A Typology of Business Model Changes

Cases from Swedish Wood Manufacturing Industry

Sarah Semnani Kenlind

Linköping Studies in Science and Technology

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2020

Department of Management and Engineering

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She had never imagined that curiosity was one of the many masks of love.

Love in the Time of Cholera

Gabriel García Márquez

To my parents, who taught me to be curious and to love deeply.

Abstract

This thesis aims to contribute to a better understanding of the business model (BM) change concept. The study purpose is achieved through developing a context-specific method and framework to measure and characterize different types of BM changes. This work promotes the importance of context-specific studies in the field of BM. It is pointed out that mature industries with slower rates of change or less complex technologies have not received enough attention in this field. Companies within these industries play a dominant role in the economic prosperity of nations and undergo different types of change. Therefore, the low-tech nature of these changes does not imply a lack of significance or complexity.

The Swedish wood manufacturing industry is chosen to represent mature low-tech industries as the context of this study. This industry is currently undergoing a series of changes, brought about by both internal and external forces. Five companies active in this industry are purposefully sampled as case studies. Despite being part of the same industry, the selected case companies each undergo a varying degree or type of change.

The study proposes a firm-level BM framework, which is suitable for studying organizational changes in this context. The proposed BM framework comprises three main dimensions of operational platform, offerings and market, as well as three BM components under each dimension. The changes in the BMs of case companies are studied by depicting and comparing their BMs at three points in time over a ten-year period. BM changes are measured from the two dimensions of degree and scope of change in this thesis.

Measuring the BM changes from the two dimensions of degree and scope of change provides valuable insight about different types of changes in the industry. First, it depicts how big a change took place in the different BM components of the case companies. Second, it demonstrates the size of the 'chain effects' each change caused within each BM dimension and the entire BM. These findings assist in proposing a typology of BM changes (BMCs). BMCs can be categorized as four different types – incremental, modular, architectural and transformational – depending on the possible combinations in the varying degree and scope of change.

This thesis confirms the claims made by previous scholars that contingency factors can limit the range of feasible change strategies for companies. The results show that the majority of BM changes in this industry have been architectural BMCs. These involve fine-tuning most of the BM components, with the aim of resuming the fit between BM dimensions and BM components in companies' BMs. Furthermore, due to the context-specific contingency factors, creating a parallel BM appears to be a more plausible option than completely transforming BMs in these industries. Lastly, this work highlights the importance of a balance and interplay between strategy, external industry-related and internal resource-based factors in companies' BMCs.

Sammanfattning

Företag som är aktiva inom mogna, lågteknologiska branscher utgör en betydande andel av näringslivet inom alla ekonomier. Dessa branscher genomgår konstanta förändringar, men på grund av lägre förändringstakt eller att förändringarna är inom lågteknologi, gör att sådana branscher sällan är belysta eller beforskade. Denna avhandling inriktar sig därför på att skapa en bättre förståelse för organisatoriska förändringar inom mogna lågteknologiska branscher, genom att använda ett affärsmodellsbegrepp (BM=business model) som analytiskt verktyg.

Ett exempel på en mogen, lågteknologisk bransch är den svenska trävaruindustrin, vilken valts som studieobjekt. Den svenska trävaruindustrin genomgår för tillfället en rad förändringar, orsakade av såväl interna som externa krafter. Interna krafter står för trender inom automatisering och digitalisering av tillverkningsprocesser. Externa krafter inkluderar förändringar i den övergripande branschstrukturen, kundgrupper och preferenser samt cykler och trender i den svenska byggbranschen. Fem företag från branschen valdes ut som fallstudieföretag. Dessa företag är etablerade och typiska aktörer inom branschen, endera medelstora företag eller små storföretag. De utvalda företagen, trots att de kommer från samma bransch, har genomgått förändringar som skiljer sig i typ och omfattning.

Studien presenterar ett ramverk för hur företags affärsmodell beskrivs. En affärsmodell byggs upp av olika affärskomponenter relaterade till värdeskapande, det vill säga, hur produkter och tjänster skapas, hur de levereras till kund och hur företaget fångar värde. Det presenterade ramverket består av tre huvuddimensioner – Operativa plattformar, Erbjudandet och Marknaden, och därtill tre affärskomponenter under varje dimension. Fallföretagens förändringar av affärsmodell studerades genom att jämföra deras affärsmodell vid tre tidpunkter under en tioårsperiod mellan 2007 och 2018. Förändringarna kom att mätas efter två dimensioner – grad (degree) och omfattning (scope). I det första fallet –grad– fastslås hur stora förändringar som uppstår i ett företags olika affärskomponenter. I det andra fallet –omfattning– visas hur stora 'kedjeeffekter' varje förändring orsakar inom hela affärsmodellen, det vill säga mellan olika affärskomponenter.

Genom att beskriva och mäta förändringar i företagens affärsmodeller utefter de två dimensionerna, grad och omfattning av förändring, skapades värdefulla insikter om olika typer av förändringar inom branschen. Dessa resultat utgjorde underlag för en typologi för affärsmodellsförändringar, kategoriserade i fyra olika typer – inkrementell, modulär, arkitektonisk och transformerande – beroende på kombinationen av graden och omfattningen av förändringen.

Resultaten från att studerat förändringar av affärsmodell i en mogen, lågteknologisk bransch bekräftar att branschspecifika faktorer kan begränsa utbudet av möjliga förändringsstrategier för företag. Denna forskning belyser vikten av balans och samspel mellan strategi, externa industrirelaterade och interna resursbaserade faktorer i företagens

förändringar. Slutligen visade resultaten att huvuddelen av BM-förändringarna i denna industri har varit arkitektoniska. Detta innebär att det skett så kallad 'finjustering' inom flertalet affärskomponenter med målet att behålla (den goda) passningen mellan komponenter inom företagens affärsmodell.

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The social scientist in me, if I can call myself one, has always been deeply overjoyed when reading the acknowledgments sections of other PhD theses. And as early as the first year of my PhD studies, I was already picturing the day when I would finally write my own. However, never in my dreams have I foreseen writing my acknowledgments during such a complicated time in our human history. So, I have let my emotions take over in this small, but important, part of my thesis.

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Vadstena, April 2020

Sarah Semnani Kenlind

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List of Abbreviations

3D	Three-dimensional
BIM	Building Information Modelling
BM	Business Model
BM Canvas	Business Model Canvas
BMC	Business Model Change
BMI	Business Model Innovation
CAD	Computer-aided Design
CAM	Computer-aided Manufacturing
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CNC	Computerized Numerical Control
CTO	Chief Technical Officer
DIY	Do-it-yourself
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
IT	Information Technology
MOA	Model of Analysis
MPS	Master Production Schedule
NPD	New Product Development
OECD	Organization for Economic Co-operation and Development
PDM	Product Data Management
R&D	Research and Development
RBV	Resource-based View
ROA	Return on Asset
ROC	Return on Capital
ROT	Abbrev. for Renovation, Reconstruction and Extension in Swedish
SCB	Statistics Sweden
SEK	Swedish Krona
SME	Small and Medium-sized Enterprise
UNIDO	United Nations Industrial Development Organization
VP	Vice President

1. Introduction

The past 20 years have witnessed a sudden rise in the popularity of the term ‘business model’ (BM), used in both academic and business discussions. The term’s prevalence began in the late-1990s, with a focus on e-business model creations in light of the widespread use of the Internet and its associated e-commerce opportunities (Mahadevan, 2000; Amit and Zott, 2001). Since 1999, there has on average been an annual increase of around 20% in the number of published research studies with the term ‘business model’ in the article title, abstract or keywords (Fallahi, 2017; Massa, Tucci and Afuah, 2017). Business models are commonly considered as *conceptual* (Al-Debei and Avison, 2010), *managerial* (Magretta, 2002) *cognitive* (Baden-Fuller and Morgan, 2010) and/or *analytical* (Lambert and Davidson, 2013) tools, used to give an *abstract representation of a company’s architecture, structure and/or economies* (Timmers, 1998; Morris, Schindehutte and Allen, 2005; Zott, Amit and Massa, 2011; Wirtz *et al.*, 2016).

BMs are always changing; Demil and Lecocq (2010) view them as a “single frame from a motion picture” (p. 234). A BM, as a conceptual and analytical tool, can be used to study organizational change (Cavalcante, Kesting and Ulhøi, 2011; Wirtz *et al.*, 2016).

However, the BM concept has not been given the attention it deserves in studies of organizational change. And despite the prevalence of studies with a focus on BMs in recent decades, the notion of BM *change* is still at quite a nascent stage (Saebi and Foss, 2015).

1.1 Problem Statement

Based on an extensive review of literature from the 1970s onwards, Maes and Van Hootegeem (2011) argue that organizational change literature is mainly shaped by dichotomist views. That is, studies focusing on only two extreme sides of a single change dimension. The change dimensions can be of different natures, such as degree, frequency, process, scope and speed of change. It is therefore common to witness the use of dichotomist terms such as incremental vs. radical, continuous vs. episodic or evolutionary vs. revolutionary, etc. in organizational change studies. Maes and Van Hootegeem (2011) consequently call for a more system thinking approach in organizational change studies, by incorporating more than one change dimension. This thesis will argue that utilizing the business model (BM) concept as an analytical tool can be a positive step towards addressing the existing criticism in organizational change studies. The BM concept, which will be further clarified in this thesis, comprises a set of interrelated components that facilitate better system thinking around how an organization functions (Morris, Schindehutte and Allen, 2005). As a result, it can be used to study more than one change dimension at once.

The pronounced presence of the business model concept in the literature comes with its own challenges. The concept is often criticized for a lack of unified definition (Morris, Schindehutte and Allen, 2005; Zott, Amit and Massa, 2011), unclear theoretical underpinnings (Schnieder and Spieth, 2013; Massa, Tucci and Afuah, 2017) and blurred boundary rules (Spieth, Schneckenberg and Ricart, 2014; Bankvall, Dubois and Lind, 2017). Despite all the criticism, the key to what makes the business model an intriguing and popular concept lies in the word ‘model’. The origin of the concept seems to be connected with simulation of the real world, the representation or simplification of businesses, using a ‘model’ (DaSilva and Trkman, 2014). The difference, however, arises through the different disciplines in which business model is being studied, the theoretical lenses used, the level of abstraction and the boundary-spanning conditions. Therefore, to

be able to utilize the concept correctly, all business model studies need to be clear on their understanding of the term, which will be addressed in detail in chapter two of this thesis. However, in short, this study views business model as a formal conceptual representation of how a firm functions (Massa, Tucci and Afuah, 2017) and adopts the following definition: “*A business model reflects the operational and output system of a company, and as such captures the way the firm functions and creates value*” (Wirtz, Schilke and Ullrich, 2010, p. 274).

Interestingly, unlike the nascent stage of BM *change* studies, the ubiquity of the business model phenomenon had quite an early encounter with another research area: *innovation* literature (Massa and Tucci, 2013; Schnieder and Spieth, 2013). Scholars generally discuss business model innovation (BMI) in two different ways. One group considers BMs to be tools, assisting innovative companies in the commercialization of new technologies and ideas, while the other group perceives BM as a source of innovation itself, which can be a complement to traditional subjects of innovation such as product and process innovation (Chesbrough, 2007; Zott, Amit and Massa, 2011; Massa and Tucci, 2013; Schnieder and Spieth, 2013). The first group, in line with the thinking applied in this study, usually takes a more granular view of the components of BMs and perceives BMs as tools that can inspire creative thinking by providing an opportunity to view the different aspects of organization at a glance. The second group, on the other hand, perceives BM as a more abstract or cognitive tool. These BMs only comprise very few components, of which value proposition and revenue model are usually two of the main ones.

In a scholarly world, where the term ‘business model’ is criticized for having no generally accepted definition, it comes as no surprise that adding the word ‘innovation’ increases this confusion. As Christensen, Bartman and van Bever (2016, p. 31) put it: “*The confusion surrounding business model innovation begins, appropriately enough, with confusion about the term ‘business model.’*” Based on a systematic literature review of 150 peer-reviewed articles on BMI published between 2000 and 2015, Foss and Saebi (2017) defined BMI as “designed, novel, nontrivial changes to the key elements of a firm’s business model and/or the architecture linking these elements” (p. 216). This is a comprehensive definition of BMI that emphasizes three critical words: ‘designed’, ‘novel’ and ‘nontrivial’. As implied by Foss and Saebi’s (2017) definition, and as argued

by many others, trivial or non-novel changes to business models do not lead to a BMI. More importantly, not all BM changes share the same characteristics (Demil and Lecocq, 2010; Cavalcante, Kesting and Ulhøi, 2011; Markides, 2013; Saebi, 2015). The above definition also includes the word ‘designed’, which indicates a conscious choice to make a change. However, not all changes in BMs are planned as per the above definition. There is therefore a need to distinguish between the types of BM change that may be ‘unplanned or trivial’ and what is known as BMI. And these changes are better explained using organizational change literature, which – compared with innovation literature – has not yet received sufficient attention in BM studies. This thesis therefore argues that one missing aspect in BM literature is a step prior to studying BMIs. BMI literature needs a more concrete foundation on which to stand, and this will be made possible by first developing a more thorough understanding of the BM *change* concept.

Many scholars have highlighted the importance of studying business models within a specific industry or context (e.g. Storbacka *et al.*, 2013; Waldner, Poetz and Grimpe, 2015; Karimi and Walter, 2016; Mora Cortez and Johnston, 2017). A systematic literature review of empirical research on business models revealed that the context-specific studies were mainly carried out in young or fast-growing industries such as biotechnology, or in industries that faced disruptive technological changes such as telecommunications, information and the media (Lambert and Davidson, 2013). As a result, one of the areas that remained under-researched is the more mature industries with a slower rate of technological advancement or less sophisticated developments. This may also be one of the reasons for a lack of focus on BM change, compared with BM innovation in the literature. BM changes in these types of industries cannot always be characterized as ‘designed’, ‘novel’ or ‘nontrivial’ in order to be considered as a BMI. This, however, does not indicate that studying BM changes in these industries is an insignificant research area.

In today’s world, the mainstream focus of research and policymaking has been on dynamics of innovation in high-tech industries and new technologies (Hansen and Winther, 2015; Som and Kriner, 2015). It is primarily perceived that prospects for economic growth and employment rest solely in the hands of high-tech products and industries, leaving behind low-tech industries as a largely forgotten sector in terms of change and innovation studies (Hirsch-Kreinsen, 2008). The low-tech sector mostly comprises mature industries where market conditions and technologies may change

slowly (von Tunzelmann and Acha, 2006). However, despite contemporary beliefs, they continue to play a dominant role in the economic prosperity of European manufacturing, particularly with regard to employment and added value (Hirsch-Kreinsen, 2008; Hansen and Winther, 2015; Som and Kriner, 2015). In Sweden, around 25% of the total gross domestic product (GDP) comes from the manufacturing industries (Statista, 2018). Low-tech industries account for 65% of the total number of manufacturing companies in Sweden and around 35% of their turnover (UNIDO, 2019). Furthermore, over 10% of Sweden's total employment comes from low- and medium low-tech industries (OECD, 2018; SCB, 2018). Despite extreme cases of radical high and lows, these industries have continued to record low but steady growth in production over the past 20 years (Trading Economics, 2019).

Based on the OECD's (2011) classifications, low-tech industries are those with an investment in research and development (R&D) to turnover ratio of below 1%, and medium low-techs are classified as industries with a ratio of below 3%. This lack of R&D intensity has, at times, given the misleading impression that change and development do not take place in low-tech industries, or that the absence of advanced technologies makes organizational changes in low-tech industries a less significant research area. This thesis will therefore aim to bringing the focus back to mature low-tech industries, as an economically and empirically significant but forgotten sector, by studying their BM changes.

1.2 Empirical Context

According to OECD (2011) and UNIDO (2020) classifications, the industries categorized as low-tech include food, beverages and tobacco, textiles, leather and apparel, wood, pulp and paper products, printing and publishing, furniture and recycling. The empirical context of this thesis is the Swedish wood products industry. This has been chosen as an example of a mature low-tech industry which falls into the under-researched area of business model and organizational change studies.

Sweden is 70% forest land, of which 80% is in active use (*Swedish Forest Industries Federation*, 2019). Sweden is the world's third largest exporter of sawn timber, pulp and paper, exporting 80% of its products (ibid.). The focus of this study, however, is the Swedish wood manufacturing industry. This industry comprises industrial end-users of

wood, such as manufacturers of windows, doors, stairs, etc., manufacturers of wooden single and multi-family housing, and manufacturers of pre-fabricated buildings (Nord, 2005). This is a considerably domestic industry. The export ratio is not as high as sawn timber, pulp and paper, and accounts for only around 15% of the industry's total turnover (*Swedish Forest Industries Federation*, 2019). This industry is made up of many small companies and few larger international actors (Nord, 2005), and is a conservative and traditional industry with slow rate of technological or new product development (Hansen, Juslin and Knowles, 2007). Up until the last decade, the innovations in this industry were mainly focused on process innovation (Hovgaard and Hansen, 2004) and digitalization activities were limited to computer-aided manufacturing (CAM) and the use of customized machinery for efficiency in wood utilization and production (*ibid.*). This remains the case when it comes to smaller actors in this industry.

During the past ten years, this industry has faced new trends brought about by both external and internal factors. External factors such as changes to loans and tax deduction regulations, economic conditions in the construction industry and the pervasiveness of e-commerce all play their roles in terms of customer demand, customer types and market conditions. There have also been internal trends such as modularized production and pre-fabricated construction (Meiling, Backlund and Johnsson, 2012; Brege, Stehn and Nord, 2014) and companies adopting lean thinking to improve process efficiency and effectiveness (Meiling, Backlund and Johnsson, 2012). Digitalization and automation also have a visible presence in different areas such as 3D printing, enterprise resource planning (ERP) and building information modelling (BIM) (Nawari, 2012; Sakin and Kiroglu, 2017). As a result, these digitalization and automation efforts can also pave the way for more servitization opportunities in the industry (Visnjic, Wiengarten and Neely, 2016; Vendrell-Herrero and Wilson, 2017). It is worth mentioning that several of these trends had been picked up around a decade or two earlier in many other manufacturing industries, such as steel manufacturing or car production. These new internal and external trends can act as forces for change in the companies that are active in this field. Nevertheless, not all companies react the same way to these forces. Some may completely transform or innovate their business models, whereas others may incrementally or gradually implement changes to different parts of their business models.

1.3 Research Purpose and Questions

As the empirical context of this study exemplified, mature low-tech industries also have different driving forces pushing companies towards change. An important point, however, is that not all the companies active within the same industry would react similarly to these forces. The discussions in the problem statement have also highlighted the benefits of taking a BM approach when studying organizational changes. Organizational change literature has been criticized for a lack of a systemic view (Maes and Van Hootegeem, 2011), and BMs are known for their systems-thinking approach. Given the set of interrelated components in BMs, this can create a simplified view of an organization system. The BM innovation literature, on the other hand, has been criticized for having unclear grounds, which leads to confusion in understanding the concept (Christensen, Bartman and van Bever, 2016). It is argued in this thesis that, in order to better understand BMI, there is a need to take a step back and first understand the concept of BM change better.

This thesis therefore aims to demonstrate how BMs, as analytical frameworks, can be used to describe and analyse different types of organizational changes. In addition, considering the emphasis of BM scholars on the significance of studying BMs within a specific context (e.g. Storbacka *et al.*, 2013; Waldner, Poetz and Grimpe, 2015; Mora Cortez and Johnston, 2017), this study will do likewise. The empirical context of this thesis will be mature low-tech industries. These industries are largely under-researched in BM and innovation studies, despite their significant role in the economic prosperity of nations and the changes that the companies in these industries constantly undergo. This lack of a scholarly focus can be traced back to the slower rate of changes and the absence of technically sophisticated changes in their operations compared with industries in the growth phase. However, this thesis argues that this empirical context is the right starting point for developing a better understanding of BM changes.

Therefore, formulated based on the above arguments, the purpose of this thesis is:

To develop a context-specific method and framework for studying different types of business model changes in organizations.

As discussed earlier, companies react differently to the forces of change. As a result, the BM changes take place to varying degrees and in varying forms. Therefore, the first step towards developing a method for studying different types of BM changes is to be able to measure the changes in companies' BMs. This requires a consistent set of criteria that can be used to measure BM changes across different companies or at different points in time, in order to provide a solid base of comparison between them, despite their differences.

However, up until now – with very few exceptions such as the works of Spieth and Schneider (2016) and Clauss (2017) – BM literature has not provided clear measures for identifying BM changes. Although these existing studies came up with deductive and quantitatively tested indicators for measuring BM innovation, neither of them has empirically applied its measures. Nor have they specified criteria for whether a different combination of these indicators can lead to different types of BMI. In other words, there are no clear indications on whether or not there will be a different type of BMI depending on which innovation indicators are met. This issue presents a problem when not all the BM changes share the same characteristics. Furthermore, proposing a unified, 'one size fits all' measure makes its empirical applicability in different contexts rather difficult. Lastly, the measures already proposed in the literature are closely linked to innovation-related indicators and disregard the type of changes in BMs that cannot necessarily be characterized as innovative.

Hence, the first research question to be answered in this thesis is:

RQ 1: How can business model changes be measured?

Klepper (1997) believes that the generic characteristics of mature industries in the literature can only capture how these industries evolve. There are, however, regular patterns that occur at the stage of maturity in these industries, which are not predicted by the product life cycle theories (Klepper, 1997). After the changes in the BMs are measured, it will be possible to describe and present them. Presenting different types of BM changes may reveal certain patterns in these changes. Understanding these patterns can therefore provide valuable insights when studying organizational changes. Therefore, the next step towards analysing different types of organizational change involves characterizing the different types of BMs.

Several previous studies have characterized different types of BMs. However, based on an extensive review of the literature, Adrodegari and Saccani (2017) concluded that most of these scholarly works tend to focus on the aspects of the BM perceived by customers, such as value proposition or revenue components. As a result, they do not consider the internal aspects of the organizations. There is therefore a need for a more all-encompassing characterization of BMs, one that takes all the BM aspects into consideration and also accounts for less innovative changes in BMs.

Subsequently, the second question that this study aims to answer is:

RQ 2: How can different types of BM changes be characterized?

A context-specific study cannot be complete without understanding the contingency factors that may have influenced the BM changes one way or another. The contingency factors can be either internal, such as organizational size, design or level of technological development, or external, such as economic conditions, regulations, industry structure, etc. Hambrick (1983a) argues that environmental characteristics tend to limit the set of viable strategies within an industry. This makes it interesting to understand whether or not this can also be the case in mature low-tech industries.

As a result, the last question that this study aims to answer is:

RQ 3: How do contingency factors in mature low-tech industries affect BM changes?

1.4 Disposition of the Thesis

The rest of the thesis is organized as follows:

Chapter 2: The Frame of Reference chapter includes more in-depth discussions on business models and their theoretical underpinnings within the view of this study. It clarifies how the business model is defined and is intended to be used in this thesis. Furthermore, there will be a brief recap of the relevant parts of the organizational change literature in order to demonstrate how the concept of business model change can benefit from this research field. As the empirical context of this study, the characteristics of mature low-tech industries are then discussed. The chapter concludes by demonstrating the model of analysis which will be followed in this study.

Chapter 3: The Methodology chapter will shed light on my approach as a researcher in carrying out this study. It briefly describes my research philosophy and proceeds to elaborate on the research approach used in the thesis. It describes the different types of data collected and discusses how the data has been analysed in this study. The chapter ends by explaining the steps taken to ensure the quality of this research.

Chapter 4: The Empirical Findings chapter includes descriptions of all five case companies in this study, as well as an overall industry description. Each case description will include a brief background on the company and provide key figures and ratios. It will then describe the changes that the companies have undergone, accompanied by a timeline of key events during the ten-year period. The chapter also touches upon the challenges associated with certain changes. Lastly, based on the empirical descriptions, the companies' BMs will be depicted at three points in time over the ten-year period.

