and Business Model Innovation process at several stages of from the foundation of your company to today. Thank you very much for your cooperation!

1) General Questionnaires:

Personal

1. Name:
2. Date of Birth:
3. Company:
4. Foundation of company:
5. What is your working experience (Before the foundation of the start-up)?
6. Have you found a company before? (If yes, please give a brief description of the business idea)

2) Foundation of Start-up:

1. How did you come up with the idea of the product/service?

2. What were the main reasons for founding the company? (internal and external)

3. What was the market situation when you founded the company? (brief explanation)

4. Has the market changed during the first years of operation? (if yes, what were the main changes)

5. Would you say you found a market gap? (if yes, please describe)

6. What challenges do you face in operating your business?

7. What is your objective with your company? Please mark with (**X**)

   A: keep growing and becoming a recognised player on the market ( )

   B: sell it sooner or later ( )

8. What is the organisational structure of your company? (Brief visual explanation)

3) Specific Information:

a) Explanation: Osterwalders Pigneur - Business Model Canvas

"A business model describes the rationale of how an organization creates, delivers, and captures value"

9 Building Blogs that show the logic of how a company intends to make money.

1 **Customers** - An organization serves one or several Customer Segments.
2 **Value Propositions** - it seeks to solve customer problems and satisfy customer needs with value propositions.
3 **Channels** - Value propositions are delivered to customers through communication, distribution, and sales Channels.
4 **Customer Relationships** - Customer relationships are established and maintained with each Customer Segment.
5 **Key Resources** - Key resources are the assets required to offer and deliver the previously described elements.
6 **Key Activities** - by performing a number of Key Activities.
7 **Key Partnerships** - Some activities are outsourced and some resources are acquired outside the enterprise.
8 Revenue - Revenue streams result from value propositions successfully offered to customers.
9 **Cost Structure** - The business model elements result in the cost

Useful Questions:

1. What would you say is your value proposition that you offer to your customers?
2. Who are your customers?
3. What channels do you use to deliver the product to your customers?
4. How would you define your (aimed) relationship to your customers?
5. What are your key resources that you need to offer your product?
6. What are your key activities to offer your customer the product?
7. Do you have any key partners that you see as necessary/important (people that helped you during the foundation of your company)?
8. What is the revenue stream that shows how you want to profit from the value you provide to your customers?
9. What is your cost structure?

The Business Model Canvas

Key Partners 	*Key Activities* 	*Value Proposition* 	*Customer Relationships* 	*Customer Segments* 
	Key Resources 		*Channels* 	
Cost Structure 		*Revenue Streams* 		

Please describe your <u>very first</u> Business Model of your company according to Osterwalder's Business Model Canvas: Date:_____

		BM 1	Cause of Change (Antecedent)
1	Customers		
2	Value Proposition		
3	Channels		
4	Customer Relationships		
5	Key Resources		
6	Key Activities		
7	Key Partnerships		
8	Revenue		
9	Cost Structure		

Please describe your <u>second</u> Business Model of your company according to Osterwalder's Business Model Canvas: Date:_____

		BM 2	Cause of Change (Antecedent)
1	Customers		
2	Value Proposition		
3	Channels		
4	Customer Relationships		
5	Key Resources		
6	Key Activities		
7	Key Partnerships		
8	Revenue		
9	Cost Structure		

Please describe your 3rd Business Model of your company according to Osterwalder's Business Model Canvas: Date:_____

		BM 3	Cause of Change (Antecedent)
1	Customers		
2	Value Proposition		
3	Channels		
4	Customer Relationships		
5	Key Resources		
6	Key Activities		
7	Key Partnerships		
8	Revenue		
9	Cost Structure		

Please describe your 4th Business Model of your company according to Osterwalder's Business Model Canvas: Date:_____

		BM 4	Cause of Change (Antecedent)
1	Customers		
2	Value Proposition		
3	Channels		
4	Customer Relationships		
5	Key Resources		
6	Key Activities		
7	Key Partnerships		
8	Revenue		
9	Cost Structure		

Please describe your <u>5th</u> Business Model of your company according to Osterwalder's Business Model Canvas: Date: _____

		BM 5	Cause of Change (Antecedent)
1	Customers		
2	Value Proposition		
3	Channels		
4	Customer Relationships		
5	Key Resources		
6	Key Activities		
7	Key Partnerships		
8	Revenue		
9	Cost Structure		

Please describe your <u>6th</u> Business Model of your company according to Osterwalder's Business Model Canvas: Date:_____

		BM 6	Cause of Change (Antecedent)
1	Customers		
2	Value Proposition		
3	Channels		
4	Customer Relationships		
5	Key Resources		
6	Key Activities		
7	Key Partnerships		
8	Revenue		
9	Cost Structure		

4) Change of **Revenue** (total or in %)

BM 1	BM 2	BM 3	BM 4	BM 5	BM 6	BM 7	BM 8	BM 9	BM 10

5) Change of **Customer base** (total or in %)

BM 1	BM 2	BM 3	BM 4	BM 5	BM 6	BM 7	BM 8	BM 9	BM 10

6) Feedback

BM 1	
BM 2	
BM 3	
BM 4	
BM 5	
BM 6	
BM 7	
BM 8	
BM 9	
BM 10	

7) Change in **Resource usage**

BM 1	
BM 2	
BM 3	
BM 4	
BM 5	
BM 6	
BM 7	
BM 8	
BM 9	
BM 10	

Thank you very much for your time and participation.

Best Regards,

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