Chapter 5: The Analysis chapter is divided into three main parts. The first part focuses on proposing operationalized means for measuring the degree and scope of BM changes. The second part is dedicated to applying these measures to all five case companies, in order to demonstrate the scope and degree of their BM changes. Finally, the third part focuses on characterizing different types of BM changes, based on the findings from the second part. This leads to proposing a typology of BM changes.

Chapter 6: The Discussions chapter will be mainly dedicated to elaborating on the implications of the study's research questions. It also provides further insights on the third research question, i.e. the contingency considerations in the study of BM changes.

Chapter 7: The Conclusion chapter provides answers to the study purpose and research questions, based on what is covered in the Analysis and Discussions chapters. It also reviews the theoretical and managerial implications of this thesis and concludes by pinpointing the research limitations and suggestions for future studies.

2. Frame of Reference

This chapter is divided into three main parts. In the first part, the view of this study on the concepts of BM and BM change will be clarified. The second part is dedicated to discussions on how concepts from organizational change can be used when studying and measuring different types of BM change. The third part has a deeper focus on the characteristics of mature low-tech industries as the context of this study. Finally, based on the points made in the three main parts, the chapter will conclude by proposing the study's model of analysis.

2.1 Business Models

Before writing this thesis, I promised myself to stay true to the name of this chapter, a *frame of reference*, and to avoid over-explanation through extensive background reviews of the literature. Fortunately, the abundance of scholarly work in this field also includes a handful of valuable literature reviews. One of the earliest – and, in my opinion, still one of the best – works is Morris, Schindehutte and Allen's (2005) conceptual review of a unified perspective on entrepreneurs' business models. This was followed by works by Al-Debei and Avison (2010) and Zott, Amit and Massa (2011), which further contributed

to developments in the BM concept. Since then, there have been several other noteworthy reviews (among others, Lambert and Davidson, 2013; Schnieder and Spieth, 2013; Spieth, Schneckenberg and Ricart, 2014; Adrodegari and Saccani, 2017). Last but not least, the critical assessments of BMs in Massa, Tucci and Afuah's (2017) and Foss and Saebi's (2017) works on reviewing BM innovation literature had significant impacts on the direction of the thesis, which are visible throughout this work. Therefore, I take this opportunity to acknowledge the benefits and significance of all these reviews in shaping my frame of reference. They helped me organize my line of thought and provided reassurance at times when I found myself overwhelmed by the pool of discussions about different business model perspectives and definitions. They provided reassurance by reminding me that my view on BM has been supported by other scholars before me, and it is merely one of several perspectives in this field.

The point of departure for this frame of reference will be the categorization made by Massa, Tucci and Afuah (2017). They divided the stream of business model literature into three main groups:

- “(1) Business models as attributes of real firms,
 - (2) business models as cognitive/linguistic schemas, and
 - (3) business models as formal conceptual representations of how a business functions”
- (Massa, Tucci and Afuah, 2017, p. 73.)

It is, of course, not entirely possible to draw clear-cut lines between these three streams in the literature. However, their categorization is a close representation of previous BM research, even if some studies may fall into more than one group. The first stream, *BM as attributes of real firms*, is where the BMs are derived empirically by classifying the actual manifestations of organizations (Massa, Tucci and Afuah, 2017). The major focus in these BMs is the set of activities performed by the firms and the outcomes associated with these activities (Casadesus-Masanell and Ricart, 2010; Massa, Tucci and Afuah, 2017). The second stream, *BM as cognitive schemas*, can be characterized as a logic, a pattern of thinking or established beliefs shared by an organization's managers (Massa, Tucci and Afuah, 2017). Some of the well-known scholarly articles that contributed to the notion of BMs with a cognitive or linguistic perspective include the works of Magretta

(2002), Baden-Fuller and Morgan (2010) and Aspara *et al.* (2013). Last but not the least, the third research stream can be considered to be situated in the middle of the spectrum, with the two former research streams positioned on either side of it (Massa, Tucci and Afuah, 2017), since it shares the characteristics of both BMs as real-world representations of the firms and BMs as cognitive models. Massa, Tucci and Afuah (2017) stress that the word ‘formal’ is central to this distinction, since unlike BMs as a cognitive schema, the conceptualization of BMs in this research stream is presented explicitly and formally. On the other hand, they also share similarities with the first research stream, in the sense that they intend to articulate the complexity of the real attributes of the firm by highlighting their most important elements (Sberman, 2000; Chesbrough, 2010; Massa, Tucci and Afuah, 2017). One of the earliest works in this stream of literature, which does not always get enough credit for inspiring many others, is Osterwalder, Pigneur and Tucci (2005) and their famous business model canvas (Osterwalder and Pigneur, 2010). This study follows the third stream of literature and perceives BMs as formal conceptual representations, aiming to describe the organizational activities and how they function.

Teece (2010) states that any enterprise either implicitly or explicitly adopts a particular business model that depicts the architecture of its value creation, delivery and capture. This description holds more or less true for all three above-mentioned views on business models. As for the view of this thesis on BMs, which is a formal conceptual model, I chose to adopt the definition of BM proposed by Wirtz, Schilke and Ullrich (2010, p. 274): *“A business model reflects the operational and output system of a company, and as such captures the way the firm functions and creates value.”* This is a short, yet encompassing definition that touches upon all important aspects of a business model. The following sections will shed more light on various angles of this definition.

2.1.1 A Note on Strategy and BMs

BMs, especially when perceived as conceptual models, are closely intertwined with the field of change and strategic management. In the 1960s, the strategic change management literature had an emphasis on the importance of congruence between an organization and its environment. Thus, it was posited that the primary strategic task is to reflect the changes in the environment on an organization’s structure (Lawrence and Lorsch, 1967; Thompson, James, 1967). These claims were backed and further developed by scholarly

Table 2.1: Selected views on relationship between BM & Strategy

View on relationship between strategy and BM	Authors
BM concept does not add anything new to the concept of strategy.	Porter, 2001
BMs are systems that show how the pieces of a business fit together, while strategy also takes competition into account.	Magretta, 2002
“The business model has elements of both strategy and operational effectiveness”.	Morris, Schindehutte and Allen, 2005, p. 733
BM comprises two core components. One is the foundation of any strategy, and shows what customers pay for. The other component reflects the operational processes.	McGrath, 2010
“Companies use <u>radical (or transformational) strategies</u> to change their business models and routine strategies to change their market positions”.	Yip, 2004, p. 18
A BM is an abstract representation of some aspect of a firm’s strategy; it outlines the essential details one needs to know to understand how a firm can successfully deliver value to its customers.	Seddon <i>et al.</i> , 2004
BM “is the translation of strategic issues, such as strategic positioning and strategic goals, into a conceptual model that explicitly states how the business functions”.	Osterwalder, Pigneur and Tucci, 2005, p. 2
Business model is a reflection of a firm’s realized strategy.	Casadesus-Masanell and Ricart, 2010
“The design and implementation of a new business model is a function of an organization’s strategy at a given period in time”.	Khanagha, Volberda and Oshri, 2014, p. 337
Strategy is a more long-term perspective and relates to how the company ‘aims’ to operate, whereas BM has a more short-term and present perspective and shows how the business is actually operating today. Dynamic capabilities are the connection point between strategy and BM.	DaSilva and Trkman, 2014
“A business model is the direct result of strategy but is not, itself, strategy”.	Wirtz <i>et al.</i> , 2016, p. 38
BMs and <u>product market strategy</u> are complements, not substitutes. They are distinct features affecting a firm’s market value.	Zott and Amit, 2008
BM revolves around customer-focused value creation and strategy does not have that strong a focus.	Zott, Amit and Massa, 2011

View on relationship between strategy and BM	Authors
BM as a separate field from strategy, addressing the aspects that strategy literature did not. Mainstream strategy literature does not address reinventing value, or how it is created in the first place. BM moves away from supplier-side strategy and the mindset that value is only created by the firm alone.	Massa, Tucci and Afuah, 2017
BM's are the intersection points between a company's strategy and business processes. BM's translate a company's broad strategies into more specific business architecture, value proposition, financial arrangements and co-operations.	Al-Debei and Avison, 2010
BM "as a vehicle that closes the gap between the abstract and practice within strategic management and business".	Kajanus <i>et al.</i> , 2014, p. 604
BM bridges strategy formulation and implementation.	Richardson (2008) as cited in Zott, Amit and Massa (2011)
Business model is a tool or means to formulate competitive strategy.	Chesbrough and Rosenbloom, 2002; Casadesus-Masanell and Ricart, 2010; Dahan <i>et al.</i> , 2010
BM's "represent boundary-spanning entities that link dimensions of the corporate strategy, technological capabilities and innovation processes of the firm".	Spieth, Schneckenberg and Ricart, 2014, p. 242
BM differentiates a company or unit according to its culture, strategy and processes.	Markides and Oyon, 2010
Market strategy is a component of business model.	Timmers, 1998
Competitive strategy is a component of business model.	Chesbrough and Rosenbloom, 2002; Chesbrough, 2007
Strategy is considered as a component of BM, and is defined as "a contingent plan of action designed to achieve a particular goal".	Adrodegari and Saccani, 2017, p. 8

works in the 1980s. In this period, the role of configuration between the three factors of environmental context, organizational structure and the firm's strategy was highlighted (Mintzberg, 1979, 1983). The consistency and fit between these three factors were argued to be attributed to increased organizational effectiveness (Doty, Glick and Huber, 1993). Lastly, in the 2000s, the concept of business model was introduced, with many scholars acknowledging its conceptual overlap with strategy (among others, Zott and Amit, 2008; McGrath, 2010; Markides, 2013; Massa, Tucci and Afuah, 2017). It comes as no surprise that the scholars in this field do not have a consensus with regard to the relationship between these two concepts. Table 2.1 summarizes selected views from the literature on the relationship between strategy and business model. As can be assumed based on the table above, there is rather a heterogeneous understating in this regard between the scholars, with some even being in complete contradiction to others. The main themes that can be extracted from these selected summaries are as follows:

- No difference between strategy and BM concepts
- BM concept is not as encompassing as strategy concept
- Strategy is not as encompassing as BM concept
- BM concept as a complement to strategy
- Strategy as a component to BM
- Strategy as a means to change BM
- BM as a means to formulate strategies
- BM as reflection, translation, function, or abstract representation of strategy
- BM as a connection point between a firm's strategy and business processes or tactics

Something that can be understood from these varying viewpoints is that these scholars do not all seem to share the same definition of strategy either. As can be seen, there are many different understandings about what a strategy entails. Mintzberg and Lampel (1999) attempted to provide an answer to this issue, by proposing ten different schools of strategy formation. I cannot completely agree that all ten schools fall into the category of strategy and that they are entirely distinct from one another. However, the four proposed schools of Design, Planning, Positioning and Entrepreneurial, in my opinion, carry many important characteristics of a strategy. The Design school, as one of the most dominant views on strategy, is supported by scholars such as Chandler (1962) and Andrews (1971).

The Design school perceives strategy formation as a conception process for “achieving the essential fit between internal strengths and weaknesses and external threats and opportunities” (Mintzberg and Lampel, 1999, p. 22). Based on this view, the senior management formulates simple and clear strategies that are neither informally intuitive nor formally analytical (Mintzberg and Lampel, 1999). The Planning school has Ansoff (1965) as one of its dominant scholars. It has similar assumptions to the Design school, with the difference of perceiving the strategy formulation process as a more formal process, containing distinct and decomposable steps (Mintzberg and Lampel, 1999). Furthermore, the Positioning school is mainly dominated by the arguments made by Porter in the 1980s (eg., Porter, 1981, 1989). In this school, strategy formation is perceived as an analytical process. It is reduced to “generic positions selected through formalized analyses of industry situation” (Mintzberg and Lampel, 1999, p. 22). Finally according to Mintzberg and Lampel (1999), the Entrepreneurial school is more of a visionary process. In the Entrepreneurial school, the role of a creative leader is highlighted and is usually focused on a particular, or niche, context such as start-ups or private ownerships. Unlike the three previous schools, these types of strategies shift from exact designs, plans and positions and rely more on intuitions (Mintzberg and Lampel, 1999). The entrepreneurial strategies are more broad perspectives and “vague visions” (ibid.), and Schumpeter (1934) can be considered as one of the famous scholars contributing to this school of thought.

My view on strategy falls the closest to the Design school and the essential role that it plays in this equation. However, at the same time, I cannot completely overlook the presence of certain elements from the Planning, Positioning and Entrepreneurial schools in my view on strategy. As a result, in this thesis I follow the broad definition of strategy proposed by Wirtz *et al.* (2016, p. 38), which is inspired by the works of other classic strategy scholars (Chandler, 1962; Ansoff, 1965; Andrews, 1971; Porter, 1996): “*Strategy involves a vision, the positioning to the environment or competitors – simply put, an idea of which direction it will go in the future.*” (Wirtz *et al.*, 2016, p. 38). The word ‘future’ in this definition implies the long-term nature of strategy. Therefore, strategy reflects what a company is aiming to become, whereas BM describes what the company actually is at a point in time (DaSilva and Trkman, 2014). Or, as Cavalcante, Kesting and Ulhøi (2011) state, BM reflects the ‘realized strategy’ of the firm. Mintzberg and Waters (1985)

argue that *realized* strategies are the result of an interplay between deliberate strategies, which were intended in the first place, and emergent strategies, which are patterns forming, despite, or in the absence of, intentions (Mintzberg and Waters, 1985). This is also an important takeaway in the understanding of the BM change concept, considering that not all changes that take place in a company's BM are necessarily a result of a deliberate strategy, and some are the result of forces from the environment or a change in another component of the BM. This will be discussed more clearly as we go continue with this chapter.

Therefore, in short, this thesis considers business models as formal conceptual representations of how businesses function, and a reflection of the realized strategy of the firm at a given point in time. This chapter will now proceed by pinpointing the theoretical basis of business models according to the assumptions discussed above.

2.1.2 The Theoretical Basis

When BMs are viewed as formal conceptual representations of how companies function, it is not prudent to consider them as a new or standalone perspective that challenges the existing traditional theories, in line with the argument put forward by Massa, Tucci and Afuah (2017). The BMs in this study are merely an organizational model, depicting the different aspects of a business. Considering that no single theory can fully explain how a business functions, different theories can contribute to our understanding of BMs (Amit and Zott, 2001; DaSilva and Trkman, 2014). Nevertheless, there is no consensus amongst scholars of this field on the exact theoretical underpinnings of the BM concept as the views vary based on how each study perceives and applies the BM concept in a specific work. The theoretical basis of BMs based on this thesis will be described below.

Resource-based View

A resource-based view (RBV) has a focus on a firm's internal resources and competences, and how they can be a source, or a support, in achieving a sustained competitive advantage (Wernerfelt, 1984; Prahalad and Hamel, 1990; Barney, 1991). This is based on the assumption that strategic resources are heterogeneously distributed between the firms and, as a result, businesses adopt different positioning strategies in the market, in order to achieve a sustained competitive advantage (Barney, 1991). Barney (1991) argues that in order to have the potential to realize a sustained competitive advantage, the firm's

internal resources need to possess four attributes. They need to be (a) *valuable*, by being able to exploit the opportunities and neutralizing the threats, and they must be (b) *rare*, (c) *imperfectly imitable* and (d) *sustainable* (Barney, 1991). Furthermore, in line with an RBV, Prahalad and Hamel (1990) argue for the idea of having a portfolio of core competencies in companies, and their positive role in the allocation of a company's resources to support its competitive advantage, to invent or exploit markets, or to delight its customers. Core competencies are defined as "the company's collective knowledge about how to coordinate diverse production skills and technologies" (Prahalad and Hamel, 1990, p. 1).

Consistent with an RBV, BMs address the internal key resources, activities and competences as one of the main aspects of how a business functions (Morris, Schindehutte and Allen, 2005; Schnieder and Spieth, 2013; DaSilva and Trkman, 2014). However, the BM concept does not carry the assumptions of traditional theories of RBV and positioning (e.g. Porter, 1989, 1995, 1996; Grant, 1991; Peteraf, 1993) when it comes to the sources of competitive advantage, considering that in the traditional RBV and positioning theories, the sources of competitive advantage are limited to the supply side (Massa, Tucci and Afuah, 2017). Nevertheless, the BM concept acknowledges that competitive advantage and value can be created from both the supply and demand sides, that is, by both the company and its customers. Moreover, compared with the traditional RBV and positioning theories, BM shifts the focus from the competitors to the customers of the business. This shift in focus highlights the concept of value, which will be discussed in the next section.

The Concept of Value

Value, although not a theory but more of a concept, is one of the most commonly agreed underlying assumptions in BM studies. Value has a pivotal place in marketing theory and practice, which despite its central role has a vague and subjective meaning (Kienzler, 2018). In its simplest form, it can be described as "the trade-off between perceived benefits and perceived sacrifices" (Zeithaml, 1988; Monroe, 2003, as cited in Kienzler, 2018, p. 1). A large amount of scholarly work has been dedicated to the concept of value and its different types and perspectives, which is not within the scope of this thesis. However, when discussed in the context of this thesis, I refer to value based on the view

of contemporary marketing theory. Value was traditionally perceived as an embedded part of produced products and service, indicating that suppliers were solely responsible for its creation (Vargo and Lusch, 2004). However, the contemporary marketing theory argues for the involvement of both the seller and the buyer in the creation of value (Vargo and Lusch, 2004; Grönroos, 2008; Kienzler, 2018). As a result, the price and the revenue model that the company sets for its offering captures only a part of that total created value (Tirole, 1988; Kienzler, 2016).

As previously mentioned, one of the distinguishing factors between the traditional RBV and positioning theories and BMs is the shift in focus from competitors to customers (Amit and Zott, 2001; Massa, Tucci and Afuah, 2017). The BM concept in this study takes into consideration the value proposition and value capture as two of the main aspects of how a business functions. By ‘value proposition’, I refer to the perceived benefits that the business proposes to its customers, through offering a bundle of products and services (Nordin and Kowalkowski, 2010; Aversa *et al.*, 2015). Value capture or revenue model, on the other hand, focuses on how the business monetizes the proposed value and earns from its offering (Osterwalder, Pigneur and Tucci, 2005; Aversa *et al.*, 2015).

Contingency Theory

A system, simply put, “is a set of interrelated elements” (Tushman and Nadler, 1980, p. 37). An *open system* is one that also “interacts with its environment” (Tushman and Nadler, 1980, p. 37). Systems encourage a way of thinking in terms of connectedness, relationships and context (Capra, 1996). Systems theory, when used in the context of organizational studies, views organizations in terms of a system, a totality or a whole, made up of different but interacting components (Burke, 2002). At the most general level, businesses can be visualized as a system that takes input from its environment, and undergoes a series of processing and transformation based on that input in order to deliver its output (Tushman and Nadler, 1980). Business models also follow the same line of thinking. They are the visualization of a business, in the form of a system. They consist of different components that, despite being different, are all interrelated and can influence each other. With a system approach, business models are perceived as “open systems with varying levels of combinatorial complexity among subsystems” (Morris, Schindehutte and Allen, 2005, p. 729) that are influenced by their environment (*ibid.*). The arguments

on the influence of environment on BMs, based on the open system view, bring us to contingency theory. This is considered as a theoretical basis for studying BM changes in this thesis.

In this study, contingency theory follows the open system approach and views organizations as integrated systems that interact with their context and environment (Parastuty *et al.*, 2015). Central to contingency theory is the assumption that organizations change in response to altered contingencies (Ranson, Hinings and Greenwood, 1980). It emphasizes that the internal characteristics of organizations need to fit and match with environmental conditions in order to achieve good performance (Galbraith, 1974; Drazin and Van de Ven, 1985; Donaldson, 1987). Therefore, based on the systems approach to contingency theory, different contingency factors need to be considered holistically and simultaneously to study changes in organizations (Drazin and Van de Ven, 1985; Bucherer, Eisert and Gassmann, 2012). Contingency factors can be firm-specific, such as the organization's size, design, technology level, etc., or environment- and industry-related, such as the rate of the industry's technological changes, industry structure, economic conditions, regulations, etc. (Hofer, 1975; Donaldson, 1987; Greenwood and Hinings, 1988; Tushman and O'Reilly III, 1996; Pateli and Giaglis, 2005).

BM concept is closely aligned with contingency theory and, as Saebi (2015, p. 148) puts it, "business model literature has unequivocally ascribed the occurrence of business model change to disruptions in the firm's environment" (eg., Voelpel, Leibold and Tekie, 2004; Doz and Kosonen, 2010; Teece, 2010). Casadesus-Masanell and Ricart (2010) argue that contingencies lead to BMs departing from a company's initial intended strategy, which highlights the importance of contingency plans for businesses. It is imperative to pinpoint that contingency theory cannot necessarily be considered as one of the theoretical underpinnings of the BM concept per se, but as an important theory to consider when studying the changes in BMs in this study. Therefore, when studying the changes in BMs within the context of mature low-tech industries, the firm-specific and industry-related contingency factors will be taken into consideration.

Up until this point in the frame of reference, I have clarified the adopted view on BMs in this study. The next section will focus on exactly how the BMs, *as formal conceptual representation of businesses*, appear in this study.

2.1.3 Business Model Framework

“Finding the ‘right distance’ from which to assess a given business model is more an art than a science.” (Casadesus-Masanell and Ricart, 2010, p. 200.)

As Massa and Tucci (2013) nicely illustrate, the level of abstraction or granularity of BMs varies widely between scholarly works in this field. The level of abstraction can be detailed to the degree of perceiving BMs as systems of interdependent activities of the firm (Amit and Zott, 2001) or as abstract in considering BM to be a narrative (Magretta, 2002). However, despite this varying degree of depth, all BMs seem to be consistent when it comes to representing the interrelatedness of their elements (Aversa *et al.*, 2015). Business models have long been known for their applicability as a unit of analysis (Osterwalder, Pigneur and Tucci, 2005; Kindström, 2010; Lambert and Davidson, 2013). A complete business model, as per the adopted definition, can be too detailed and complex a representation to make an analysis possible. The job of an analyst is therefore to turn BMs into a simplified representation that facilitates their utility as a unit of analysis (Casadesus-Masanell and Ricart, 2010). According to Casadesus-Masanell and Ricart (2010), this is possible through aggregation and decomposition. By *aggregation*, they (*ibid.*) imply ‘zooming out’ from the details and claim that even though zooming out will blur the details, it makes the aggregation of those details clearer. *Decomposition*, on the other hand, means decomposing BMs into different groups or components that can also be analysed in isolation (Casadesus-Masanell and Ricart, 2010). As we know, the notion of using classifications and gestalts in analysis and theory building is nothing new in the literature (Greenwood and Hinings, 1988; Doty and Glick, 1994). Therefore, as the analyst of this work, I need to make certain choices in this regard. Given that I do not consider myself a good *artist*, I am fully aware that these choices are always associated with certain limitations, in terms of blurring the details or disregarding possible linkages.

Another reason for the popularity of the BM concept is its holistic perspective. This holistic view provides an integrated view of a firm’s activities, where its scope is not limited to the firm’s internal elements or external factors (Schnieder and Spieth, 2013). BMs are known for their boundary-spanning characteristics, which makes them an ‘attractive and slippery’ concept (Spieth, Schneckenberg and Ricart, 2014, p. 242). Business models can range from strictly firm-centric models to more network-embedded

types (Bankvall, Dubois and Lind, 2017). Their scope can even be as broad as circular economy business model considerations (Lüdeke-Freund, Gold and Bocken, 2019). This study perceives BMs as *firm centric*. The external scope of BMs in this study is limited to the relationship of the firm with its key stakeholders; that is, its owners, suppliers, partners, competitors and customers. It should be noted that when ‘relationship’ is mentioned, I refer only to firm-level relationships in the sense of connections and power dynamics in the industry (Osterwalder and Pigneur, 2010; Bankvall, Dubois and Lind, 2017). As a result, relationships at individual level are not the focus of this study.

Furthermore, business models can be descriptive (eg. Osterwalder, Pigneur and Tucci, 2005) or prescriptive (eg. Giesen *et al.*, 2007). The majority of prescriptive business model studies either argue for innovating BMs as a new source of competitive advantage (Chesbrough and Rosenbloom, 2002; Chesbrough, 2007) or focus on the phases involved in the process of BM innovation (Bucherer, Eisert and Gassmann, 2012). This thesis, however, does not have either of the aforementioned motivations. In this study, BMs will have a descriptive nature, and are viewed as conceptual snapshots, representing how the business functions at a given point in time (Demil and Lecocq, 2010). Hacklin and Wallnöfer (2012) argue that BMs are valuable templates for mapping the current situation of a firm. However, they believe that the role of BMs in developing strategic options is limited to being a symbolic artefact that stimulates the creative process, as opposed to being the type of analytical tool that provides a clear set of steps (Hacklin and Wallnöfer, 2012). I follow Hacklin and Wallnöfer’s (2012) argument with regard to the role of the BM as an analytical tool. The BMs in this study are structured and systemic descriptions of how organizations function, through depicting a set of interrelated components. They can also assist in visualizing certain external linkages and influences, which is limited to the scope chosen for the BMs in the study. As a result, their role as an analytical tool involves stimulating the creative thinking or decision-making of the analyst, by providing the possibility to see many aspects of the company at a glance. However, as also pointed out by Hacklin and Wallnöfer (2012), descriptive BMs – the view adopted in this thesis – do not act as the type of analytical model that provides precise normative guidance for the future strategic direction of the organization.

The above-mentioned positioning of BM in this study has laid the foundation for the next two sub-sections. Going back to the first discussions in this section, Casadesus-Masanell

and Ricart (2010) highlighted the importance of choosing the right distance and decomposition from which to assess a business model or, as others describe it, choose the level of granularity (Aversa *et al.*, 2015) or abstraction (Massa and Tucci, 2013) for a business model. This means deciding on the dimensions and components of the business model and from which distance the BMs in this study will be assessed. Demil and Lecocq (2010) argue that researchers tend to identify the components of BMs in two ways: *ex ante* or *inductive*. *Ex ante* is when authors choose to identify the main components of the BM in advance and then fill in the information about a specific company using these pre-defined components (Demil and Lecocq, 2010). One well-known example of an *ex ante* model is the BM canvas (Osterwalder and Pigneur, 2010). *Inductive*, on the other hand, is when the main components of a BM are extracted inductively, based on a real-life business. This is in line with one of the categorizations made by Massa, Tucci and Afuah (2017), who identified one of the major interpretations of BMs in the literature as *attributes of the real firm*. However, as already mentioned, this is not the view of BMs in this study. Demil and Lecocq (2010) further discuss that the benefit of the *ex ante* method lies in having a more consistent measure of changes across firms (Siggelkow, 2002). The *inductive* method, on the other hand, acknowledges the fact that not all firms share the same core or equally central components in their BMs (Demil and Lecocq, 2010). By combining the advantages of both *ex ante* and *inductive* approaches in identifying BM components, Demil and Lecocq (2010) propose a third approach. They specify only three core components of a BM, each of which can encompass several subsidiary elements that can be adjusted inductively on a firm-to-firm basis (Demil and Lecocq, 2010).

This study has also chosen to follow a similar approach to Demil and Lecocq (2010). The BMs in this study encompass three main *dimensions* which are identified *ex ante*, and the decision to arrive at them is discussed in the upcoming sub-section. Furthermore, each of the three main dimensions of a BM comprises several *components*. It should be noted that even though these components are also identified *ex ante*, they are all loosely defined. This is aimed at specifying the content of each of these components inductively in a case-specific manner, to acknowledge the fact that the same components are not “equally central or core in all the firms” (Demil and Lecocq, 2010, p. 231). The second sub-section below will focus on the components in each of the BM dimensions.

Business Model Dimensions

Similar to the work of Demil and Lecocq (2010), the BM literature includes many examples of authors introducing three main dimensions to their business models. Of course, the chosen labels vary, and they can be called core components, elements, dimensions, etc. In addition, depending on their adopted level of abstraction, the business models are either presented only in those three dimensions, or further broken down into sub-components as well. Table 2.2 summarizes selected classifications of BMs into three dimensions by different scholars. It is not safe to assume that all these classifications carry the same meaning. However, some of the recurring themes in these dimensions are the presence of *internal aspects* such as a firm's resources, processes, architectures, etc., the *proposition and delivery of value* and the *revenue models*.

The purpose of this thesis is to contribute to the body of knowledge in business model change studies, with a focus on mature low-tech industries. The Swedish wood manufacturing industry has been selected as an example of a mature industry in this thesis. To the best of my knowledge, the work of Brege, Stehn and Nord (2014) is one of the only BM constructs that has been used to study organizational change in this industry (Höök, Stehn and Brege, 2015). Their proposed three building blocks of a BM – operational platform, offering and market position – are in line with the general theme of literature in BM dimensions discussed above. 'Operational platform' consists of a company's competences and resources, as well as external complementary resources from suppliers/partners, and the way they are organized and used in the company (Brege, Stehn and Nord, 2014). 'Market position' describes the customer segments, the channels and the relationships through which the value proposition is communicated and delivered (ibid.). Lastly, the 'offering' block is, in a way, an intermediate block, connecting the resource-base from the operational platform to the market position (Höök, Stehn and Brege, 2015). Brege, Stehn and Nord (2014) conceptualize the offering block as a bundle of hardware, software and services, which – in combination with a revenue generation model – leads to a value proposition for customers. The three blocks in Brege, Stehn and Nord's (2014) BM construct are proposed based on the argument about the distinction between operational effectiveness and strategic positioning in doing business (Porter, 1996; Abrahamsson and Brege, 2004), with the operational block on one side and the market position on the other. In addition, although not entirely similar, the idea behind

Table 2.2: Selected classifications of BM into three dimensions

Authors	Identified Dimensions	Label	Level of Abstraction
Mahadevan, 2000	<ul style="list-style-type: none"> Value Revenue Logistical 	Streams	Each stream is broken down into several parts, adjusted according to the context of the study (e-business)
Gordijn and Akkermans, 2001	<ul style="list-style-type: none"> Business value Business process System architecture 	Viewpoints	Mainly abstract, with some implicit discussions on what each aspect includes
Lehmann-Ortega and Schoettl, 2005	<ul style="list-style-type: none"> Value proposition Value architecture Revenue model 	Components	Explicitly mentions the subsidiary elements of each component
Voelpel <i>et al.</i> , 2005	<ul style="list-style-type: none"> New customer value propositions Value network configuration Sustainable returns for stakeholders 	Basic generic elements	Abstract
Demil and Lecocq, 2010	<ul style="list-style-type: none"> Resources and competences Organizational structure Propositions for value delivery 	Core components	Each core component encompasses various subsidiary elements, but they are not explicitly labelled
Zott and Amit, 2010	<ul style="list-style-type: none"> Structure Governance Content 	Activity systems	Abstract
Yunus, Moingeon and Lehmann-Ortega, 2010	<ul style="list-style-type: none"> Value proposition Value constellation Profit equation 	Components	Explicitly mentions the subsidiary elements of each component
Mason and Spring, 2011	<ul style="list-style-type: none"> Technology Network architecture Market offering 	Core elements	Explicitly mentions the distinct dimensions in each core element
Brege, Stehn and Nord, 2014	<ul style="list-style-type: none"> Operational platform Offering Market position 	Building blocks	The components in each block are discussed, but are not explicitly labelled
Aversa <i>et al.</i> , 2015	<ul style="list-style-type: none"> Value creation Value delivery Value capture 	Basic elements	Abstract
Wirtz <i>et al.</i> , 2016	<ul style="list-style-type: none"> Strategic Customer and market Value creation 	Components	Explicitly mentions the models in each component

Authors	Identified Dimensions	Label	Level of Abstraction
Spieth and Schneider, 2016	<ul style="list-style-type: none"> • Value offering • Value architecture • Revenue model 	Dimensions	Explicitly mentions the elements in each dimension
Clauss, 2017	<ul style="list-style-type: none"> • Value creation • Value proposition • Value capture 	Dimensions	Explicitly labels sub-constructs of each dimension

Brege et al.'s (2014) proposed BM framework has a comparable line of thinking to the BM canvas proposed by Osterwalder and Pigneur (2010), in the sense that both frameworks consider value proposition to be the connecting point between the firm's resources/activities and its customers.

Considering the above discussions and the fact that the three building blocks are aligned with the view of this thesis on BMs, I opt to adopt operational platform, offering and market position as the main dimensions of the BM framework in this thesis. However, until now, these three dimensions have been used at quite an abstract level in previous studies (Brege, Stehn and Nord, 2014; Höök, Stehn and Brege, 2015; Lessing and Brege, 2015), by perceiving companies' BMs as only comprising these three dimensions. Due to the more firm-centric view of this thesis in using BMs as a tool to study organizational change, the adopted BM framework will feature a higher level of granularity. This will ask for specifying the components included in each dimension, which will be discussed in the next sub-section. Furthermore, when the framework is used in a more granular manner, it is deemed more appropriate to label the 'market position' dimension as 'market' instead. Because, the connotation of *positioning* that comes with the term 'market position', may risk misinterpretation in the meaning of this dimension.

Business Model Components

The main components of BMs have already been touched upon several times throughout this chapter. It should come as no surprise that there are a tremendous number of scholarly works suggesting the components of a BM. There are also a considerable number of literature reviews that have conceptualized or summarized these different findings. For example, based on their literature review, Morris, Schindehutte and Allen (2005, p. 727) summarize the most frequently cited components as "*value offering* (11), *economic model*

(10), *customer interface/relationship* (8), *partner network/roles* (7), *internal infrastructure/connected activities* (6), and *target markets* (5)". Moreover, Spieth and Schneider (2016) conceptualize their review of the literature and sort the components of BM into three main dimensions. First, the value offering dimension includes *value proposition*, *target customers* and *market positioning and competitive strategies*. Second, the value creation dimension comprises *core competences and resources*, *transactive and organizational structure*, *distribution logic*, *internal activities and value chain* and *external value creation network*. Finally, the third dimension is the revenue model, which is made up of a firm's *earnings and costs logic* (Spieth and Schneider, 2016). Fallahi (2017) concludes, after a systematic literature review, that *value proposition*, *value chain architecture* and the *profit model* deployed by the firm have emerged recurrently in BM literature. Lastly, Adrodegari and Saccani (2017) review other literature reviews in this field (Morris, Schindehutte and Allen, 2005; Al-Debei and Avison, 2010; Baden-Fuller and Mangematin, 2013; Wirtz *et al.*, 2016) and identify the most commonly cited BM components in the literature. These components, ranked in a descending order, are *value proposition*, *revenue model*, *customer*, *internal competences*, *internal processes*, *market*, *network*, *financing*, *strategy* and *channels* (Adrodegari and Saccani, 2017).

This short overview of BMs components in the literature makes it difficult to disregard one of the earliest works in this field. Osterwalder, Pigneur and Tucci (2005) carried out a review of literature, based on which they conceptualized nine main components of a BM, divided into four pillars. These components are *value proposition*, *target customer*, *distribution channel*, *relationship*, *value configuration*, *core competence*, *partner network*, *cost structure* and *revenue model* (Osterwalder, Pigneur and Tucci, 2005). It can be seen that, even including recent literature reviews, the recurring themes and elements in the BM components bear a close resemblance to the work of Osterwalder, Pigneur and Tucci (2005). These components, and later the BM Canvas proposed by Osterwalder and Pigneur (2010), have since been widely applied by both other academicians and especially practitioners. The adopted components of BMs in this study also follow this pattern closely. However, the components will be adjusted according to the context of the study, the stance of this thesis on BMs and how the adopted three main dimensions (i.e. operational platform, offering, and market) are conceptualized. Furthermore, as mentioned earlier, the components of the BM framework in this thesis are defined loosely

by a conscious choice, in order to acknowledge the differences in the centrality of elements across different firms (Demil and Lecocq, 2010).

Operational platform

- *Key resources*: Can be any key physical, human, technical, intellectual and financial resources (Osterwalder and Pigneur, 2010), as well as external complementary resources provided by suppliers/partners (Brege, Stehn and Nord, 2014).
- *Key activities*: The main groups of activities in the wood manufacturing industry are considered to be purchase of raw material, product design, setting prices for tenders/quotations (sales), manufacturing and product assembly (Hovgaard and Hansen, 2004; Nord, 2005).
- *Cost structure*: Can include the structure of fixed to variable costs and cost distribution considerations (Osterwalder and Pigneur, 2010). In this thesis, cost structure is also considered as part of the operational platform dimension, based on the assumption that this dimension is perceived as the input part of the model.

Offering

- *Products and services*: The actual products and services produced and offered by the company (Brege, Stehn and Nord, 2014).
- *Value proposition*: The total offering (mix of products/services) solving customers' problem, associated benefits (technical, economic, social) or favourable point of difference (Parasuraman, 1997; Anderson, Narus and van Rossum, 2006; Osterwalder and Pigneur, 2010).
- *Revenue model*: How and for what does the customer pay, whether the generated revenue is cost or value-driven (Osterwalder and Pigneur, 2010; Brege, Stehn and Nord, 2014).

Market

- *Customer segments*: The different customer segments the company serves and the distribution of these segments (Osterwalder and Pigneur, 2010; Brege, Stehn and Nord, 2014).
- *Key actors and relationships*: The key actors involved, based on the company's position in the market and the nature of relationships and power dynamics

between them and the company. Includes suppliers, competitors, customers, etc. (Osterwalder and Pigneur, 2010; Bankvall, Dubois and Lind, 2017).

- *Channels*: The channels through which customers are communicated with and reached (Osterwalder and Pigneur, 2010). This includes sales and marketing mechanisms.

Operational platform	Offering	Market
Key resources	Products and services	Customer segments
Key activities	Value proposition	Key actors and relationships
Cost structure	Revenue model	Channels

Figure 2.1: The adopted BM framework of the thesis

So far, the view of this study on BMs has been clarified and a BM framework, adjusted according to the purpose and context of the thesis, has been proposed. It is now time to move on to discussing how this framework can be applied to study BM changes.

2.1.4 Business Model Change

Demil and Lecocq (2010) consider BM to be a snapshot, at a specific point of time, of ongoing changes between its interconnected elements. According to Demil and Lecocq (2010), studying BM change can follow two different approaches, *static* or *transformational* (or, more commonly, *process*). The static approach follows the mindset of viewing BMs as blueprints (Osterwalder, Pigneur and Tucci, 2005), facilitating functions such as classification and description (Demil and Lecocq, 2010). The transformation approach perceives the BM as a tool or a concept, which is used to address the actual process of change or innovation, with a focus on either the organization or the BM itself (Demil and Lecocq, 2010). However, Schnieder and Spieth (2013) criticize the BM literature for not properly addressing the distinction between these two approaches. Interestingly, a few decades earlier, Pettigrew (1987) and Rajagopalan and Spreitzer (1997) made similar remarks about organizational change studies. In simpler terms, the static view focuses on the content of BM change, or the ‘what’, whereas the process view seeks to answer the ‘how’ question. There are, however, some scholars who argue that all change models implicitly include some elements of process as well (Burke, 2002). As can be deduced based on the view of BMs in this study, this thesis adopts a static view on BMs and will study change in the content of different BM components.

Based on their review of BM innovation literature, Foss and Saebi (2017) conclude that BMI is studied either as an outcome and its implications, or as a change process. Ahlgren Ode (2018, p. 36) adds that scholars in the former group mainly focus “on the content of the innovative BMs ex post”, while those in the latter group often explore the different phases in which BMI evolves over time (Ahlgren Ode, 2018). I argue that the focus on content in BM change studies can also point towards another type of finding. Studying chronological changes in the content of BMs (Wirtz *et al.*, 2016) can be used to reveal and understand the patterns in these BM changes. Outcomes of BM changes can be just one possible characteristic that surfaces in a study of BM change patterns. In fact, business models comprise several interrelated components that, when studying changes in their content over time, can provide valuable insights. As will be further explained in both the upcoming sections and the Methodology chapter, this thesis aims to study the content of organizations’ BMs at different points in time. By monitoring the changes in the content of BM components, patterns can be spotted both in changes taking place in one organization and across the companies within the industry. Another insight can be the study of contingency factors in the form of the antecedents and challenges of these BM changes (Bucherer, Eisert and Gassmann, 2012; Saebi, 2015; Foss and Saebi, 2017). The outcomes and consequences of change, on the other hand, are one possible pattern that may emerge. However, considering that the organizations on which this study focuses are currently undergoing changes, it may not be completely clear and safe to link these changes to certain outcomes.

Demil and Lecocq (2010, p. 228) argue that “the static view of a business model allows us to build typologies”. This is due to the intuitive ability of static models to explain holistic and complex phenomena within organizations (Doty and Glick 1994). Table 2.3 summarizes selected typologies in BM literature on change and innovation. These typologies are then compared in terms of degree of novelty, that is, whether the BM change or innovation is defined as newness to the firm, to the industry or to the market, etc. (Fallahi, 2017; Foss and Saebi, 2017). These different typologies are also compared in terms of the level of abstraction, that is, whether the view on BMs in those studies was highly abstract or accompanied by a proposed BM construct. As can be seen in Table 2.3, the degree of novelty varies widely between these different proposed typologies. Some scholars characterize all the different types of BMs in their typology based on the same

degree of novelty (i.e. all different BM change types are within the novelty of only newness to the firm or the industry), whereas others consider degree of novelty to be one of the aspects that distinguishes one type of BM change from another. Furthermore, when it comes to level of abstraction, all of these typologies – with the exception of Chesbrough (2007) and Aversa *et al.* (2015) – provide a very generic definition of BM. It is notable that even though Chesbrough (2007) and Aversa *et al.* (2015) touched upon the components of BMs in their studies, they explain very little about the role of these components when characterizing the different types of BM change/innovation. This observation is also congruent with Adrodegari and Saccani's (2017, p. 17) claim that "the differentiation among different BM types, when present, generally refers to aspects perceived by the customer (the Value proposition and the Revenue components), but it is not illustrated through the internal and network organization, resources and capabilities". Furthermore, providing an only abstract conceptualization of BMs makes it difficult to measure different types of BM change/innovation, hence the existence of very few scholarly works with a focus on measuring BM innovation (Spieth and Schneider, 2016; Clauss, 2017).

Fallahi (2017) carried out a similar review of literature in her work, but on different BMI conceptualizations. She compared the BMI conceptualizations based on how they are positioned with regard to novelty, outcome and scope. The novelty in these BMI conceptualizations was only new to the firm, the industry or the market. According to Fallahi's (2017) conceptual review, the outcome of BMI is either replacing an old BM or working in parallel with two BMs or, as it is also known, a BM portfolio (Kindström, 2010; Karimi and Walter, 2016). Finally, the scope of BMI based on this review can range from changes in only one element to changes in some or all elements of the BM. This is yet another illustration of how ambiguous the definition of BMI is. Furthermore, the overlap and unclear distinction between the terms 'change' and 'innovation' in this literature adds to the level of this ambiguity. Given the degree of novelty and scope of several of these BMI conceptualizations, one can also simply address them as BM change.

Considering the contextual focus of this thesis on BM change in mature and not technologically advanced industries, the BM change will be positioned as follows. The degree of novelty in all types of BM change in this study will only be newness to the firm. The scope, however, can range from changes in one component, or only one dimension,

to changes in all three dimensions of the proposed BM framework. This is aimed at facilitating a more systemic view of change in the organization, in order to better identify the change patterns. In addition, this thesis aims to address one more dimension in BM change, which is the degree of change in the BM components. As Cavalcante, Kesting and Ulhøi (2011, p. 1330) put it: “Not all changes lead to a change in the business model, however. If this were the case, then the business model concept would lose its model properties.” It is not, of course, an easy task to identify how big a change is big enough to be characterized as a BM change, but this issue can be addressed better by looking at organizational change literature and this will be discussed in the next section.

Table 2.3: Selected typologies of the Business Model in the literature

Authors	BM Typologies	Focus Area	Short Description	Novelty	Level of Abstraction
Linder and Cantrell, 2000	<ul style="list-style-type: none"> • Realization • Renewal • Extension • Journey 	BM change	These different types of change models range from realization, that is realizing the fullest potential of the current model, to journey, that is when the company moves to a completely new model and never goes back. The measure of these changes is the degree to which the model deviates from the core logic of the firm.	Firm	Each change model comes with its own different components
Chesbrough, 2007	<ul style="list-style-type: none"> • Undifferentiated • Some differentiation • Segmented • Externally aware • Innovation process integrated • Adaptive platform 	BM innovation	The six types of BM range from a generic BM that many other competitors share, to a fully adaptive platform where key suppliers and customers become a partner in the process. The adaptive platform BM is often used by small start-ups, internal incubators, spin-offs and joint ventures.	Industry	<u>BM with six components:</u> Value proposition Target market Value chain Revenue mechanism Value network Competitive strategy
Giesen <i>et al.</i> , 2007	<ul style="list-style-type: none"> • Industry • Revenue • Enterprise 	BM innovation	Industry model innovates by moving into a new industry. Revenue model innovates by changing the way the firm generates revenue. Enterprise model innovates by changing the role the company plays in the value chain.	Industry Market	Abstract

Table 2.3: Selected typologies of the Business Model in the literature (cont.)

Authors	BM Typologies	Focus Area	Short Description	Novelty	Level of Abstraction
Cavalcante, Kesting and Ulhoi, 2011, pp. 1331–1334	<ul style="list-style-type: none"> • Creation • Extension • Revision • Termination 	BM change	<p>BM creation: “Materialization of a business idea into a new venture”.</p> <p>BM extension: Adding activities and/or expanding existing core processes.</p> <p>BM revision: Removing something that modifies an existing BM and replacing it with a new process.</p> <p>BM termination: Abandoning/removing processes, closing down a business area, unit or entire company.</p>	<p>Firm</p> <p>Individual business unit</p>	Abstract
Bucherer, Eisert and Gassmann, 2012	<ul style="list-style-type: none"> • Incremental innovation • Market breakthrough • Industry breakthrough • Radical innovation 	BM innovation	<p>Categorization of BM innovations according to degree of innovativeness. Ranging from incremental innovations limited to firm, to BMs new to industry, market or both.</p>	<p>Firm</p> <p>Industry</p> <p>Market</p>	Abstract
Schnieder and Spieth, 2013	<ul style="list-style-type: none"> • BM development • BM innovation 	BM adjustments	<p>They argue that BM development has more of an RBV, and dynamic capabilities view and focus on adjustments to the existing BM. BM innovation has a strategic perspective and focus on the exploration and exploitation of environmental opportunities.</p>	<p>Firm</p> <p>Industry</p>	Abstract
Aversa <i>et al.</i> , 2015	<ul style="list-style-type: none"> • Splitting • Substituting • Augmenting • Inverting • Excluding • Porting 	BM change	<p>By considering BMs as a simple representation of a modular design, they come up with six different modular operators. An argument inspired by examples from technology design literature, on six different ways that changes can be introduced to BMs.</p>	Firm	<p><u>BM with three elements:</u></p> <p>Value delivery</p> <p>Value creation</p> <p>Value capture</p>

Table 2.3: Selected typologies of the Business Model in the literature (cont.)

Authors	BM Typologies	Focus Area	Short Description	Novelty	Level of Abstraction
Osiyevskyy and Dewald, 2015	<ul style="list-style-type: none"> • Defiant resistance • Pure exploitation • Integration • Pure exploration 	BM change	<p>Typology of incumbent firm responses to emerging disruptive innovations. They come up with four different response scenarios based on combinations of two BM change intentions: 1) Explorative adoption of disruptive approach. 2) Exploitative strengthening of existing approach. They define incremental innovating as 'pure exploitation' and adoption of the new approach as 'pure exploration'.</p>	Firm	Abstract
Saebi, 2015	<ul style="list-style-type: none"> • BM evolution • BM adaptation • BM innovation 	BM change	A distinction is made between different types of BM change in terms of scope and frequency of change, degree of radicalness and novelty, and planned outcome.	Firm Industry	Abstract
Foss and Saebi, 2017	<ul style="list-style-type: none"> • Evolutionary • Focused • Adaptive • Complex 	BM innovation	<p>Their typology is in the form of a matrix, with scope on one dimension and novelty on the other. The scope is divided into modular and architectural, and novelty into new to firm and new to Industry. The four BMI types are the result of these combinations, with evolutionary on one side of the extreme and complex on the other.</p>	Industry Firm	Abstract

2.2 Organizational Change

“To understand organizational change, one must first understand organizational inertia, its content, its tenacity, its interdependencies.” (Weick and Quinn, 1999, p. 382.)

Organizational change can be defined as a “change in how an organization functions, who its members and leaders are, what form it takes, or how it allocates its resources” (Huber *et al.*, 1993, p. 216). BM concept and organizational change literature share a lot of common ground, to which insufficient attention has been paid at times. Organizational change requires system thinking (Maes and Van Hootegeem, 2011). Citing Capra (1996), Burke (2002) lists the primary criteria for system thinking as:

- Systems are integrated wholes, having properties that none of the components have on their own.
- Systems nests within other systems.
- “A part of a system is actually ‘a pattern in an inseparable web of relationships’” (Capra, 1996 as cited by Burke *et al.*, 2007, p. 52).

Furthermore, Rajagopalan and Spreitzer (1997), in their review of literature on strategic change, classified their findings into two schools of *content* and *process*. They (*ibid.*) argued that the content school refers to antecedents and consequences of change, or in other words, the ‘what’. The process school, on the other hand, takes a more change agent perspective and focuses on the role of managers, or ‘how’ they implement the organizational change (Rajagopalan and Spreitzer, 1997). They also criticized the literature of these two schools, claiming that they have evolved empirically, distinct from one another, without much concern for their theoretical synergy (Rajagopalan and Spreitzer, 1997; Burke, 2002). This is in line with the arguments put forward by Pettigrew (1987) a decade earlier, claiming that an adequate study of strategic changes in organizations should take into account the three elements of content, process and context simultaneously. He discussed that “formulating the content of any new strategy inevitably entails its context and process” (Pettigrew, 1987, p. 657). Moreover, Burke (2002) posits that organizational change models can be used to address the separation of content and process schools, since change models implicitly or explicitly carry some elements of process as well (Burke, 2002). He defines ‘model’ as “conceptual model, in other words, frameworks and ways of thinking that emanate from theory” (Burke, 2002, p. 175). Burke

(1994) discusses the usefulness of organizational models in terms of their use in enabling categorization, enhancing understanding about the organization and helping to interpret data about it. However, he (ibid.) further adds that as useful as organizational models can be, it should be kept in mind that they are only as good as their selected components and how these components relate to one other (Burke, 2002). Therefore, deciding on the right components of organizational models carries considerable weight. As can be seen from the above discussions, the stances taken in the field of organizational change have a close similarity with arguments made in BM and BM change literature. They both follow a system thinking approach, and both literatures attract similar criticism with regard to separation of content and process in change studies. In addition, organizational change models are comparable with business models when it comes to arguing in favour of their roles as *models*, in understanding how a business functions.

There have been many attempts to propose organizational change models in the literature, some of which share a similar line of thinking with the notion of BM. For instance, Tushman and Nadler (1980) propose a congruence model for diagnosing organizational behaviour consisting of three main dimensions of inputs, transformation process and outputs. They (ibid.) consider the inputs to be resources, environment and history. The transformation process dimension comprises individual, task, informal organization and formal organizational arrangements. Finally, the last dimension is divided into organizational, group or individual outputs (Tushman and Nadler, 1980). They argue for the interrelatedness of all these dimensions and components, and take into account the mediating role of strategy in turning inputs into transformation processes. Tushman and Nadler (1980) also touch upon the importance of identifying boundary rules for the drawn systems. Another interesting observation is the assumptions introduced by Drucker (1994) on what he labeled as “the theory of the business”. He proposed a set of assumptions about how a firm can prosper in a certain environment or marketplace, and argued that they shape an organization’s behaviour. His theory had three main parts: 1) Assumptions about an organization’s external environment such as its customers, technology, market and structure, 2) assumptions about an organization’s purpose and mission, and 3) assumptions about an organization’s core competencies and skills needed to achieve the purpose (Drucker, 1994). These parts bear a close resemblance to the BM concept, albeit leaning closer towards the cognitive perspective of BMs.

As also pointed out earlier by Cavalcante, Kesting and Ulhøi (2011), BM can be a useful tool for studying organizational changes, considering their alignment with the change models in this field and their holistic view, which can be argued to be more systemic and comprehensive than many other proposed organizational change models. The majority of these traditional organizational models do not take into account important components such as value proposition or revenue models.

2.2.1 Change Dimensions

Change can be studied from many different dimensions, most of which have been largely addressed in the literature. However, there seems to be no general agreement on the attributes that describe these different dimensions (Maes and Van Hootegem, 2011). This has led to confusion in the understanding and use of change terminologies. To take few examples, change can be studied from a *mode* dimension, that is whether changes are planned/prescribed or emergent/constructive (Mintzberg and Waters, 1985; Van de Ven and Poole, 1994; Maes and Van Hootegem, 2011). They can have a focus on the *role of change* agent (Kang, 2015) and the approach followed by these change agents during the change process. The different *phases* of change may be the focus of a study, where one famous example is Lewin's (1958) proposed three change phases of unfreeze, movement and refreeze. The *frequency* of changes can also be studied, and whether these changes are continuous or discontinuous (Tushman and O'Reilly III, 1996; Maes and Van Hootegem, 2011).

When it comes to this thesis, the dimensions of change to be studied need to fit the purpose and the context of the research. Considering that BMs will be the tool by which to study organizational changes in a specific context, this study takes a firm-level approach to studying BMs. This means that the individual and cognitive aspects, such as the role of change agents or studying changes on an individual level, will not be primary concerns in this thesis. Furthermore, due to the adopted static view on BMs in this thesis, the process of change will not be explicitly studied either, taking away the process-related dimensions of change such as studying different phases of change. However, as will be elaborated on in more detail in the Methodology chapter, through studying changes in the *content* of static BMs over a period of time, certain change *processes* can covertly emerge. In addition, *activities* as one of the proposed components of the BM framework in this

thesis, when studied over a period of time, can also implicitly shed light on some change processes.

The holistic and systemic nature of BMs allows us to study more than one change dimension through them. In this thesis, one dimension of change to be studied will be the *scope* of change – that is– the level of the impact of change (Burke, 2002; Maes and Van Hootehem, 2011). In the case of BM change, the scope indicates the areas that are affected by change (Saebi, 2015). Whether the change will be limited to a few components, an entire BM dimension or perhaps all three dimensions of BM will be affected by the change. The second change dimension in this study will focus on the *degree* to which these BM components are affected by change or, as Maes and Van Hootehem (2011) label it, the *stride* of change. This dimension seeks to answer the question of how big a change has taken place in each of the BM components, and whether this relates to adjustments to these components or a complete renewal of these areas. It is important to make a distinction between the stride of change and the speed or tempo of change, since the stride is about the magnitude of the change, whereas the speed of change is about how quickly or slowly the change has taken place (Maes and Van Hootehem, 2011). The latter is not the focus in this study, considering that the study focus is on mature low-tech industries where the changes are not generally fast-paced. Finally, studying organizational changes through BMs also assists when learning about another dimension of change, that is the *means* of change (Tosey and Robinson, 2002). The means of change relates to the way in which the organization has carried out the change – whether it was through a focus on the Activities component of the BM, the whole operational platform, only the value proposition, etc. However, it should be noted that the *means* dimension is not the primary focus and is more of a possible by-product of the findings from the first two dimensions. The next section will further discuss the different attributes of change in the above-mentioned change dimensions.

2.2.2 Attributes of Change

Before proceeding to discuss the attributes of change dimensions that are the focus of this study, the overlap between change and innovation literature needs to be mentioned once more. In a lot of cases, the distinction between these two concepts has not been made clear. Furthermore, what characterizes innovation can be very different based on the

context applied, and the same characterization may even be labelled as change by another scholarly work. Certain terminologies such as incremental change/innovation or radical change/innovation are also used interchangeably between the two concepts, without clearly distinguishing between their differences. However, as previously stated, the context of this thesis is mature low-tech industries, where the changes taking place may not necessarily be high-tech, ground-breaking or fast-paced. Even though the companies active in this industry undergo many changes, it would not be deemed prudent to consider them all as innovation. There would also be a risk of overlooking valuable insights about changes in these companies, only because they cannot be characterized as innovation. It can be argued that innovation is one of the ways to undergo changes in an organization (Smeds, 1997), but this makes change a more encompassing concept that is the core emphasis in this study. However, it should be noted that the innovation literature has also contributed to building the frame of reference in this thesis.

There are not many other studies that have applied the notions from organizational change literature to BM change in a similar manner to this work. Therefore, there is a need to adjust the change attributes to the concept of BM change in this thesis. The first dimension which will be studied is the *scope* of change. When discussed in the context of organizational change, scope refers to the level of impact of change on the organization (Maes and Van Hootegem, 2011). The scope of change can be limited to certain changes in different sub-units where the functionalist vision of the organization remains intact (Collins, 1996). It can also be to the extent of a complete transformation, affecting the overall routines and functions of the organization (Tosey and Robinson, 2002). Following this line of thinking, when the scope dimension is addressed within the context of BM change, I refer to whether the changes are focused on one or only a few components of the BM, or whether they affect most of the company's BM components (Saebi, 2015; Fallahi, 2017). For a better understanding of the scope dimension of change in this study, I chose to adopt the notion of orders of change, as proposed by Kimberly and Nielsen (1975). They (ibid.) refer to orders as "the level of the ultimate target for change" (Burke, 2002, p. 105). The first-order change is when the change is focused within a subsystem of the organization (Kimberly and Nielsen, 1975). Second-order change indicates a wider scope, extending to other subsystems beyond the initial focus. This takes place when other subsystems will be affected when the initial change is carried out (Kimberly and Nielsen,

1975; Burke, 2002). In other words, there are changes in other components as a consequence of change in one component. Lastly, third-order change influences an entire system. It is affected by multiple factors or is a result of a chain of sequential factors (Kimberly and Nielsen, 1975). It is more complex, and no single first-order or perhaps even second-order change can lead to it singlehandedly (Burke, 2002).

The second change dimension under the focus of this study is the *degree* of change. That is, the magnitude, or how big a stride the change is (Maes and Van Hootegeem, 2011). The scholars in organizational change literature have used a wide variety of terms to describe the different degrees of change. Despite a few exceptions suggesting three different degrees (eg., Watzlawick, Weakland and Fisch, 1974; Golembiewski, Billingsley and Yeager, 1976), the majority take a dichotomist approach, only proposing the two extreme sides of the degree of change. *Incremental* change is one of the most commonly used terms for describing the small adjustments and refinements made in the organization (Maes and Van Hootegeem, 2011). Sometimes, terms such as first-order (Watzlawick, Weakland and Fisch, 1974) or alpha change (Golembiewski, Billingsley and Yeager, 1976) are also used to refer to this type of change. Tushman and O'Reilly III (1996) argue that incremental changes facilitate the desired congruence and fit in organizations. Incremental changes involve variations that occur within an existing state or system, and that keep the system itself unchanged (Watzlawick, Weakland and Fisch, 1974; Golembiewski, Billingsley and Yeager, 1976). "Incremental change is based on precedent; it is intended to do more of the same but better." (Kindler, 1979, p. 476.)

Consequently, the opposing side to incremental change in organizational change literature refers to changes of greater magnitudes. This type of change is commonly labelled as *transformational* or *revolutionary* change by the scholars in this field (eg., Kindler, 1979; Romanelli and Tushman, 1994; Tushman and O'Reilly III, 1996; Tosey and Robinson, 2002). However, as Maes and Van Hootegeem (2011) rightly argue, revolutionary change mostly carries the elements of process while transformation is more related to the content of change. I also follow this reasoning, and considering the focus on the content of change in this study I will only use the term 'transformation' from now on. Transformational changes are characterized by reconceptualization or redefinition of some domain (Golembiewski, Billingsley and Yeager, 1976), complete changes and renewals to the whole system (Watzlawick, Weakland and Fisch, 1974), or major restructurings and

frame-breaking changes in organizations (Maes and Van Hootegeem, 2011). It is argued that organizational transformations are possible through either incremental or radical and discontinuous changes (Greenwood and Hinings, 1996), considering that incremental changes can be cumulative (Maes and Van Hootegeem, 2011).

However, when adjusted to the context of BM change in this study, I refer to the degree of change taking place within each of the BM components. I intend to understand the magnitude of change in the components of an organization's BMs between different points in time. Due to a lack of sufficient theoretical support in organizational change literature for varying degrees of change in the form of a spectrum, this study also limits the degree of change to its two extremes; that is, whether changes are incremental *refinements* of components or complete *renewals* (Maes and Van Hootegeem, 2011). Of course, I am fully aware that the degree of changes usually falls somewhere in between these two extremes. In addition, this parsimonious decision is also aimed at keeping the study of BM changes simpler and less complicated, considering that BM changes will be studied from both dimensions of *scope* and *degree* in this thesis. The Methodology and Analysis chapters will demonstrate the applicability of discussions presented in the frame of reference in a more palpable manner.

As discussed in the problem statement, the BM changes will be studied under a specific context in this thesis. This context is mature low-tech industries, which will be discussed further in the next section.

2.3 Mature Low-tech Industries

Traditionally, a large amount of scholarly work has been dedicated to studying the characteristics of various stages in product and industry life cycles (e.g., Dean, 1950; Utterback and Abernathy, 1975; Williamson, 1975; Abernathy and Utterback, 1987; Klepper, 1997). Several terms and varying numbers of stages have been identified to describe these cycles of industry evolution. However, the basic idea behind all of these scholarly works essentially boils down to describing the industry cycle as starting with an introduction stage, followed by a period of high growth which, according to some scholars, may be followed by a period of shakeout when the weaker companies are forced out of the industry (Drew, 1987; Utterback and Suárez, 1993; Klepper, 1997). After the shakeout, the industry will finally reach a period of maturity and stability. The maturity

stage will normally last for a long time and may be followed by an eventual decline (Levitt, 1965; Klepper, 1997). Industries at the maturity stage are generally divided into two groups of low- and high-tech industries in terms of the rate of their technological change (Lei and Slocum, 2005). As explained earlier in the Introduction chapter, this distinction is also made based on the percentage of R&D investment compared to the total turnover of companies active in the industry (OECD, 2011). The contextual focus of this study is on mature low-tech industries.

As can be expected, not all scholars are in exact agreement on how mature low-tech industries are characterized. However, certain themes recur in scholarly works within this field. The companies active in mature industries are typically known to be well-established, with an average age of more than 50 years (Utterback and Suárez, 1993; Williams *et al.*, 1995). They are usually composed of a few large, incumbent firms and many SMEs (Utterback and Suárez, 1993; Flammini *et al.*, 2017). Even though it is still possible for markets in these industries to grow, their growth tends to be at a more predictable and regular rate. As a result, large shifts in market shares are uncommon (Williamson, 1975). There is a typical tendency in mature industry companies to seek cash flow rather than growth in market share (Hambrick, 1983b). According to Utterback and Suárez (1993), survival is recognized as a basic goal for companies in these industries. Moreover, the offered products and services tend to be known in the market and familiar to users (Hambrick, 1983a; Drew, 1987; Audretsch and Feldman, 1996). There are few opportunities for product differentiation in mature low-tech industries (Lei and Slocum, 2005). These products and services are the result of established dominant designs in the industry, and the ability to deliver high quality products or services is positively correlated with firms' performance (Abernathy and Utterback, 1987; Utterback and Suárez, 1993).

Audretsch and Feldman (1996) characterize mature industries as those where larger companies have a higher propensity and advantage to innovate. Others argue that innovation is more likely to come from later entrants (Klepper, 1997), smaller firms or those active in other industries (Utterback, 1974). The mature industry literature generally seems to have a high degree of overlap with manufacturing industries. Table 2.4 summarizes selected viewpoints on the characterization of mature low-tech industries, in terms of innovation and manufacturing practices. As can be seen from the table, the

significance of advancements and refinements in manufacturing practices and technologies are highlighted in most of these works. Having standardized and linear workflows, specialized machineries and process innovations are recognized as the characteristics of companies in mature industries. As for innovation, it appears to be generally believed that, unlike the growth stage, there is a shift in focus from major innovations in the offered products and services in maturity. Instead, innovations tend to be mainly geared towards improvements in internal operations and only refinements in the product or service offerings.

Another aspect that can be used when characterizing mature low-tech industries is their underlying structure. Quite an old model, but still very relevant, is Porter's five forces which can be used to identify the structure of an industry (Porter, 1980). He identified competition intensity of the industry, threat of new entry, threat of substitutes, the power of suppliers and the power of customers as the five main indicators when characterizing an industry (Porter, 1980). In Table 2.5, this model is applied to characterizing mature industries, with the help of selected literature. As can be understood from the table, the competition in mature industries seems to be at a stable and collaborative stage, having price as the main basis of competition. As a result, this means low profit margins for the industry actors. The threat of new entries is low, considering the unattractiveness of the industry due to low profit margins and possible capital, technology and knowledge barriers. These claims, however, can be compared with Klepper's (1997) and Utterback's (1974) arguments regarding the role of new and contemporary firms, or those from other industries, in bringing innovation possibilities into mature industries. With regard to suppliers and customers, it is believed that established connections with both exist in mature low-tech industries, and all these actors are familiar with their roles and positions in the industry structure.

When studying BM changes in mature low-tech industries, it is imperative to be familiar with industries' characteristics. This familiarization can be beneficial in two ways. First, it facilitates an understanding of what the BMs in these industries would typically look like, i.e. BMs with a high focus on the quality and performance of their *operational platform* dimension. The cost structures in these industries have a high ratio of fixed costs (Lei and Slocum, 2005). *Offerings* are usually in the form of a wide range of well-established products and services, to which – aside from minor refinements – no major

value is added. Revenue models are cost-based and competitively priced with low profit margins. Lastly, the *market* dimension usually has established and long-term actors. No major change in terms of customer segments and marketing or sales channels takes place, due to the high focus of innovations on the internal operational aspects of the companies. The second way in which understanding the characteristics of mature industries can be helpful when studying their BM changes is in terms of getting an insight into the important contingency factors. As previously discussed, the contingency factors can be both firm- and environment-specific, such as the firm's size and design, the rate and types of technological developments in the firm and its industry, the industry structure in terms of competitors, new entries, substitutes and customers, and changes in the economic conditions and regulations (Hofer, 1975; Donaldson, 1987; Greenwood and Hinings, 1988; Tushman and O'Reilly III, 1996; Pateli and Giaglis, 2005). The results of a study conducted by McGahan and Porter (1997) show that industry- and business-specific effects both played a role in the profitability of U.S. public corporations. Hambrick (1983a, p. 702) argues that "the characteristics of an environment limit the range of maximally feasible strategies" that a company can pursue. As a result, not all the generic strategies can be claimed to be equally viable within an industry (Hambrick, 1983a).

When studying organizational changes, internal and external contingency factors can play an important role, in terms of being both the antecedents and the moderators of these changes (Raisch and Birkinshaw, 2004; Wezel and Saka-Helmhout, 2005; Nybakk *et al.*, 2009; Waldner, Poetz and Grimpe, 2015). However, the scope and nature of this thesis makes an in-depth study of moderators of change difficult. Instead, in this work the antecedents and challenges of the organizational changes will be studied. Studying change challenges will help with understanding how and which contingency factors may have had a role in imposing these challenges. This approach has also been previously applied by Bucherer, Eisert and Gassmann (2012) and Foss and Saebi (2017) in BM innovation studies.

Based on all the discussions that took place in this chapter, the next section will conclude the frame of reference by proposing the thesis' model of analysis (MOA).

Table 2.4: Selected viewpoints on characteristics of mature low-tech industries

	Williamson, 1975	Hambrick, 1983b	Abernathy and Utterback, 1987	Williams <i>et al.</i> , 1995	Audretsch and Feldman, 1996	Klepper, 1997	Lei and Slocum, 2005	Flammini <i>et al.</i> , 2017
Innovation/ innovativeness	Fewer significant innovations, which mainly tend to be in the form of improvements.		Nature of innovation changes from fundamental changes to the product and refinements of established designs. Continued developments in companies, but by substituting technological diversity with standardization.		The geographical concentration in production of companies in the studied mature industries increased the dispersion of innovative activities, due to the trivial cost of transmitting standardized information.	Less significant product innovations and a rise in process innovation instead.	Continued improvements in process technologies.	New technologies bring a high degree of uncertainty to mature industries
Manufacturing/ operations	Reaching an advanced degree of refinement in manufacturing, management and marketing in mature industries.	Companies in mature industries typically do not undertake major inventory build-ups and capacity expansions that reduce their cash flows.	Rationalized, integrated and linear workflow on the process side of operations. Skilled workers and general-purpose machines are replaced by highly specific equipment. Increased production volumes. Processes and performance criteria are more clearly specified.	Manufacturing function's quality plays a key role in the performance of companies in mature industries.	Routinized technological regime in mature stages of industry life cycle.		Sophistication of operations and logistics. Focus on cost-driven efficiencies. Tendency to utilize standardized platforms, technologies and operating systems.	

Table 2.5: Characterizing mature industries based on Porter's Five Forces

	Utterback, 1974	Audretsch and Feldman, 1996	Williams <i>et al.</i> , 1995	Klepper, 1997	Drew, 1987	Hambrick, 1983b	Weiss, 1997	Lei and Slocum, 2005
Competition		Large competitors that are geographically concentrated transmit knowledge and innovations between one another.		Competition shifts from technology to price. Profit margins decline.		Stable competitive structure. Basis of competition is low price and reliable delivery.	High number of mergers and acquisitions. Thus, lower number of actors in the industry.	Well-established competitors
New entry		Innovative advantage of large firms creates innovative disadvantage for newcomers.	Existence of technology and capital barriers.	Codified knowledge and low R&D barriers, but low profit margins make entry unattractive.	Market shares are established, making it difficult for newcomers.			
Customers		Well-known nature of demand.		Established connections with buyers	Products are known to the buyer. Buyers know what to look for	Products and services familiar to the majority of users.		Knowledgeable customers
Suppliers				Established connections with suppliers	Products are known and familiar to the supplier. Suppliers are aware of the needs of the market.			Long-term relationship with suppliers
Substitutes	Firms in other industries bring the innovations to the mature industry.							

2.4 The Model of Analysis

In this chapter, the view of this thesis on BMs has been discussed and the BM framework which will be used in this study has been introduced. Furthermore, the position of this thesis on what constitutes a BM change in terms of its novelty and scope has been clarified. It was then discussed how BMs can be used as a model to study organizational change and how the organizational change literature can be a viable source with which to explain different types of BM change. Next, it was clarified that only changes in the content of BM components will be the focus of this study. The organizational change literature was then used to identify the change dimensions which will be studied in this work, namely the scope and degree of BM changes. Therefore, in this study, the BM changes of selected companies will be measured and analysed in terms of the scope and degree of their changes. Consequently, this will lay the foundation for understanding the different types of BM changes that have taken place in this industry. The patterns in different types of change can assist when characterizing and proposing a possible typology of BM change.

Lastly, in the previous section, the characteristics of mature low-tech industries were reviewed. It was argued that when a study is context-specific, recognizing the contingency factors that may influence BM changes can be a valuable contribution. Finally, it was clarified that the study of contingency factors in this thesis will be limited to identifying the internal and external antecedents and challenges of organizational changes. Based on these discussions, this thesis will follow the model of analysis presented in Figure 2.2.

Figure 2.2: The Model of Analysis

3. Methodology

This chapter focuses on the methodological considerations of this thesis. It provides a brief background on my journey as a PhD student and the research approach followed in this thesis. It then discusses the selected method of research, data collection, and explanations about how the empirical data was analysed in this study. The chapter concludes with reflections on the limitations of this study, their consequences and measures taken to ensure the quality of this research.

3.1 The PhD Journey

In this section, I aim to briefly describe the activities that I have carried out in my five years as a PhD student, and how each of them eventually contributed to this PhD thesis. A big part of the section focuses on the Bioinnovation project that I have been collaborating with during my time as a PhD student.

The Licentiate Thesis

The first one and a half years of my PhD studies were spent on my licentiate degree. Even though my field of study during my licentiate period was not entirely relevant to my PhD

research, it had been a great contributor to the final result of my work. I passed around 70% of my course requirements for completing a PhD degree during that period. I have also familiarized myself with the process of writing a PhD thesis and its methodological considerations while writing my licentiate thesis. My licentiate thesis had a broad area of focus and looked at organizational relationships at all three levels of individual, firm and network. The takeaway point from that experience was the decision to focus only on firm-level relationships for the rest of my PhD work.

Bioinnovation Project

Project: Part 1

From March 2016, together with my co-supervisor, I started collaborating with the Bioinnovation project within the wood industry. This was a small part of a Vinnova-funded project in association with other entities such as Luleå University and the industry association Swedish Wood, as well as several wood manufacturing companies in Västerbotten County in Sweden. The project lasted for a total of two and a half years, and our collaboration was officially finalized in January 2019. We participated in two parts of the project.

The *first part* focused on studying e-commerce possibilities within the small companies involved in the project. However, this changed course over time and came to have a broader focus on changes and digitalization possibilities in general. Our contribution to this first part of the project, for which my co-supervisor was the main author, was providing an industry report. The report was a description of the industry structure, its key figures in different segments and the current trends of change. As the co-author, I contributed by preparing and updating the industry figures and some of industry trends in this report. The industry trends for the project's report were taken from several relevant online sources on wood manufacturing, such as the Swedish Forest Industry Federation, the Swedish Construction Federation, the Swedish Federation of Wood and Furniture Industry and NTT Woodnet News. My contributions towards this industry report played a positive role for me in developing an understanding about the wood manufacturing industry, which had been a completely unknown area for me prior to 2016. It has also been a valuable source when writing the empirical chapter of this thesis.

Project: Part 2

My co-supervisor and I also took part in the second part of the Bioinnovation project, alongside Swedish Wood and Luleå University. This part focused on understanding consumers' preferences for use of wood, especially pine, in interior design and furniture. The project started with a set of ten informal pre-study interviews conducted by each of us, with our family, friends and acquaintances. This aimed to provide an overall idea of consumer preferences and inspiration for designing a questionnaire. A detailed questionnaire was then devised over the course of one and a half years. There monthly (mainly Skype) meetings were held during this time, to refine the content of the questionnaire. In addition, the work of external graphic designers who had been hired to prepare the visualizations needed for the questionnaire was discussed with them during these meetings. A market research company was engaged to carry out the market research in five European countries, with 1000 respondents in each. Although the findings from this large-scale European questionnaire study was not directly relevant to the focus area of my thesis, it has been another great contributor towards improving my understanding of this industry, consumer buying habits and trends. In total, I put around 260 rewarding hours into the work relating to these two projects.

The Pre-study Phase

Our colleagues at Luleå University have been a great help in undertaking the pre-study interviews with the five companies that worked on the project with us. We all contributed to preparing the interview guide for the semi-structured interviews, and they took responsibility for carrying out the interviews and preparing a report based on them. The reports prepared by our colleagues on the current situation in each company have been a great help in understanding the industry-related issues, and contributed to the empirical discussion part of the thesis. The interviews took place in late 2016. In March 2017, my co-supervisor and I paid a visit to three of the five companies where the pre-studies took place. We visited the factory floors and carried out interviews, mainly in an unstructured manner. All three interviews with company CEOs were recorded and two were also transcribed. Based on the information gathered during the pre-study, two of the companies were selected as the case studies for this thesis.

Knowledge Development

In parallel to working on the Bioinnovation project and the pre-study, I have also been improving my theoretical basis on the subject matter. This included completing several courses in related fields such as organizational change, service management and business development. Moreover, between March 2017 and the end of 2018, I took part in two international and one Scandinavian forestry and wood conferences and presented the results of my work. I have also participated in three wood-related seminars and workshops in Sweden during this period. In addition, I attended an international conference on business model studies. Lastly, apart from the regular meetings with my supervisors to get advice on the development of my work, I also had the opportunity to present and discuss my thesis during three internal seminars with my colleagues. The feedback from these meetings and seminars has been of considerable value for this work.

Case Company Interviews

Aside from the first two interviews that were undertaken in March 2017, the rest of the interviews and data collection were carried out during 2018 and early 2019. My co-supervisor accompanied me during all the company visits and interviews. Figure 3.1 below represents a simplified view of my journey as a PhD candidate.

Figure 3.1: My PhD journey

3.2 The Research Process

“It is better to choose a philosophy of science than to inherit one by default.” (Van de Ven, 2007, p. 36.) In his book *Engaged Scholarship*, Van de Ven (2007) argues that most of us are in fact practitioners of science and not philosophers. However, explicitly or implicitly, we all depend upon a philosophy of science for interpreting the meanings, relations and consequences of both our data and theories (Van de Ven, 2007). Indeed, our philosophy dictates how we intend to collect and use data and not the other way around. However, especially in social sciences, it is not entirely possible to place oneself within the exact borders of one philosophy of science. Nevertheless, I associate the philosophy adopted in this work closest to *realism*. I believe that a reality exists, independent of my mind. However, no scientific method is preferred over another for the attainment of truth (Van de Ven, 2007; Moses and Knutsen, 2012). As a social scientist, I can never deny my pre-existing cognitive frameworks, which shape how I view the world and interpret both my observations and theoretical statements. On the other hand, the pragmatist that is always hidden somewhere inside me – perhaps due to my background of working in the industry before starting my PhD – also tends to perceive knowledge as instrumental action plans (Van de Ven, 2007). As a result, depending on the purpose of the study, objective or subjective methods may be applied. I therefore agree with the implications for engaged scholarship proposed by Van de Ven (2007) in terms of the pragmatic usefulness of a realistic ontology. I follow an abductive approach in the creation of theories, similar to Van de Ven (2007) and proposed by many others such as Josephson and Tanner (1996) and Dubois and Gadde (2002). Furthermore, I agree with Van de Ven (2007) in viewing models as mediators between theory and data. Considering that no theory can ever be completely tested, data will not be able to test or reveal a whole theory either. Models can therefore be used to examine part of a theory (Van de Ven, 2007).

This research follows a similar process to engaged scholarship (Van de Ven, 2007), which comprises four steps:

- 1) Problem formulation: situating the problem by encountering theory with reality
- 2) Theory building: creating, elaborating on or evaluating a theory to develop a conceptual model

- 3) Research design: the analysis process through applying the conceptual model to the empirical data
- 4) Problem solving: communicating and interpreting the research findings

Problem Formulation

This thesis, as discussed in the introduction, signifies the role of both theory and reality in its problem formulation. The problematization had its starting point in theory, where the result of the initial search demonstrated insufficient developments in the field of BM change. These shortcomings were then coupled with the fact that, in BM studies, the industry contexts with low-tech or slower rates of changes have remained highly under-researched. This is despite stressing the importance of context-specific studies in BM research by scholars of this field. The preliminary research on this type of industry had shown their economic significance, as well as their potential empirical implications for the research, considering that – despite having less complicated technologies – these industries constantly undergo change. These changes may take place at a slower pace than fast growing industries, but they can come with their own complex natures. I have therefore argued that, to develop a better understanding of the field of BM change, studies must be carried out in this specific context.

Theory Building

By acknowledging the influences from my environment and empirical settings, the process of constructing the model of analysis (MOA) in this study has mainly been done deductively. The BM literature was reviewed by first reading over ten previously published literature review articles and, based on these, tracing the notable scholarly works in the field. After developing an overall understanding of BMs, I identified how I choose to perceive and apply BMs in this study. By narrowing down my area of focus and identifying my own view on BMs, I was then able to review the literature of the field towards a more specific area. The final result was to deduce the proposed BM framework of this study. Almost parallel to reviewing the literature on BMs, I noticed the low level of focus on the applicability of BMs when studying organizational changes. This has led to a more targeted review of literature in organizational change, with the aim of applying the relevant areas of the organizational change literature to BM change research. The result was the final proposed MOA for this thesis.

The purpose of this study, and consequently of the proposed MOA, required the introduction of a set of operationalization measures. Compared with the deductive approach followed in proposing the MOA, the operationalization measures were introduced via a more iterative and abductive approach (Dubois and Gadde, 2002; Van de Ven, 2007), whereby both theories and empirical findings have assisted in proposing the operationalization measures of this study.

Research Design

Multiple case studies have been selected as the research method in this study. In this step, the empirical data were structured and categorized based on the MOA. Depending on the purpose of each specific part of this MOA, both process and variance analytical approaches were applied (Van de Ven and Poole, 1990; Van de Ven, 2007). By acknowledging the undeniable presence of my own subjective interpretations throughout analysis, I have attempted to consider theory as the main tool of analysis (Yin, 1989).

Problem Solving

This study has measured BM changes by applying the proposed operationalized measures to multiple cases within an industry. The findings, accommodated by the theories used in explaining them, have led to proposing a typology of BM change, characterizing different types of BM changes that can take place. In addition, this thesis explains how contingency factors can affect BM changes in the empirical context of this study.

It is not possible to claim that the research process has been strictly sequential, starting with problem formulation and ending with problem solving, since – over the course of a thesis – the research process tends to involve several cycles, addressing different aspects of the work. Furthermore, the abductive approach followed in this study indicates that there has always been an interplay between the theories and empirics in all the steps of this research. However, it may be possible to show an approximate demonstration of this study's research process and the level of contribution from theories and empirics in each step. Figure 3.2 on the next page illustrates this.

Figure 3.2: The research process

3.3 Case Study Research

The purpose of this thesis is to measure and characterize BM changes, and to understand the contingency factors surrounding these changes in mature low-tech industries. This is a somewhat understudied theoretical area and empirical context. There is therefore a

heavy reliance on a rich empirical data in order to be able to develop theories (Eisenhardt, 1989; Yin, 1989). The aim of this research is to study this phenomenon in its specific context and not independent from it, which makes case study an appropriate research approach (Gibbert, Ruigrok and Wicki, 2008).

Considering the research objective in developing an understanding of the characteristics of different types of BM changes, a multiple case study approach seems appropriate. As Eisenhardt (1989, p. 541) puts it: “The juxtaposition of seemingly similar cases by a researcher looking for differences can break simplistic frames. In the same way, the search for similarity in a seemingly different pair also can lead to more sophisticated understanding.” In this research, the Swedish wood manufacturing industry has been chosen as an empirical example of a mature low-tech industry.

The case selection process in this research was purposeful sampling (Patton, 2002). Purposeful sampling is done in a non-random manner, with the objective of selecting cases that can be logically assumed to be the most effective use of limited resources and a good representation of the whole population (Patton, 2002; Palinkas *et al.*, 2015). This thesis was aimed at studying different types of BM changes in the mature low-tech setting. An attempt was therefore made to ensure the most effective representation of changes in the industry, within the scope of our resources. The case companies were selected based on their differences in terms of offering, customer segments, performance, market position and the types of change they have gone through, so that it would be possible to exemplify different types of BM changes. However, with the aim of achieving a better cross-case analysis, it was decided that these companies share certain traits as well. All case companies were older and established actors, providing a base of comparison between the changes they went through during that same period, given that newcomers – with a shorter number of active years in the market – may follow a different pattern of change. In addition, the companies were all either larger SMEs or smaller companies in the large enterprise category. It was decided that following the developments of those companies with a large enough scale to undergo change can provide better insights for characterizing different types of BM changes.

Case studies can be both qualitative and quantitative (Yin, 1993; Stake, 2000; Creswell, 2003). The case studies in this thesis are mainly of a qualitative nature and include

interviews, company visits and documents. However, there are also some quantitative data in the form of companies' financial figures, which were used in a simple descriptive statistical form and as a complement to the collected qualitative data. The next section will discuss the data collection process of this research in more detail.

3.4 Data Collection

The data sources in this thesis included interviews, company visits, company documents (mainly in the form of annual reports) and online sources. Most of this data was collected during a period of one and a half years. This was, however, with the purpose of gaining an insight into the longitudinal changes in these companies between 2007 and 2018, which was addressed both by interviewing people who were present at the companies during this period and by studying other sources of information published in the past ten years.

Interviews

A total of 26 face-to-face interviews were carried out with 23 people at all five case companies by me and my co-supervisor. This involved a total of 25 hours of recording. (The majority of the interviews were recorded.) I was present at all but one interview, which was conducted and recorded by my co-supervisor. This interview was then transcribed and thoroughly studied by me. The interviews were conducted in Swedish, English or a mixture of both. The interviews in English were transcribed by me and the ones in Swedish were transcribed by a native Swedish speaker. Parallel to the recording of the interviews, notes were also taken. My reading and listening skills in Swedish are at a level that enabled me to thoroughly understand the content of the interviews. In the event of any uncertainty, I clarified my enquiries with my supervisor or the respondents. The details of these interviews are summarized in the tables in the upcoming pages.

To better understand the changes over the past ten years, the priority was to interview the key individuals who have been working in the organization for all or most of this period. Around 40% of the respondents have been at their organization for more than ten years, and the rest had either worked there for more than five years or held key positions, with good knowledge about organizational affairs. The interviews were mainly conducted based on a semi-structured interview guide, which is included in Appendix section A.

The interview guide followed the different components of the BM framework and the rest of the elements in the MOA. The respondents were asked questions regarding changes that had taken place in each of these components over the past years, the reasons for these changes and the possible challenges involved.

Company Visits

In order to understand the key activities at each organization, we had guided visits both in the office and on the factory floors. During these visits, company representatives explained about the administrative and production processes. For further clarification, my co-supervisor occasionally asked the staff on the factory floor about the technicalities of the machines they worked with and their roles and responsibilities. I actively took notes during these company visits.

In the case of Prefab Co., we were also non-participatory observers at the company's weekly morning meeting, where all the key managers were present and briefly discussed the situation during the last week, as well as plans for the upcoming week. All the company visits were carried out at the same time as the interviews.

Company Documents

The primary data collected from interviews and company visits were supplemented and triangulated (Denzin, 2017) with two secondary sources. The main source of the secondary data was a study of the companies' annual reports. This was with the aim of both obtaining descriptive information about the main changes that had taken place and identifying changes in the company's quantitative and financial information. All case companies' annual reports and their holding companies' annual reports from 2006 to 2017 (or 2018 for those that had already been published at the time of data collection) were thoroughly studied. In certain years, when more clarifications on specific changes were required, the annual reports of sister companies were also studied. I have not studied many other internal company documents.

Table 3.1: Case companies' interview details

Position	Years at company (at the time of interview)	Date	Length	Interview type	Present at the interview	Action
Stairs Co.						
CEO	More than 10 years	March 2017	85 mins	Unstructured	Sarah, Tomas, interviewee	Recorded, took notes during & after
		Nov. 2018	30 mins	Unstructured – factory visit	Sarah, Tomas, interviewee	Notes taken
		Nov. 2018	80 mins	Semi-structured	Sarah, Tomas, CEO, Sales Manager	Recorded & transcribed
Sales Manager	5 years					Recorded & transcribed
CFO	10 years	Nov. 2018	85 mins	Semi-structured	Sarah, Tomas, CFO, IT Manager	Recorded & transcribed
IT Manager	7 years					Recorded & transcribed
Production Manager	More than 10 years	Nov. 2018	65 mins	Semi-structured	Sarah, Tomas, CEO, Production Manager	Recorded & transcribed
Purchasing Manager	More than 10 years	Nov. 2018	25 mins	Semi-structured	Sarah, Tomas, CEO, Purchasing Manager	Recorded & transcribed
Windows A						
Vice President R&D	6 years	Nov. 2018	80 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
Vice President, Business Development & Digital Solutions	4 years	Nov. 2018	35 mins	Semi-structured	Sarah, Tomas, R&D, Business Development	Recorded & transcribed
Marketing & Innovation Director	2 years	Nov. 2018	50 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
		Dec. 2018	50 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
Finance Director	6 months	Dec. 2018	60 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
Production Floor Manager	More than 10 years	Dec. 2018	45 mins	Unstructured – factory visit	Sarah, Tomas, Marketing, Production	Notes taken

Table 3.1: Case companies' interview details (cont.)

Position	Years at company (at the time of interview)	Date	Length	Interview type	Present at the interview	Action
Windows B						
CEO	4 years	March 2017	75 mins	Unstructured	Sarah, Tomas, interviewee	Recorded & transcribed
		Jan. 2019	80 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
		Jan. 2019	30 mins	Unstructured – factory visit	Sarah, Tomas, interviewee	Notes taken
Sales & Marketing Manager	3 years	May 2017	60 mins	Unstructured	Tomas, interviewee	Recorded & transcribed
IT Manager	5 years	Jan. 2019	30 mins	Semi-structured	Tomas, Sarah, CEO, IT	Recorded & transcribed
Production Manager	6 months	Jan. 2019	30 mins	Semi-structured	Tomas, Sarah, CEO, IT, Production	Recorded & transcribed
Prefab Co.						
CEO	More than 10 years	June 2018	150 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
CTO	4 years	June 2018	55 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
Business Manager, Project Leader, Price Calculator	6 months now, 7 years before	June 2018	60 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
CFO	4 years	June 2018	55 mins	Semi-structured	Sarah, Tomas, interviewee	Recorded & transcribed
Production Line Coordinator	4 years	June 2018	45 mins	Unstructured – factory visit	Sarah, Tomas, interviewee	Notes taken

Table 3.1: Case companies' interview details (cont.)

Housing Co.						
Position	Years at company (at the time of interview)	Date	Length	Interview type	Present at the interview	Action
CEO of modular company, CEO of sister company, Purchasing Manager	More than 10 years	Dec. 2018	30 mins	Unstructured – factory visit	Sarah, Tomas, CEO	Notes taken
		Dec. 2018	60 mins	Semi-structured	Sarah, Tomas, CEO, Sales Manager	Recorded & transcribed
Sales Manager	8 years	Dec. 2018	90 mins	Semi-structured	Sarah, Tomas, CEO, Sales Manager	Recorded & transcribed
Development Manager	More than 10 years	Dec. 2018		Semi-structured	Sarah, Tomas, Sales Manager, Dev. Manager	Recorded & transcribed

Industry Information

Financial figures and ratios are presented in the industry and case study descriptions in the Empirical Findings chapter. The industry figures were extracted from an extensive database that had been previously prepared and updated by several other colleagues from our division. The database contains the key figures of companies active in Sweden's wood manufacturing industry that have more than nine employees. The information is extracted from the Business Retriever database and includes companies' key figures from 2004 until 2017. I have also contributed to updating some of the figures from the last two years in this database. It is possible that this database contains slight inaccuracies, in terms of the total number of companies with more than nine employees. However, these slight inaccuracies do not have a major effect on the average industry figures or the approximate percentages that were used and discussed in this study.

Furthermore, the qualitative information used in the industry descriptions has been collected through reviewing the relevant industry press releases and reports from sources

such as the Swedish Construction Federation, the National Board of Housing, Building and Planning, the Swedish Federation of Wood and Furniture Industry, the Swedish Tax Agency, the Swedish Central Bank, NTT Woodnet News, Statistics Sweden, etc.

Online Sources

Lastly, the companies' websites and the holding company's website were studied. In several cases, the websites of sister companies or main competitors of the companies were also studied. Furthermore, searching for the names of the companies in Google provided access to several news articles related to the case companies, as well as a few educational videos made by the companies for commercial purposes. The online sources were searched and traced back until 2005.

3.5 Data Analysis

Van de Ven (2007) makes a distinction between two types of analytical approaches, namely process and variance approaches. A process approach is the study of a sequence of changes over time. A variance approach, on the other hand, is the study of interrelationships or important factors and making comparisons, regardless of time. When serving the right purpose, both approaches are useful (Drazin and Van de Ven, 1985). Both approaches were applied in different parts of this study. Figure 3.3 visualizes the data analysis process in this study and makes a distinction between the variance and process analytical approaches.

Understanding case study research comes with its own challenges, considering that it typically involves fuzzy boundaries and multiple levels and units of analysis (Langley, 1999). In this research, an attempt was made to stay faithful to the model of analysis and to consider firm-level BMs as the main unit of analysis. Therefore, the collected data from both primary and secondary sources were categorized based on the MOA.

NVivo software was used to organize the interview transcripts. The interview transcripts and notes were categorized based on the proposed BM framework of this study. In addition, the other elements of MOA were used to further categorize the transcripts into sub-groups. For instance, the internal and external contingency factors were divided into those that acted as triggers to changes and those that imposed challenges on the changes.

Figure 3.3: Data analysis process

Furthermore, a whole sub-category was dedicated to changes related to digitalization, considering that digitalization- related discussions were brought up several times during the interviews. Although not the focus of the study, the outcomes of certain changes were also placed into another group, which assisted in the final analysis and discussions. The relevant information collected from the annual reports and other secondary sources were

organized in Excel files in chronological order. When studying companies' annual reports, special attention was paid to the information provided under the 'Important events' headings. The information was organized based on internal and external changes, changes in companies' operational activities and ownership, and companies' financial figures and key ratios. The different sources were then cross-referenced to ensure the accuracy of the information. Finally, all the organized data was used in the preparation of the industry and individual case descriptions, as well as timelines of key events plotted for each case study and the whole industry for the period 2007 to 2018. These timelines provided a longitudinal picture of the changes, which was used to understand the antecedents and sequence of change that took place in companies' BMs.

First, a variance analysis was carried out to study the changes in the content of companies' BMs over time. It was decided to depict companies' BMs at three points in time, over the period 2007 to 2018 – three snapshots of BMs, similar to what Armenakis and Bedeian (1999) included in their study of organizational changes. The timeline of key events was then divided into two time periods. The starting year was 2007, marked as Time 0 (T0), and 2018 was set as the end year, marked as Time 2 (T2). As for Time 1 (T1), which would involve dividing the total years into two time periods, some room was left for flexibility, due to case-specific considerations. Therefore, by default, T1 was chosen as the end of 2012, since this would divide the whole time period equally into two. However, there is an understanding that the cycle of changes takes different turns in each company. As a result, a correct depiction of change in companies' BMs in Time 1 may have been jeopardized by strictly setting the end of Time 1 as 2012, considering that – for some companies – a major change in the previous time period may end a year sooner or later than 2012. However, when studying the changes that took place in organizations individually through the timeline of key events, it transpired that – except for one case – the end of 2012 was in fact an appropriate point at which to end the first time period. The only exception was the Windows B case, where the partnership with the external sales organization ceased at the end of 2012, meaning that changes in organizational settings, in terms of starting an internal sales operation, took place in 2013. As a result, the T1 for all other companies was set at the end of 2012, and for Windows B at the end of 2013. Afterwards, with the help of both primary and secondary data, information was then plotted into the relevant sections of the BM framework in their corresponding time

periods. As also mentioned in the Frame of Reference chapter, each of the BM components was loosely defined to leave room for differences in the key aspects that exist in each company.

Beer and Walton (1987) criticize the study of organizational changes, firstly for using snapshots and not a longitudinal view, which makes it hard to determine how permanent a change may be, and secondly for usually ignoring the history and environment around the changes in such studies. Both these issues were intended to be addressed where possible in this study. Even though that the data was collected over a two-year period, it had a longitudinal focus and enabled a process analysis to be carried. However, in the study of BMs, the focus was mainly on the content of *what* had been changed and not on the process of *how* things had changed, since a focus on the 'how' question would have required a longer involvement with the case companies, which was not possible for this thesis. To tackle the issue of studies being in the form of snapshots, even though there are three BM snapshots for each of the case companies at Time 0, Time 1 and Time 2, the change in the content of these BMs over time can provide a better longitudinal picture than studying a single snapshot. The study of BM snapshots through variance analysis was also complemented by a process analysis. The categorized data and BM snapshots facilitated this process analysis. The result was a set of detailed series of changes tables. In these tables, company changes were grouped chronologically into series of changes. The internal and external triggers for each change series were identified. The changes in each series were discussed, and the internal and external challenges imposed on each series of change were mentioned. Lastly, the BM components that have been affected during each series were listed.

The abductive approach (Dubois and Gadde, 2002) adopted in this study had a bold presence, specifically in terms of introducing the operationalization measures in this study and proposing a BMC typology that was then followed. The indicators proposed for measuring the degree or scope of change in each BM component were the result of iterations between theoretical and empirical findings. The process of arriving at the indicators is discussed in detail in the Analysis chapter. A set of indicators for measuring changes from two dimensions of scope and degrees of change was proposed. The degree of change measures was applied to companies' BMs at three points in time. The degrees of change in different components were identified through studying the BM changes from

T0 to T1 and T1 to T2. On the other hand, the scope of change measures was applied to the series of change tables. This helped to explain the change-orders during each time period in companies' BMs. It is worth mentioning that there is no way to assess these indicators in a completely objective manner, considering that the subjective opinion of the analyst, and his or her level of knowledge about the case materials, always plays a role in making these decisions. However, the reason for setting these introduced operationalization measures is to achieve consistency in the decision made by *one* analyst across different cases. It is therefore not intended to be a completely unified measure, with the level of reliability expected from a quantitative study.

The focus on the content of BM snapshots in the study of changes in this thesis also aimed to propose a typology in BM change, since classifications have generally been argued to be better than dynamic models when aiming for theory building. This is due to the intuitive ability of static models to explain holistic and complex phenomena within organizations (Doty and Glick 1994). After the operationalization measures were applied to the BM changes in the case studies, the theory was used once more for a cross-case analysis between the companies (Yin, 1989). This has resulted in proposing a typology of BM changes, as well as discussions on how contingency factors affect the BM changes in the empirical context of this study.

I was privileged to have had two industry experts as supervisors with more than 30 years of experience in the industry, allowing me to discuss and cross-check the contextual information, case data and my own understanding of the changes in the industry with them. My supervisor, Tomas Nord, also an industry expert, has been with me at every stage of the primary data collection process. We also discussed the preliminary analysis of each case immediately after returning from factory visits and interviews. After producing the case descriptions and preliminary analysis for each case, meetings were held with my supervisors regarding each case and I received feedback on the areas where I had either misunderstood the empirical information or lacked empirical information which led to an incorrect judgment. The proposed operationalization measures were also discussed and refined with my supervisors and twice with colleagues during internal seminars on my work.

3.6 Methodological Reflections

Like all research, this study comes with its own limitations. My job as a researcher is firstly to be aware of these limitations and their possible consequences, and secondly to make sure that these limitations can be minimized or controlled through quality measures. This section will address these aspects.

3.6.1 Research Limitations

As a researcher and the author of this thesis, I was responsible for choosing the right levels of abstraction and granularity in the proposed BM framework, to allow for the effective applicability of BMs as tools in studying organizational changes. This involves an awareness that these choices are always associated with certain limitations, in terms of blurring the real-life details or disregarding possible linkages. It should also be noted that, in real life, changes will probably affect organizations in a somewhat different manner that is not entirely similar to the abstract view provided by BMs. We should, therefore, keep in mind the applicability of models that may take away the details that can be significant in real life, in order to see the bigger picture.

Moreover, the BM components of the proposed framework in this study have been loosely defined. This was with the aim of leaving scope for demonstrating core differences in every organization. However, it should be acknowledged that this decision may also come with limitations in terms of cross-case analysis of BMs in different organizations. This limitation was kept in mind when comparing companies' BMs. However, considering that the selected case companies all shared a set of common traits, this issue did not appear to negatively affect their comparability.

Despite being a longitudinal ten-year study, the interview data has been collected in the past two years and not throughout the whole ten-year period. This may affect the accuracy of the presented BMs and changes as we go further back in time. However, as mentioned earlier, 40% of the total respondents have been in the organization for more than ten years. In addition, the interview data was supplemented by an in-depth study of companies' annual reports and other secondary sources. Lastly, given the focus of this study on changes in the content of companies' BMs, slight inaccuracies in the exact representation of BMs at an earlier point in time did not have a significant effect on the quality of the study.

In this research, the Swedish wood manufacturing industry has been chosen as an empirical example of a mature low-tech industry. It may be argued that the findings in this study cannot be generalizable to all mature low-tech industries. However, by providing detailed descriptions of the industry's characteristics in this thesis, I have aimed to offer a better base of comparison between wood manufacturing and other mature low-tech industries. Furthermore, there were of course limitations in terms of time constraints and accessibility that prevented us from including more cases. There were also two specific companies that we were interested in studying, which offer their end-users advanced e-commerce options. The aim was to show examples of the more innovative companies in mature low-tech industries. Unfortunately, they did not agree to work with us. However, since the more innovative companies only make up a small proportion of this industry setting, it is not believed that the lack of access to these cases will have influenced the results of this study to a significant extent.

Last but not least, this study aims to achieve analytical generalizability, not statistical generalizability (Yin, 2010). The study objective is theory development through undergoing an abductive approach in the research (Dubois and Gadde, 2002). Furthermore, the operationalization measures introduced in this study are also aimed at creating a consistency in the decisions made by one analyst across different cases, considering that there are always certain subjective elements influencing the analysis of qualitative studies. Therefore, it cannot be assumed that reliability in its strictest definition can be achieved in this study (M. Eisenhardt, 1989; Yin, 1989).

3.6.2 Quality of Research

Considering that quantitative measures of research quality such as reliability and validity are not equally applicable to qualitative studies, Lincoln and Guba (1985) suggest trustworthiness measures for ensuring the quality of qualitative research. Trustworthiness includes four criteria of credibility, transferability, dependability and confirmability (Lincoln and Guba, 1985), which will be briefly defined in Table 3.2.

Table 3.2: Trustworthiness criteria

Trustworthiness criteria	Description
Credibility	Similar to internal validity; confidence in the fact that the research studies what it is supposed to study.
Transferability	Similar to external validity; whether the study can also be applied elsewhere.
Dependability	Similar to reliability; focuses on consistency in the work and whether there is a traceable logic in the methodology.
Confirmability	Focuses on objectivity and the neutrality of analysis and conclusion.

In the following tables, I summarize the measures of trustworthiness suggested by Lincoln and Guba (1985) for each criterion, and how it was applied to this study

Table 3.3: Trustworthiness measures taken in the study

Credibility measures	Actions taken to ensure credibility
Early familiarization with the field of study	<p>Reviewing the literature of the field and taking relevant PhD courses.</p> <p>The two-and-a-half-year collaboration with the Bioinnovation project.</p> <p>Reading industry reports and figures, and preparing industry reports. The industry description in the thesis.</p> <p>Having two supervisors who are both experts in this field.</p>
Prolonged engagement in the field	Involved in this area of work for the past four years of my PhD.
Peer-debriefing and member-checking	<p>Internal presentations and seminars.</p> <p>Supervisory sessions.</p> <p>Conferences in related field.</p> <p>Workshops with the industry.</p> <p>Meetings with colleagues at Luleå University.</p>
Transferability measures	Actions taken to ensure transferability
Clarification of the context	The context of this study has been clarified in the introduction as well as in sections 2.3 and 4.1.

Thick description	<p>There is a detailed description of the theoretical assumptions of the study and how the frameworks have been proposed in chapter 2.</p> <p>Detailed description of the study context in chapters 2 and 4.</p> <p>Detailed discussions on the operationalization measures of the study in chapter 5.</p>
Note on transferability of study results	<p>The process of arriving at the model of analysis and proposed operationalization measures has been discussed transparently and in detail in this thesis.</p> <p>The empirical context of the study, and how it is characterized, is also described clearly throughout this study.</p> <p>Other studies can therefore follow the steps taken in this thesis for achieving a theoretical/analytical transferability. In addition, there is the possibility of replication and application of models in other industries that share similar characteristics to this study's empirical context.</p>
Dependability measures	Actions taken to ensure dependability
Description of data collection and analysis	Discussed in sections 3.3 and 3.4
Triangulation and the use of various data collection methods	<p>As discussed in sections 3.3 and 3.4, data from different sources have been collected to ensure triangulation. The same questions have also been asked to more than one interviewee, to ensure consistency in the claims made by respondents.</p> <p>The claims made by respondents were cross-checked at company visits and ad-hoc questioning of random staff on the production floor.</p> <p>The claims made by respondents were compared with the corresponding companies' financial figures.</p> <p>The information stated on annual reports was cross-checked with other online sources and external industry reports.</p>
Clarifications on changes during the study	<p>As discussed in section 3.1, there have been certain changes in the area of my studies following my licentiate degree. However, these were not unplanned changes and they benefited my PhD thesis.</p> <p>Not many major changes took place, except for a few other companies that we were interested in studying, but were unable to.</p> <p>There were also changes from an initial focus on only digitalization in companies, to all changes taking place in the companies.</p>

Confirmability measures	Actions taken to ensure confirmability
Theory-driven research	<p>Review of literature throughout my PhD studies.</p> <p>Taking relevant PhD courses.</p> <p>Theoretically driven constructs developed in chapters 2 and 5.</p> <p>Theoretically informed research design, case selection, data collection and analysis.</p>
Peer-debriefing and member-checking	<p>Internal presentation of thesis, supervisory sessions.</p> <p>Attending theoretical and empirically relevant conferences.</p> <p>Sharing the findings with case companies to receive feedback.</p>
Triangulation	<p>Detailed reviews of literature for theoretical triangulation.</p> <p>Diversity in data collection as discussed in 3.4 and dependability measures.</p>
Measures to enhance transparency	<p>Case descriptions shared with case company respondents, to enhance transparency and receive feedback.</p> <p>Clarification of theoretical assumptions, methods, analytical assumptions and detailed empirical description.</p>

4. Empirical Findings

In this chapter, the empirical context of the industry in focus will be briefly described. This will be followed by pinpointing the main events that took place in the industry over the past decade. The chapter then continues by presenting the five case companies in this thesis individually, and a timeline of their key events between 2007 and 2018 will be presented. This will be accompanied by discussing triggers, as well as challenges to the changes in these companies. Lastly, their BMs will be depicted at three different points in time.

4.1 The Swedish Wood Manufacturing Industry

Before proceeding with the case study descriptions in this chapter, the context of this thesis needs to be clarified further. The wood manufacturing industry is one of the industrial end-users of solid wood (Nord, 2005). The industrial end-users of wood are those that use sawn timber and its refined/further processed versions to produce finished or semi-finished goods. Companies producing semi-finished goods include those that manufacture products such as building components, impregnation, glulam beams or construction joinery (Nord, 2005; Sandberg *et al.*, 2014), which are not the focus of this

study. Finished goods comprise wood-based products such as windows, doors, staircases, flooring, moulding, furniture, packaging and timber-framed houses or prefabricated constructs (Nord, 2005; Nord and E. Semnani, 2019). The empirical focus of this thesis is on the finished goods used in the construction of houses and buildings. Therefore, when the wood manufacturing industry is mentioned in the thesis, this refers to segments within this industry including manufacturers of wooden houses, prefabricated constructions, doors, windows, flooring, kitchen/bathroom interiors, and interiors for other public and private spaces.

The Swedish wood manufacturing industry is a mature industry that comprises many small and medium-sized enterprises (SMEs) and very few large actors (Nord and E. Semnani, 2019). Table 4.1 shows the distribution of the companies in this industry within four different intervals, based on their turnover in 2017. The figures in this table were produced using financial data from companies in this industry with more than nine employees in at least one year during the period 2013-2017, as extracted from the Business Retriever database (Nord and E. Semnani, 2019). As previously mentioned in the Methodology chapter, this database is one of the sources of data used in this study. The similar upcoming industry financial data discussed in this thesis will be taken from the same source, unless otherwise stated. As can be seen in Table 4.1, around 10% of the companies in this industry are responsible for more than 60% of the total industry turnover and more than 50% of employment. On the other hand, small companies with less than SEK 50 million in annual turnover make up more than 50% of the total number of companies active in the industry but account for only 6% of the industry's turnover. This is in line with the characteristics of mature industries described in chapter two, in terms of an industry composition that is made up of few large actors and many SMEs.

Furthermore, as shown in Table 4.2, the industry has a low ten-year average (2008-2017) for return on assets (ROA) of 9.3% and a profit margin of 4.8%. It should, however, be noted that around four years of this ten-year period (2009-2012) coincided with the global and European economic crisis. Even though two of the company size intervals in the industry have managed to perform above the average, the figures in general are considerably low. Interestingly, aside from larger companies, the other size interval with an above average performance is companies with an annual turnover between SEK 50

million and SEK 100 million. Low profit margins have been discussed as another characteristic of mature industries in the Frame of Reference chapter.

Table 4.1: Swedish wood manufacturing industry figures (2017)

Intervals Based on Turnover	No. of Companies	Turnover in SEK Billions	No. of Employees
≥ MSEK 500	23 (10%)	27.5 (64%)	8 600 (54%)
MSEK 500 ≥ 100	50 (21%)	10.2 (24%)	4 000 (25%)
MSEK 100 ≥ 50	38 (16%)	2.6 (6%)	1 200 (8%)
MSEK 50 ≥ 0	125 (53%)	2.8 (6%)	2 000 (13%)
Total	236	SEK 43.1 Billion	15 800

Table 4.2: Swedish wood manufacturing: average ROA and profit margins (2008-2017)

Intervals Based on Turnover	Return on Assets	Profit Margin
≥ MSEK 500	12.7%	7.3%
MSEK 500 ≥ 100	10.2%	4.2%
MSEK 100 ≥ 50	12.0%	6.6%
MSEK 50 ≥ 0	8.1%	4.4%
Total	9.3%	4.8%

Last but not least, Figure 4.1 shows the growth in industry turnover, adjusted in line with inflation (SCB, 2019), between 2004 and 2017. Except for the period of economic recession, when turnover stagnated and then plateaued, a steady and regular rate of growth in turnover is evident in this industry. This can be linked to another characteristic of mature industries, as previously discussed in the frame of reference.

Unlike the Swedish sawmill industry, the wood manufacturing industry is largely domestic and has a low level of exports, at around 15% of its total turnover (*Swedish Forest Industries Federation*, 2019; TMF, 2019b). In fact, an industry-wide quantitative study of the Swedish wood manufacturing industry has revealed a negative relationship between internationalization and SMEs' performance (Hosseini, Brege and Nord, 2018).

According to the study, the benefits of internationalization have not yet exceeded the associated costs for Swedish SMEs in the wood manufacturing industry. One reason is the fact that this is a low-tech industry which is not highly automated (Hosseini, Brege and Nord, 2018). Another reason why the wood manufacturing industry remains largely domestic is Sweden's specific standards and building regulations and the differences in such standards between different countries (Boverkett, 2018). It is therefore difficult for manufacturers in this industry to tailor their products to the building standards of other countries.

Figure 4.1: Industry turnover adjusted for inflation (2004-2017)

In Sweden, the main groups of customers in this industry have traditionally been retailers, do-it-yourself (DIY) chains, builder's merchants and professional consumers (Nord, 2005; Guan, 2013). Wooden house manufacturers' customers can also be private end-users. However, recent trends within e-commerce in this industry (Wahlfeldt, 2018) and the digitalization of internal operations using systems such as building modelling, enterprise resource planning and configurators are making it more common for the actors in this industry to reach private end-users directly (Johansson and Johansson, 2018; Almgren, 2019; Verkstadsforum, 2019). This will be discussed in more detail later on in this chapter.

As mentioned, professional consumers are one of the main groups of customers in the wood manufacturing industry. Professional consumers are large, medium and small

construction companies (Nord, 2005). Construction projects in Sweden usually have tendering as a dominant strategy, which puts pressure on pursuing the lowest costs in such projects (Nord, 2008; Hurmekoski, Jonsson and Nord, 2015). In addition, Swedish companies in this industry face increased competition from labour and manufacturers in low-cost economies (NRA Sweden, 2012). As a result, productivity improvements and activities directed towards cost reduction have been a priority for companies in the wood manufacturing industry. Automation in manufacturing is considered to be one of the main tactics for achieving cost reductions in this industry (Nord and Widmark, 2010; NRA Sweden, 2012; Lindstrand, 2016). In manufacturing, automation refers to the use of different technologies and systems to reduce human intervention in operating processes or procedures in factories (Groover, 2010). The various technologies and support systems used by wood manufacturing companies include computer-aided design (CAD), computer-aided manufacturing (CAM), building information modelling (BIM), computerized numerical control machines (CNC), enterprise resource planning systems (ERP) and master production scheduling (MPS) (Groover, 2007; Meiling, Backlund and Johnsson, 2012; Sakin and Kiroglu, 2017). In line with the industry trend of automation, many wood manufacturing companies seek to pursue lean thinking and a modular approach to production (Nord, 2005; Meiling, Backlund and Johnsson, 2012). Modularity, or industrializing, refers to the mass production of customized offerings by manufacturing them in the form of modules, which has a direct focus on production efficiency (Probst *et al.*, 2013; Kowalkowski *et al.*, 2015). These automation and digitalization trends also provide an opportunity for certain servitization possibilities which did not exist before. Furthermore, a more recent but growing trend witnessed by this industry during the last few years is the rise in the construction of smart and connected homes. Therefore, by being part of the ecosystem providing smart housing products and services to customers, wood manufacturing companies can also play a role in this process (Andersson and Sundberg, 2019; Statista, 2019).

Around 70% of added value products from the sawn timber produced in Sweden, is – in one way or another – used in construction and housing (Sandberg *et al.*, 2014). It therefore comes as no surprise that the wood manufacturing industry is highly dependent on and connected to the economic cycle in the construction market. In addition, the increasing attention paid to the environmental impacts of construction is further encouraging the

incorporation of wood into buildings (Sathre and O'Connor, 2010; Hurmekoski, Jonsson and Nord, 2015). Figure 4.4 summarizes a selection of key events related to the Swedish economic cycle for construction during the period 2007 to 2018. These events have been selected from various industry sources including the Swedish Construction Federation, (2019), the National Board of Housing Building and Planning (Boverket, 2018), the Swedish Federation of Wood and Furniture Industry (TMF, 2019b), NTT Woodnet News (NTT, 2019), Statistics Sweden (SCB, 2019) and case companies' annual reports. As shown on the timeline in Figure 4.4, there have been several changes in the construction industry's economic cycle during the last decade. One change has been a drastic shift towards the construction of multi-family housing in Sweden. As can be seen below in Figure 4.2, in 2007 – before the start of the economic recession – almost twice as many apartments were completed compared to houses. This number dropped steeply until 2010, since when there has been a sharp increase to become almost four times as high as the number of completed houses in 2018. Single-family houses, on the other hand, did not experience a boom after the recession despite not being as strongly affected by the recession as the construction of multi-family housing. One reason that may have contributed to this is the current shortage of 'buildable land' that meets the regulatory requirements and restrictions for constructing single-family housing in Sweden (Handelskammare, 2014; Netzell, 2015).

Figure 4.2: The annual number of completed apartments and houses in Sweden (SCB, 2019)

In line with the aforementioned example, the Swedish economic cycle for construction is strongly influenced by regulatory changes, such as changes to taxation and banking regulations or general construction legislation. One of the major regulatory influences has been the tax deduction benefits for renovation, reconstruction and extension (*ROT avdrag* in Swedish). In December 2008, the 50% ROT benefits were introduced up to a ceiling of SEK 50,000 per year (Skatteverket, 2017). These benefits led to a considerable increase in investments in housing renovations. However, ROT tax deduction benefits were reduced to 30% from 2016 onwards (Skatteverket, 2017). Figure 4.3 below depicts the annual levels of investment in housing renovations, adjusted in line with inflation in 2017 (SCB, 2019). It should be noted that part of the increase in investments in renovations relates to the renovation of Million Programme (*miljonprogrammet* in Swedish) properties. The Million Programme was a Swedish initiative in the 1960s to tackle the shortage of housing, and many of the buildings constructed in the 1960s are now in great need of renovation (Swedish Construction Federation, 2019).

Figure 4.3: Investments in housing renovations in Sweden (SCB, 2019)

Another important regulatory change in terms of the economic cycle for construction is the requirements for obtaining a mortgage in Sweden, which have undergone several changes over the last decade. These changes include lowering interest rates in 2009, and this has continued since then (Swedish Central Bank, 2019). However, this was followed

by the introduction of a mortgage ceiling in 2010, which indicated that the banks could provide mortgage only up to 85% of the total value of the property. This has made buyers responsible for paying the remaining 15% (FI, 2015). Furthermore, obtaining mortgages also became more difficult after 2014 due to the introduction of a requirement for loan amortization, up to 50% of the total value of the property, as part of the monthly payment to the bank, together with the interest. The amortization requirement was put into practice in August 2015 (FI, 2015). These restrictions continued when banks introduced a debt-to-income ceiling requirement for mortgages in 2017. This meant that the maximum possible mortgage granted to applicants can be five to six times their gross annual income (FI, 2017). This became stricter in March 2018, when a higher amortization requirement was introduced for applicants granted a mortgage amount of more than 4.5 times their gross annual income (FI, 2018). The main regulatory changes affecting the wood manufacturing industry are also summarized in the timeline of key events in Figure 4.4 on the next page during the period 2007 to 2018.

It had been previously discussed in the Methodology chapter that, keeping in mind all the limitations due to a lack of time and access, this thesis seeks to study cases with different characteristics. The aim is to provide a better overall picture of the types of changes taking place within the companies active in Sweden's wood manufacturing industry. Table 4.3 provides a brief overview of the five case studies included in this thesis. The case studies are two window manufacturers, one staircase producer, one single or multi-family house constructor and one prefabricated module producer. These companies are all older than 60 years, with some being as old as 100 years old. Furthermore, except for one larger enterprise, which was chosen as an example of a market leader, the rest of the companies all fall within the medium-sized category (Eurostat, 2016). However, aside from these shared traits, the five companies are considerably different in terms of their offerings and turnover. Another interesting insight is their turnover compared with 2007, i.e. before the beginning of the economic crisis. As can be seen, some of these companies have managed to recover well from the recession, while others still seem to be struggling. The figures in the table have not been adjusted in line with inflation. The following sections will describe each of these cases in greater depth, including the sector in which they are active and the changes they have experienced.

Regulatory Changes

ROT tax deduction programme introduced (50% reduction)	Introduction of mortgage ceilings	Difficulty obtaining loans due to regulatory changes	Introduction of new amortization requirement for loans	Reduction in ROT tax deduction from 50% to 30%	Stricter loan regulations introduced, including debt-to-income ceiling requirements	Continued shortage of buildable land for construction of houses
Low interest rates						

Economic Cycles in Swedish Construction

An 8.7% average annual increase in total investment in new construction and renovation in Sweden since 2003	Renovation of Million Programme housing began a few years ago	Boom in industrial construction	Continued decline in housing construction since 2006	Consumer market particularly weak, but industrial market is also slightly affected	Construction industry starts to stabilize after recession, but demand is still low in markets	Modest growth in demand for construction companies and house builders	A boom in construction of multi-family housing	Housing construction records highest turnover during the last decade	Increasing demand for multi-family housing in the form of condominiums and for first-time buyers		
2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Figure 4.4: Timeline of key events in Sweden's wood manufacturing industry

Table 4.3: Brief overview of case studies

Company Name	Year Established	Ownership & Management	Company's Main Offerings	No. of Employees (2017)	Turnover in SEK thousands (2017)	% Change in Turnover (from 2012)	% Change in Turnover (from 2007)
Stairs Co.	1923	Owned by a holding company, managed by the CEO	A wide range of stairs, from basic and highly standardized, to completely unique designs	120	SEK 140 000	32%	-8%
Windows A	1924	Publicly listed company, managed by the CEO	A wide range of windows, from basic and highly standardized, to completely unique designs Recent offerings of smart/connect windows	900	SEK 2 000 000	23%	30%
Windows B	1918	Owned by a holding company, managed by the CEO	Manufacturer of customized and unique windows for larger construction projects	100	SEK 160 000	27%	52%
Prefab. Co.	1956	Owned by a holding company, managed by the CEO	Turnkey projects of one or two storey modular buildings, fully standardized site huts and rental modules	190	SEK 490 000	58%	17%
Housing Co.	1944	Owned and managed by the same family	Villas in a wide range from standard to custom designs Recent offering of prefabricated one or two storey multi-family buildings	200	SEK 675 000	101%	56%

4.2 Stairs Co.

Stairs Co. is the largest wooden stair manufacturer in Sweden and one of the market leaders in the Nordic region. The company was established in 1923 and has about 120 employees. Stairs Co. manufactures wooden indoor stairs ranging from basic models to unique customized staircases. In segmenting the wood manufacturing industry in Sweden, stair manufacturers will be categorized as part of the joinery segment. The joinery segment comprises about 100 companies and accounts for around 2000 employees in the Swedish wood manufacturing industry. On average, this segment therefore consists of many small companies with around 20 employees. These joinery companies are smaller manufacturers of wooden stairs, interiors, windows, doors or furniture, which are usually made-to-measure carpentry projects. Stairs are, perhaps, the single most unique products produced by these companies, considering that the rest of their offerings can be diverse carpentry objects (Nord and Brege, 2014). However, given that there are not many companies like Stairs Co. with a sole focus on stair production, stairs are usually part of joinery companies' overall offerings. Stairs Co. is one of the market leaders in this segment, and as shown in Figure 4.5 its turnover is well above the average in this segment.

Figure 4.5: Stairs Co. 's Turnover and Segment Average Turnover

However, as shown in Figures 4.5 and 4.6, Stairs Co. has experienced some fairly volatile years, especially during the economic recession between 2008 and 2012. This is reflected in both the sudden drop in the company's turnover and the dramatic decline in the company's profit margin and return on capital (ROC), which fell well below the segment

average. Nevertheless, Figures 4.5 and 4.6 show that the company has experienced positive trends since 2014.

Figure 4.6: Stairs Co.'s Profit Margin & ROC and Segment Averages

It should, of course, be noted that certain events such as non-recurring major investments can have dramatic effects on key ratios such as profit margin and ROC. The next section will therefore take a closer look at the main events that took place in this company during a ten-year period. This will provide a better understanding of changes that Stairs Co. has gone through and an explanation for the fluctuations in the company's key figures.

4.2.1 Changes at Stairs Co.

Figure 4.7 depicts the main events that took place in Stairs Co. between 2007 and 2018. These events were identified based on the interviews, a study of the company's and its holding company's annual reports, and other online news sources. These key events feature a wide variety and include ownership changes and acquisitions, changes in resources, internal systems and operations, products, brands, etc. As can be seen in the figure, the timeline is marked at three points in time (i.e. T0, T1 and T2), dividing the ten years into two time periods. The next two sections will delve deeper into the changes that took place during each time period.

Figure 4.7: Timeline of key events at Stairs Co.

Changes from 2007 to 2012

In 2007, the company's ownership was divided between the founding family and the employees, owning 52% and 48% of the shares respectively (annual report, 2007). According to several of the interviewees, there had been evidence of an increase in demand and changes in customers' preferences and buying habits for a few years before 2007. End-users, and as a result retailers, demanded more variety in the stair models offered. According to the Production Manager, the company could no longer limit its offering to the initial 16 models, or the 67 models that they offered in 2007. It was therefore decided in 2008 to carry out the largest investment in the company's history, with a three-year expansion plan to increase production capacity (wood manufacturing group's website). According to two of the respondents, Stairs Co.'s CNC machine was also purchased at this time. The expansion project was finalized in 2010 (annual report, 2010).

Up until 2011, Stairs Co. was part of another wood manufacturing group which was solely responsible for the company's sales and marketing. This collaboration ended in 2011 (annual report, 2011). The company invested around SEK 4 million in establishing its own internal sales organization after leaving the wood manufacturing group (annual report, 2011, 2012). The company then started marketing its products under its own brand, having previously sold them under the wood manufacturing group's brand (annual report, 2011). Ownership changes had also taken place in 2012 when the founding family decided to sell its shares to a stair manufacturer, while remaining the largest shareholder with 35% of the shares (online news sources, 2012).

According to the interviewees, the expansion plans brought a considerable increase in the types of raw material used, and a wider range of combinations of stair components, to the extent that by 2018 Stairs Co. offered up to 18,000 different combinations.

"Many models combined with many surface treatments and many types of wood it adds up to... I believe, there are 18,000 possible combinations available. It is a lot..." (CEO, 2018, translated from Swedish)

The CEO further explained that the increased range led to some difficulties with pricing the different products. It also took longer for the design and sales teams to provide accurate quotations and price calculations for customers' inquiries. Consequently, the

increased workload resulted in a need to employ more white-collar workers, which had a dramatic effect on the total production cost (annual reports and interviews). The CEO explained that these issues led to a need for digital solutions to expedite the price calculation process, improve its accuracy by limiting human error and create a standard automated process. Therefore, the company's digitalization journey began during this period. The Head of IT was employed in 2012, and work to develop and integrate the company's internal digital systems has gradually begun since.

Changes from 2013 to 2018

After several difficult years during the economic recession, the company was starting to recover by 2013. According to the CEO and the Production Manager, the company had more cash at its disposal before the recession and thus more freedom in terms of how it used its funds. The company previously purchased large quantities of stock to benefit from discounts on bulk purchases, and therefore held a higher value of inventory. A tighter budget after the recession meant a need for better control over purchasing raw materials, resulting in lower inventory levels.

“One change that has happened is that we had lots of cash in hand. We managed this by stocking up on materials. But this went well as long as we had a good financial situation to manage cheap businesses per unit.” (Production Manager, 2008, translated from Swedish)

Furthermore, in 2013 and 2014, a series of changes in the ownership of Stairs Co. took place. Stairs Co. eventually became the subsidiary of a new holding group that has been the company's sole owner since 2014 (annual report, 2013, 2014). According to the CEO and two other respondents, the new ownership has a greater focus on lean management and minimizing waste in operational processes, in order to achieve an even production flow. Therefore, new ownership emphasizes finding the right mix and balance in customer orders between standard and customized stairs. They have also prioritized achieving efficiency over major investments in highly automated machinery. The focus is now on better profitability, as opposed to the previous focus on increasing turnover.

“One should dare to choose to turn down certain customers. One cannot serve everyone. Then there will be harmony.” (CEO, 2017, translated from Swedish)

“The plan in the old days was to buy one more paint machine, for SEK 10 million. But our new owner said: ‘No, no, no, hold your horses! Try to be more efficient first.’”

(CEO, 2018)

“The only earnings they (the wood manufacturing group, which was previously responsible for sales) would have, was from how much they would sell. So, if they sell more their earnings would go up. But that wasn’t our situation. The (previous) owners, they had the same goal to keep up sales too. They have had good years, so it had worked! But in 2008 when the recession happened, it didn’t work anymore.” (CFO,

2018)

One of the main ways to achieve these objectives has been through major investments (both financial and human) in digitalizing internal systems by updating the company’s existing MPS, ERP and BIM, as well as developing a new configurator system. The configurator aims to offer the possibility of a digitalized order-taking process for customers. However, the pre-condition to achieve this goal is updating and integrating existing systems. This integration has been a big challenge for Stairs Co. This is because it has around 18,000 possible combinations of stair models, which takes a lot of time to enter into the system. There are also overlaps in the data across the existing systems, which can be time-consuming to fix.

“We are trying to build a system for some very complex products... Every stair that we make, basically needs to have new blueprint, a new CAD, CNC, etc.... And this cannot take much time, so we have to automate everything. But that’s the big challenge for us. Because even with our basic category stair, which is very simple, they all have different measurements, so it will be different.” (IT Manager, 2018)

Furthermore, the respondents expressed their uncertainty about how Stairs Co.’s three customer groups, which are large construction companies, house manufacturers and retailers, would react to this system, considering that the company operates in a traditional and conservative industry.

“I think what we know is that the end consumer will appreciate it. But our customers, like the ones working at house manufacturing companies’ purchasing units...”

traditionally working... they may not exactly like how we do this... ” (Sales Manager, 2018)

As explained by the interviewees, Stairs Co. also faces difficulties with regard to ensuring an even production flow. It is not easy to maintain the right mix when producing standard and customized stairs, for two main reasons. First, there is a high dependence on orders from large construction companies that are mostly customized, with pressure on prices. Second, there is the cyclical nature of demand for stairs, which increases during the summertime when more people are carrying out renovations. In addition, the ongoing attempts at production efficiency – facilitated by digital systems – have not yet led to the desired results in terms of shortening lead times. This is partly caused by a more systematic production process via digital tools, which at times may lead to inflexibility when it comes to certain queues in the production line.

“When you are working with the IT systems, it’s like a 1 or 0. You can’t have ‘depends on’ and ‘sometimes’... So that has been a real internal fight. Now we have to decide exactly what we take when we produce something. Before, we would say... we could take ‘that’ but not ‘that’... depending on what we have in stock. And that changed the whole way of producing.” (CEO, 2018)

The CEO further pointed out that Stairs Co.’s sister company, the second largest stair manufacturer in Sweden, tends to have delivery times that are two weeks shorter. The sister company earns more than Stairs Co. and has very manual, traditional settings in its internal operations. The respondents also believed that the large size of the company, compared with other carpentry companies in the segment, makes the whole change process more cumbersome.

Another evident change during this period has been the reduction in the number of retailers. The company’s ultimate goal is to reach end-users directly, when the configurator system is fully functional. In the meantime, however, Stairs Co. has opened two sales offices in Stockholm and Gothenburg, and has provided more interactive and educational content on its website for the end-consumers of stairs.

“We’ve seen a big change in what the customer wants. Around maybe five to ten years ago, it was quite standard staircases. And now, more and more people want to be involved in the details, and they want to feel the wood and they want to see it. So,

because of that, we also see big benefits from having showrooms on-site and people who can help them.” (Sales Manager, 2018)

“And now we are in-between, because we don’t have a good enough configurator system yet. But when we do, then we won’t need the retailers, I would say. We need good assembly guys, but not retailers in the long-term. And you see the same in the car industry and all over... soon you (end-users) won’t want to talk to them (retailers), you will want to make everything on your own.” (CEO, 2018)

Finally, in 2018, the company launched a wider offering of installation services. Stairs Co. invested in an assembly company which is responsible for installation services in the south of Sweden. This service used to be offered on a much smaller scale.

“This is because we have seen for a couple of years now that the desire to buy installed stairs has increased a lot... And then we also see that it doesn’t matter how good a product we deliver, if the installation of the stairs isn’t good, the staircase will be a bad result. So, we are seeing a big gain there.” (Sales Manager, 2018)

However, as pointed out by the Sales Manager, the increase in the level of this offering has also increased the company’s workload and responsibilities.

4.2.2 Stairs Co.’s Business Models

Figures 4.8, 4.9 and 4.10 represent the company’s BMs at three points in time. The BMs are depicted based on the changes discussed in the previous sections and with the help of additional information from the company’s annual reports and interviews. The first BM is from the end of 2007 (Time 0), the second one from the end of 2012 (Time 1) and the last one from the end of 2018 (Time 2). It should be noted that, with the aim of avoiding redundancy, the BMs in T1 and T2 only represent the changes that took place in different BM components. Furthermore, the changes shown in the Cost Structure component of the BMs is shown purely based on the company’s financial figures and is the average of the past five years in each of the BMs. The respondents did not mention any significant changes in the company’s cost structure during the interviews. However, an interesting observation from Stairs Co.’s cost structure is the high contribution of personnel costs to the total cost of production. Personnel costs account for almost 50% of the total costs, which is not common in the other case studies.

By the end of T2, there had been some changes in the value proposed by the company to its customers. According to the CEO, in line with the company's efficiency goal, Stairs Co. had managed to ensure on-time delivery to its customers. This was not the case previously. However, the CEO and Sales Managers have pinpointed the fact that the end-users of stairs do not normally understand the value that lies in the specification of the stairs. The industrial customers, on the other hand, are more knowledgeable in this area. The CEO has also shared the results of market research that was carried out on their customers' preferences after changing their brand name in 2017. Even though both the new and old brands offered the exact same products, the stairs from the new brand were associated with better quality in the minds of the consumers.

“Actually, the customer doesn't even ask (about the exact class of the pine). They will be like: ‘white-painted material’. But for us, it might be (wood material) B or C, depending on...” (CEO, 2018)

Furthermore, as can be seen in the BM of Time 2, there have been some changes in the Revenue Model component. This was in line with the new ownership's goals in terms of focusing on profitability. The respondents discussed changes in the product pricing process. The CEO, CFO and Production Manager explained about attempts to introduce action- or time-based pricing, as opposed to traditional cost-based pricing. In other words, the price of the same product can vary for different customer groups, depending on the amount of time dedicated to pre-ordering procedures. The CEO mentioned that, depending on the customer group and their level of knowledge about the product, the time taken during the pre-ordering process can vary greatly. This factor was not initially taken into account when pricing the products. According to the respondents, this pricing method is still at a trial phase.

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Owned 52% by the founding family and 48% by employees Skilled workforce in design and production Ownership of premises and machinery (not very automated and mostly manual) Recently launched ERP system 	Products and services: <ul style="list-style-type: none"> Three main groups of offerings called Function, Character and Special They range from very basic models to completely unique designs 	Customer segments: <ul style="list-style-type: none"> B2B only Three groups: house manufacturers, large construction projects, retailers Both new construction and renovation Covering all types of price range 39% exports to other Nordic and German-speaking countries
Key activities: <ul style="list-style-type: none"> Purchasing and procurement of raw materials Design process and cost calculation Almost all production of components in the factory, not much outsourcing Marketing, sales carried out by the wood manufacturing group on their behalf 	Value proposition: <ul style="list-style-type: none"> Not the cheapest stairs producer in the market, but a high-quality provider Good quality, value for money Different customer groups have different perceptions of value 	Key actors and relationships: <ul style="list-style-type: none"> Long-term relationships with many suppliers Member of the wood manufacturing group which takes charge of sales and marketing Biggest producer in the market, covering 50% Long-term relationships with many customers, especially house manufacturers and large construction companies. House manufacturers are the most price-sensitive group
Cost structure: <ul style="list-style-type: none"> Personnel costs: 44% Raw materials and supplies: 30% Other external expenses: 23% Depreciation of tangible goods: 3% 	Revenue model: <ul style="list-style-type: none"> Cost-based pricing Fixed price lists for house manufacturers and retailers changed yearly/every other year Cost-based price quotations given to big construction projects on each order 	Channels: <ul style="list-style-type: none"> No real need to advertise, as sales and marketing are carried out by the wood manufacturing group.

Figure 4.8: Stairs Co.'s BM at T0

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Owned 73% by the new industrial owners & 27% by employees Expansion of 3000 m² in company factory and machinery New major machinery: CNC Invested in own sales and marketing department Journey towards digital systems and paperless factory floor 	Products and services: <ul style="list-style-type: none"> Limited offering of installation services A wider variety of stair models 	Customer segments: <ul style="list-style-type: none"> 36% exports to other Nordic countries and no longer to German-speaking countries
Key activities: <ul style="list-style-type: none"> Marketing and sales carried out by the company internally Working on production efficiency, waste minimization and shortening production times 	Value proposition:	Key actors and relationships: <ul style="list-style-type: none"> No more external sales operations Establishing own sales subsidiary in Norway
Cost structure: <ul style="list-style-type: none"> Personnel costs: 44% Raw materials and supplies: 27% Other external expenses: 26% Depreciation of tangible goods: 3% 	Revenue model:	Channels: <ul style="list-style-type: none"> Printed materials advertisement/basic website Now advertised through their own independent brand Mainly in touch with customers in person or by phone

Figure 4.9: Stairs Co.'s BM at T1

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> ○ Almost wholly owned by the holding company (96%) ○ Educated workforce to work with digital systems ○ Three main digital systems of ERP, MPS and configurator in operation ○ Reduced levels of inventory ○ Invested in an installation company and two sales offices 	Products and services: <ul style="list-style-type: none"> ○ Three main groups of stairs offering called Basic, Premium and Special (only a name change but keeping the same concept) ○ Offering up to 18,000 possible combinations of stairs ○ Wider offering of installation services ○ Sister company in Norway in charge of installation services there 	Customer segments: <ul style="list-style-type: none"> ○ Decreasing focus on retailers, looking for optimal balance between the other two types of customers ○ Exports to Norway via sister company ○ 12% of sales to sister companies
Key activities: <ul style="list-style-type: none"> ○ Integration of three digital systems and administrative process improvements ○ Stock control improvements 	Value proposition: <ul style="list-style-type: none"> ○ Good quality, good delivery, value for money ○ More customer involvement and education on product configuration ○ The new changed brand is associated with better quality in customers' minds, despite being the same 	Key actors and relationships: <ul style="list-style-type: none"> ○ Sister company acquired sales subsidiary in Norway ○ Increased collaboration with sister companies in Sweden and Norway
Cost structure: <ul style="list-style-type: none"> ○ Personnel costs: 45% ○ Raw materials and supplies: 30% ○ Other external expenses: 23% ○ Depreciation of tangible goods: 2% 	Revenue model: <ul style="list-style-type: none"> ○ Action-based cost pricing and time-based pricing ○ Action-based price quotations given to large construction projects on each order 	Channels: <ul style="list-style-type: none"> ○ Digital advertising ○ Digital communication with customers ○ Well-developed website with interactive area providing customers with pricing guidelines ○ New brand since 2017 ○ Own sales offices in Stockholm and Gothenburg

Figure 4.10: Stairs Co.'s BM at T2

4.3 Windows A

Windows A is the biggest window manufacturer in Sweden. The company currently has around 900 employees in Sweden and produces a wide variety of windows, aiming to meet all the specific requirements of its customers. The company was established in 1924, but used to produce a wider range of wooden manufactured products including stairs, kitchen interiors and furniture. By 1953, the company had headed towards specializing in window manufacturing, and has since been solely active in the window manufacturing segment. In 2004, Windows A was acquired by one of the largest window groups in Europe and was reorganized into two different divisions of window production and sales.

The window segment in Sweden can be divided into different window types, including turning, inward, fixed and top/sideways hanging windows. The segment also includes patio doors and all accessories relating to windows such as handles or built-in shades. Turning windows are the most common type of window in Sweden today, and are made of a combination of wood and aluminium (TMF, 2019b). Wood and aluminium windows accounted for 81% of the total windows delivered in Sweden in 2018 (TMF, 2019a). The windows segment in Sweden comprises about 30 companies with around 2100 employees. The window manufacturers are considerably larger companies than the joinery companies discussed in the previous section. On average, they also have 2% higher profit margins than the joinery segment. As can be seen in Figure 4.11, due to the company's size, its turnover is not particularly comparable to the segment average. The figure below also depicts very high fluctuations in the company's turnover during the past decade, with an ongoing increase since 2014.

Figure 4.11: Windows A's Turnover and Segment Average Turnover

Furthermore, Figures 4.12 and 4.13 below show comparisons between the profit margin and ROC respectively of Windows A and Windows B – which will be further discussed in the next section – and the segment averages. Both case companies are from the same segment, and a better comparison is possible if their key ratios are shown on the same graphs.

Figure 4.12: Windows A's & B's Profit Margins and Segment Averages

Similar to the fluctuations in company turnover, Windows A has experienced volatile profit margins and return on capital over the past decade. However, with the exception of the profit margin in 2012, company's profit margin and ROC have both been above the segment average during the past ten years.

Figure 4.13: Windows A's & B's ROCs and Segment Averages

The next section will delve deeper into the changes that took place at Windows A over the past decade.

4.3.1 Changes at Windows A

Figure 4.14 depicts the main events that took place at Windows A between 2007 and 2018. These events were identified based on the interviews, a study of the company's and its holding company's annual reports, as well as other online news sources. These key events come in a wide variety of forms and include ownership changes and acquisitions, changes in resources, internal systems and operations, products, brands, etc. As can be seen in the figure, the timeline is marked at three points in time (i.e. T0, T1 and T2), dividing the ten years into two time periods. The next two sections will delve deeper into the changes that took place during each time period.

Changes from 2007 to 2012

The holding company in which Windows A is the biggest subsidiary had begun an intensive round of acquisitions in 2005, which was finalized in 2008 (annual reports 2005, 2006, 2007 & 2008). As part of these acquisitions, Windows A's production unit was established in 2006, after taking over the production units of two other sister companies (annual report, 2006). By 2007, the company had factories in three Swedish cities (annual report). Moreover, in 2008 and 2009, two more production units in two other Swedish cities were also acquired by Windows A (annual reports). After finalizing the series of acquisitions, the holding company of Windows A began a process of business restructuring for capacity adjustments, production harmonization and reducing production platforms (annual report, 2008). The restructurings were concluded in 2010. As part of capacity adjustment efforts, Windows A reduced its number of employees in 2009 (annual report). However, as stated in the company's annual reports, the high number of acquired production units did not allow Windows A to reach its desired production capacity.

In 2010, the holding company of Windows A introduced a new vision, mission and strategy for the whole group (annual reports, 2010). There was an increased focus on product and brand development, segmenting and positioning based on the new strategies (annual report, 2010). In line with the new strategies, there were recruitments to key positions of the holding company from 2009 to 2012.

Figure 4.14: Timeline of key events at Windows A

The new directions resulted in launching two new window ranges at Windows A. One of the window ranges was segmented towards their industrial customers (annual report, 2011). There were also spring and autumn TV campaigns for Windows A for the first time during this year (annual report, 2011).

Furthermore, after the completion of a group-wide restructuring project in 2010, the holding company introduced new guidelines in 2011. The focus was on having fewer and larger factories, as well as using more automation and synergies to achieve economies of scale (annual report, 2011). Therefore, the company went through waste minimization and efficiency improvements in all its departments. In addition, a common production philosophy based on lean manufacturing was launched during this period (annual report, 2011). Windows A also shut down two of its production units in 2011 and 2012 as part of its waste minimization efforts (annual reports).

Changes from 2013 to 2018

The efforts to create a unified platform, in order to benefit from automation and synergy, continued in this period. The R&D Director, who was recruited in 2012, started the company's digitalization journey as part of this mission. According to him, this journey had continued until 2018, and would also continue afterwards. The digitalization efforts had a focus on structuring all the data in the product development process. This involved utilizing different tools and technologies such as CAD, BIM and product data management (PDM), as well as pricing and simulation tools. During this period, Windows A continued to shut down its extra production units, until it was left with two factories in 2015 (annual report, 2015). The desired capacity was finally achieved in 2016, after moving the production of all other factories to these remaining units (annual report, 2016).

In 2014, the holding company was publicly listed and no longer had any majority shareholder (annual report, 2014). According to one of the interviewees, not having a majority shareholder facilitated the pursuit of innovation and new product development (NPD) strategies that were introduced in 2012. Several key positions were also recruited in line with this strategy between 2014 and 2017. Furthermore, a number of new window ranges and design concepts were launched during this period. The Marketing & Innovation Director, who was appointed in 2016, focused on improving the efficiency of

the company's R&D and Sales units. Therefore, certain restructurings took place in these departments that removed some of the bottlenecks in the company's innovation process and minimized the waste in the sales process. However, the Marketing & Innovation Director pointed out that innovation outside the company's existing platforms is not an easy task. It requires a considerable amount of resources and change to routines, and a large part of the company's R&D resources are used for adjusting existing machinery and platforms.

"Coming up with new ideas has never been the problem. The problem is scarce resources in R&D, and you also have to understand when coming into this business that a lot of it just involves making adjustments to current platforms, doing pruning, fixing things... so maybe only 15% of the R&D team's entire work agenda is innovation."

(Marketing & Innovation Director, 2018)

In addition, as expressed by the Marketing and Innovation Director, windows in general are a complex product. Window types can be considerably different, based on slight variations in the width of their frames, the type of glass or the ratio of wood to aluminium. These are not easy to understand for customers who are not technically informed about such details and specifications. As a result, many of the product developments that are carried out on windows are not easily observed and appreciated by end-users, despite their associated benefits.

As stated in most of the company's annual reports and pointed out by interviewees, maintaining the right balance in the order mix has always been a major concern for Windows A. This refers to the mix between industrial and consumer sales. In most years, Windows A experiences an unfavourable order mix where industrial buyers account for the majority of orders. Industrial buyers are powerful actors, imposing high price pressure on their purchases. According to one of the interviewees, the reduction in ROT benefits in 2016 has also contributed to this unfavourable mix. On the other hand, being the market leader and as per values communicated by the company, Windows A aims to be the window provider for every type of customer in Sweden. Therefore, in 2016, major investments were made for two main strategic starting points. One involved improving production efficiency by increasing automation, and the other involved speeding up the development of new products and concepts (annual report, 2016). In line with these

strategies, a lean work process was started at all major production units and new automated machinery was purchased (annual report, 2016). A pilot project has also begun at one of Windows A factories, testing paced production methods for more effective installation of custom-made products (annual report, 2017). However, according to the interviewees, ensuring efficient, paced production is a major challenge for Windows A, since – despite having standard window families – every order that the company receives is made-to-measure. This makes the process of design, configuration and production almost unique for every order.

“We have product families. We have... variances, which are aluminium or wood, etc.... But then, the similarities stop. Because you can have windows in whatever dimensions you want. And the problem is that we don’t have any filters saying no to certain things. There could be a million versions... So, the customer can place an order for basically anything and then it has to go into our configuration system... It’s extremely hard to learn, which is also a bottleneck. And everything needs to be configured into the system before you can actually produce it.” (Marketing & Innovation Director, 2018)

“Well, it is a very difficult business to analyse. Because we don’t really have a standard product. It’s all order-based and virtually every order is different to the next.” (CFO, 2018)

Moreover, in 2017, a decision was made by the holding company to assign more responsibility to each individual company within the group. This decision was made based on the assessment that the benefits from economies of scale and synergy had not been realized through unified platforms and centralized operations. The interviewees also believed that, through decentralization, the company can have a better focus on sales, by getting closer to both end-consumers and other customers. Therefore, a major restructuring and decentralization project has begun at Windows A.

“It’s not like in the car industry where you operate on very slim margins and really need the scale advantage. And that’s why we do this [decentralization], why we split up the companies. Because we see that there are no economies of scale in this business... We see some of our other companies within the group, where they haven’t tried to industrialize in the same way, and they are doing quite well.” (CFO, 2018)

“The consolidation is good, because you might find some synergies. But we feel that there is a middle layer that might not really provide enough value.” (R&D Director, 2018)

In line with the introduced strategies and investments made in 2016, Windows A also has a strong focus on launching innovative products that can shape the market. One of these innovative efforts has been directed towards digital solutions and smart windows. In 2017, the company opened an office at a science park with the aim of carrying out NPD and promoting their ‘digital business model’ (annual report, 2017). A goal was set for 50% of the products sold by 2020 to have the option of being ‘connected’ (annual report, 2017). In addition, according to the R&D Director, a digital business model would allow the company to increase its focus on offering smart solutions, instead of tangible products. In the same year, Windows A’s first range of connected windows and related mobile apps were launched (annual report, 2017). This was followed by the launch of a mobile app specifically made for carpenters in 2018.

However, as agreed by all interviewees, operating in a traditional and conservative industry imposes significant challenges in terms of introducing smart products and solutions. Operating in a traditional industry involves some aversion to such changes. For instance, according to one of the interviewees, the app that has been developed for carpenters is rarely used, despite receiving positive feedback from them with regard to its associated benefits. Connected products face the same challenge, due to a lack of demand from customers.

“From consumer-perspective, a window might just be a window, but when it comes to the details there’s quite a big difference. And I think you need to have some respect there as well. Because it’s a historical product and there’s a lot of resistant in the market to using something else. It’s very traditional.” (R&D Director, 2018)

“I think we see ourselves as the market leader, so in that sense, we are driving the market. But I don’t think that the housing factories demand a lot of product innovation from us. I think we are trying to innovate our products as it were, and pushing them to the market... Rather than the market asking us for something.” (CFO at Windows A, 2018).

Lastly, in 2017, Windows A opened an online shop for window accessories and spare parts. In November 2018, the company also started offering installation services for end-users. This operation had already been carried out by a sister company of Windows A on a smaller scale for a few years. However, in 2018, it was decided to offer the installation service via Windows A, which is the biggest and best known window brand in the group. According to the interviewees, this decision was made in order to come closer to end-users to ensure a better order mix. The Business Development Director added that the general trend towards the ‘death of retail’ also played a role in making this decision.

“They (consumers) would like to buy windows off the shelf if they come with the right specifications. They have normally done a lot of Googling before going there (DIY chains stores). And we just need someone to install it. So, by selling it, with our brand, they also feel that they are safer. Because if we do a bad installation, even if we are selling the best windows, your impression of the whole business is bad. And then it’s our brand. So, we need to be reliable.” (Business Development Director, 2018)

Nevertheless, as can be expected, having industrial customers with good bargaining power and strong positions in the market proved to be another challenge in this regard. Windows A received negative reactions from its industrial customers when introducing the online shop and the installation services targeted at end-users, since these changes would place the company in competition with some of its industrial customers.

“I’ve never been to a business where the customers dictate where we should sell.”
(Marketing & Innovation Director, 2018)

4.3.2 Windows A’s Business Models

Figures 4.15, 4.16 and 4.17 represent the company’s BMs at three points in time. The BMs are depicted based on the changes discussed in the previous sections, with the help of supplementary information from the company’s annual reports and interviews. It should be noted that, with the aim of avoiding redundancy, the BMs in T1 and T2 only represent the changes that took place in different BM components. Unfortunately, it was not possible to obtain accurate financial data on Windows A’s cost structure. This is because the company is made up of two separate financial entities, where one reports the

production-related costs and the other reports the sales-related expenditure. However, according to the information provided by the company's CFO, direct material generally makes up around 50% of the total turnover. There have also not been any significant changes in the company's cost structure during this period.

Another component that has remained unchanged over the years is the company's revenue model. As discussed by both the Marketing Director and the CFO, this is an area where Windows A needs to improve, since the revenue model is cost-based and does not make a distinction between different customer groups or sales channels. There are also some cost miscalculations in this process, which at times can lead to offering prices to different customer groups that are too low or too high.

"Cost-based, cost-based... we always look at that, which I think is wrong. I think we are moving into a more value-based price market. But we are still very focused on bottom-up instead of, you know, top-down... And sometimes, I also think that we don't even have a clue about the cost. So, our price-model is not at all geared to different offerings. It's a very rough model I would say... Sometimes we are too expensive. Because we don't know that this is the cost and sometimes, we are maybe... too cheap where we could balance it better." (Marketing & Innovation Manager, 2018)

Windows A has recently started developing in terms of the value they deliver to their customers. According to the R&D Director, by delivering smart windows they aim to shift their offerings from purely tangible products to smart solutions. Furthermore, the company has recently offered educational services on its website. As explained by the Marketing Director, Windows A needs to maintain its position as a market leader by caring for its consumers throughout the purchase process.

"So, you have to provide a little care, too, in order to become the leader. So, when we change our position to become a leader, we should then educate our consumers, customers. We should hold them by the hand while they are making one of the most important purchases in their life, more or less. It's actually quite stressful to buy windows. You do it once or twice in a lifetime. So, it's not that you're used to it... or know what it is..." (Marketing & Innovation Manager, 2018)

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Owned 95% by a private equity co. and 5% by senior executives Skilled workforce in design and production Ownership of premises and machinery (not highly automated and mostly manual) 	Products and services: <ul style="list-style-type: none"> Offering a wide range of windows, sliding doors and window accessories Made-to-measure windows 	Customer segments: <ul style="list-style-type: none"> Selling to retailers, builder's merchants, house manufacturers, large construction companies Domestic only – within Sweden Two thirds of sales from the renovation market
Key activities: <ul style="list-style-type: none"> Purchase and procurement of raw materials Design process and cost calculation Sales operation carried out by a recently separated unit 	Value proposition: <ul style="list-style-type: none"> Being the market leader, providing windows for every type of need 	Key actors and relationships: <ul style="list-style-type: none"> Long-term relationships with many suppliers Close collaboration with sister companies Biggest producer in market, covering around 50% of the Swedish market Long-term relationships with many customers, especially house manufacturers and large construction companies Construction companies place significant pressure on prices
Cost structure: <ul style="list-style-type: none"> Was not possible to get access to the exact figures Direct material accounts for around 50% of total turnover 	Revenue model: <ul style="list-style-type: none"> Cost-based pricing with list prices Different rebates and kickbacks depending on the customer group 	Channels: <ul style="list-style-type: none"> Separate sales divisions – one for professional/industrial customers, one for consumers Not much advertising and publicity

Figure 4.15: Windows A's BM at T0

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Three production facilities across Sweden Reduction in number of employees as part of capacity adjustment Recent recruitment to key group-level positions including new CEO, Head of Info, Operational Manager and R&D 	Products and services: <ul style="list-style-type: none"> Two types of new windows launched with security and energy efficiency focus 	Customer segments: <ul style="list-style-type: none"> Unfavourable 10% drop in the share of consumer market (60%) 40% of sales to industrial market
Key activities: <ul style="list-style-type: none"> Coordinating economies of scale and best practice in internal activities Undergoing waste minimization, efficiency and lean mindset Business restructuring for capacity adjustments 	Value proposition: <ul style="list-style-type: none"> Consumer in mind, courage to improve, competent people at hand 	Key actors and relationships <ul style="list-style-type: none"> Collaborations at a science park More central control from group level
Cost structure:	Revenue model:	Channels: <ul style="list-style-type: none"> TV commercials targeted at end-users Consumer-friendly website developed

Figure 4.16: Windows A's BM at T1

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Publicly listed company with no majority shareholder Production units reduced to two Key group-level positions recruited, including Innovation Director, Bus. Dev. & Digital Solutions, Operations & Development and Finance Director New internal communication and new ERP system launched Some automated machinery purchased 	Products and services: <ul style="list-style-type: none"> The new windows ranges including an eco-labelled window Connected windows and patented innovations in window production and design Mobile apps for carpenters and connected windows Installation service for end-users Launched online educational services 	Customer segments: <ul style="list-style-type: none"> Direct sale of windows, installation services, window accessories/spare parts and smart products to end-users via e-commerce Unfavourable mix of 54% of sales to consumer market. 46% of sales to industrial market
Key activities: <ul style="list-style-type: none"> Internal organizational restructuring and decentralization Sales unit becomes part of the organization again, after restructuring Changes in functions and responsibilities of R&D section Towards internal digitalization and automation Pilot run of paced production 	Value proposition: <ul style="list-style-type: none"> Improved life at home; comfort, climate and safety Focus on caring for customers and being there for them in this process More customer involvement and education in product configuration Solution provider instead of just window producer with smart products 	Key actors and relationships: <ul style="list-style-type: none"> Strong new competitor entered market in 2015 More decentralized and independent control from the company Collaborations at a science park and with business accelerators Several collaborations with other smart home solutions companies
Cost structure:	Revenue model:	Channels: <ul style="list-style-type: none"> New brand campaigns Publishing trend reports TV advertising campaigns Online shop and e-commerce Two sales teams merged (industrial and consumer)

Figure 4.17: Windows A's BM at T2

4.4 Windows B

The Windows B company was established in 1918, and has a long history of producing project-specific and customized windows. The company currently has around 100 employees and works closely with large construction companies and window contractors. As shown in Figure 4.18 below, in contrast to Windows A as described in the previous section, Windows B’s turnover is slightly below the segment average. However, its turnover has been in line with the segment trend over the past decade. The very niche focus on only producing project-specific windows is one explanation for the modest turnover.

Figure 4.18: Windows B’s Turnover and Segment Average Turnover

Furthermore, as already shown in Figures 4.12 and 4.13 in the previous section, Windows B has mainly maintained an above average profit margin and ROC over the years, with the exception of the period between 2011 and 2014, which – as detailed in the timeline of the industry’s key events in Figure 4.4 – was a recession period for the construction industry. The next section will further discuss the changes that took place over the past decade in Windows B

4.4.1 Changes at Windows B

Figure 4.19 depicts the main events that took place in Windows B between 2007 and 2018. These events were identified based on the interviews, a study of the company’s and its holding company’s annual reports, the company’s website and other online news sources. These key events come in a wide variety of forms and include ownership changes

and acquisitions, changes in resources, internal systems and operations, products, etc. As can be seen in the figure, the timeline is marked at three points in time (i.e. T0, T1 and T2), dividing the ten years into two time periods. The next two sections will delve deeper into the changes that took place during each time period.

Changes from 2007 to 2013

Since 2004, the company was owned by an industry businessman (annual report). In 2008, half of the company's shares was bought by a new holding company. The new holding company acquired and merged several Swedish window manufacturers and their suppliers during the period 2007 to 2011. Windows B was one of these companies that became fully owned by the new holding company by the end of 2011 (annual reports 2007, 2008, 2011 & 2012). As stated in the company's annual reports and confirmed by Windows B's CEO, after the changes in the ownership, around 20% of Windows B's sales and around 5% of its raw material purchases were with its new sister companies.

Furthermore, until 2013, the company was only responsible for producing windows, as an external wood manufacturing group oversaw the sales and marketing of Windows B's products (annual report, 2007). However, in 2012 and after the change of ownership, a decision was made to withdraw from this arrangement. As a result, the partnership with the wood manufacturing group was terminated in 2013 (annual reports, 2012 & 2013). Windows B then invested in its own internal sales department (annual report, 2013). According to the interviewees, Windows B had mainly long-term relationships with its customers, due to the project-specific nature of its offerings. Therefore, there was no great need for marketing and advertising, even after the partnership with the wood manufacturing group ended. In addition, according to the CEO, the company had begun a limited offering of assembly and installation services to some of its customers in 2012.

Changes from 2014 to 2018

In 2014, and less than two years after initially offering installation services, it was decided to wind down the service. According to the CEO, the company did not want to become a competitor to its own customers through this service offering. Furthermore, 2014 was also associated with major investments in production improvements and efficiency (annual report, 2014). Several key positions such as Sales and Marketing Manager and Lean Coordinator were also appointed in 2014 and 2015.

Figure 4.19: Timeline of key events at Windows B

In 2014, 40% of the company's net sales were to its sister companies. This amount was considerably higher than any other year (annual report, 2014). By 2015, Windows B had started to increase its presence in the media and the press. For instance, it started advertising the benefits of its windows in terms of energy-related cost reductions for real estate companies.

"We want to be seen by architects and consultants that work on construction projects..." (Marketing Manager, 2017, translated from Swedish)

Moreover, according to the interviews, the company has witnessed a change in the characteristics of the new generation of industrial customers over the years. Two of the interviewees stated that, unlike the older generation of buyers that the company works with, the new generation is less experienced and educated about the complexities of windows manufacturing. As a result, customers need more help and support during the purchasing process, which increases the amount of time taken by the sales staff to finalize orders. This has also led to a need for Windows B to provide more educational information on its website about windows.

"The customers themselves, they don't even know what exactly they want sometimes."
(CEO, 2017, translated from Swedish)

During the years since the change in ownership, there has also been some organizational restructuring at the higher levels of the holding company (annual report, 2017). According to the interviewees, since these changes the holding company has imposed certain requirements for increased collaboration between the sister companies. These include more regulated purchases of raw material, as well as more standardized accounting and reporting procedures across all the companies in the group. According to the CEO, the increased level of collaboration between the sister companies comes with its own benefits in terms of the complementary nature of their offerings. However, the standard reporting requirements present certain challenges for Windows B. According to the CEO and the IT Manager, the company does not have enough resources or expertise for more digitalized, systematic reporting. This level of systematic reporting requires the integration of several digital systems such as ERP, MPS, BIM and configurator systems. However, according to the IT Manager, at Windows B either these systems work in parallel with each another or the reporting procedures are carried out more manually using

simpler tools such as MS Excel. As a result, the process of updating and integrating the systems is difficult and time-consuming.

Finally, in early 2018, the holding company introduced a growth strategy for Windows B. The aim was for this to be achieved via factory developments, to increase production volumes. This resulted in a SEK 20 million investment in purchasing automated machinery. A new position of Production Manager was also introduced in 2018. The Production Manager started to oversee the expansion plans and was also responsible for organizing and educating staff, alongside the new production routines and the use of new machinery.

4.4.2 Windows B's Business Models

Figures 4.20, 4.21 and 4.22 represent the company's BMs at three points in time. The BMs are depicted based on the changes discussed in the previous sections and with the help of supplementary information from the company's annual reports and interviews. With the aim of avoiding redundancy, the BMs in T1 and T2 only represent the changes that took place in different BM components. Furthermore, the changes shown in the Cost Structure component of the BMs are purely based on the company's financial figures and are the average of the past five years in each of the BMs. The respondents did not mention any significant change in the company's cost structure during the interviews.

At Windows B, the employees and their competences have always been considered as one of company's key resources.

"The knowledge is not in the machinery, but in the people." (CEO, 2017, translated from Swedish)

"The personnel that we have here are very stable. People care." (Production Manager, 2019, translated from Swedish)

Therefore, the company aims to focus on developing its personnel while also growing its production capacity.

"There can be consequences. It will be a lot... Then we are also at a stage where we should not only grow in terms of volume, but also in terms of personnel. It is important to be able to train staff, to make them feel that they are part of the group." (Production Manager, 2019, translated from Swedish)

Furthermore, the CEO and Marketing Manager of Windows B both emphasized the company's niche market position. Windows B only produces project-specific windows and does not aim to change its market position. As a result, this leads to considerable stability in the Customer Segments and Value Proposition BM components.

"We will never be in competition with our big sister company in terms of their production volume of around 3000 windows per day. That's a completely different world." (CEO, 2019, translated from Swedish)

"We don't just go for anything and everything... We don't search meticulously for specific customers; we choose the specific window projects." (Marketing Manager, 2017, translated from Swedish)

The challenge, however, is always to find the right balance between the level of standardization and customization in the production of their unique offerings.

"So, it's a balance. We should not remove too much. Then we fall into the standard group of products. And we must not remove too little, because then we will be almost sluggish and that is something that only we will suffer from." (CEO, translated from Swedish, 2019)

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Owned by an industry businessman's family Highly skilled workforce in design and production Ownership of premises and machinery (not very automated and mostly manual) 	Products and services: <ul style="list-style-type: none"> Providing highly customized and unique windows Wood or aluminium-clad windows, window doors, special designed windows 	Customer segments: <ul style="list-style-type: none"> Only take project-specific orders Both new construction and renovations High focus on working with customers who already have technical knowledge about windows 5% exports to Russia
Key activities: <ul style="list-style-type: none"> Purchase and procurement of raw materials Design process Production of customized windows Marketing and sales carried out by a wood manufacturing group on their behalf Mainly manual job routines 	Value proposition: <ul style="list-style-type: none"> Not the cheapest windows producer in the market, but will not have add-on prices later Producing very closely with the customers, total problem solving and high degree of customer support throughout the process 	Key actors and relationships: <ul style="list-style-type: none"> Long-term relationships with many suppliers Member of economic association of the wood manufacturing group, which takes charge of sales and marketing Long-term relationships with many customers High price pressure due to working only with large construction companies
Cost structure: <ul style="list-style-type: none"> Raw materials and supplies: 48% Personnel costs: 33% Other external expenses: 18% Depreciation of tangible goods: 1% 	Revenue model: <ul style="list-style-type: none"> Cost-based price quotations given to large construction projects for each order 	Channels: <ul style="list-style-type: none"> No real need for advertising Sales and marketing carried out via a wood manufacturing group

Figure 4.20: Windows B's BM at T0

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> ○ Fully owned by a Danish holding co. ○ Sales and marketing department established ○ Assembly service business developed 	Products and services: <ul style="list-style-type: none"> ○ Launched a new sound window ○ Offering fitting and assembly services 	Customer segments: <ul style="list-style-type: none"> ○ 1% exports to Russia ○ No future export plans
Key activities: <ul style="list-style-type: none"> ○ Marketing and sales carried out internally ○ Assembly business for customers 	Value proposition:	Key actors and relationships: <ul style="list-style-type: none"> ○ No longer a member of economic association of the wood manufacturing group ○ Collaboration with the sister company on sales (20%) ○ 2% of purchases from sister companies
Cost structure:	Revenue model:	Channels: <ul style="list-style-type: none"> ○ Not very reliant on advertising due to long-term relationships with customers ○ Will be working on brand developments, as previously known via the wood manufacturing group's brand ○ Website with basic information

Figure 4.21: Windows B's BM at T1

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Fully owned by the Swedish holding co., the subsidiary of the Danish enterprise Major investments in factory improvements such as painting and glazing departments, and purchasing high-tech multi-function machinery Competence matching and educating workforce for new technical requirements Increase in white-collar workforce 	Products and services: <ul style="list-style-type: none"> Two new window models launched No longer offering assembly services 	Customer segments: <ul style="list-style-type: none"> No exports and no plans for future exports
Key activities: <ul style="list-style-type: none"> High focus on improving production flow, waste minimization and job rotation for increased volume and capacity Still quite manual and paper-based job routines, starting more systematic reporting and calculations 	Value proposition:	Key actors and relationships: <ul style="list-style-type: none"> Collaboration with sister companies 5% of purchases & 15% of sales with sister companies
Cost structure: <ul style="list-style-type: none"> Raw materials and supplies: 48% Personnel costs: 36% Other external expenses: 15% Depreciation of tangible goods: 1% 	Revenue model:	Channels: <ul style="list-style-type: none"> More presence in social media and digital advertising Website used for education and guidance on windows for customers

Figure 4.22: Windows B's BM at T2

4.5 Prefab Co.

Prefab Co. was established in 1956, when its founder – who was experienced in traditional wooden house building – became fascinated by the concept of prefabricated homes on a trip to the USA. The company is currently a subsidiary of a modular building group. It has 190 employees and is active in building modular constructions for offices, schools, site huts and student and retirement housing. In addition, with the help of its sister companies, Prefab Co. provides the possibility to rent and lease its standardized modular building and site huts. Sweden has a long history of constructing one- or two-storey timber-framed buildings. Since 1996 and with the changes in Swedish building codes, multi-storey timber-framed buildings have also been built (Meiling, Backlund and Johnsson, 2012). Developing an industrialized concept started quite early in wood construction (Nord, 2005), and pre-fabricated or off-site construction is now a growing trend in this industry (Brege, Stehn and Nord, 2014). The prefabricated (or ‘prefab’) building segment in Sweden has around 25 companies with approximately 2400 employees. As shown in Figure 4.23 below, despite fluctuations over the years, Prefab Co.’s turnover has always been above the segment average. However, the economic recession that started in late 2008 seemed to have a dramatic negative effect on the company’s turnover.

Figure 4.23: Prefab Co.’s Turnover and Segment Average Turnover

Furthermore, as shown in Figure 4.24, despite the fluctuations, Prefab Co.’s profit margin seems to be close to the segment average. Prefab Co.’s ROC, on the other hand, has

experienced quite dramatic changes over the past decade. Interestingly, in 2009 and 2013 these fluctuations were also in completely the opposite direction to the segment's average ROC.

Figure 4.24: Prefab Co.'s Profit Margin & ROC and Segment Averages

The next section will focus in more depth on the changes that took place at Prefab Co. over the past decade.

4.5.1 Changes at Prefab Co.

Figure 4.25 depicts the main events that took place at Prefab Co. between 2007 and 2018. These events were identified based on the interviews, a study of the company's and its holding company's annual report, the company's website and other online news sources. These events come in a wide variety of forms and include ownership changes and acquisitions, changes in resources, internal systems and operations, products, turnover, etc. As can be seen from the figure, the timeline is marked at three points in time (i.e. T0, T1 and T2), dividing the ten years into two time periods. The next two sections will delve deeper into the changes that took place during each time period.

Changes from 2007 to 2012

In 2008, Prefab Co. started offering turnkey projects for standardized constructions, with fixed prices and a fixed delivery date. This group of products is called catalogue buildings. According to Prefab Co.'s CEO, one of the first incentives for making this decision was the fact that the cost and the delivery date are two of the majority of their customers' main concerns.

Figure 4.25: Timeline of key events at Prefab Co.

“The two key questions in our branch are: ‘What does it cost?’ and ‘When can it be finished?’ That’s almost the two first questions.” (CEO, 2018)

However, according to the CEO, because of the complex nature of construction projects, it is not possible to provide this type of information quickly for customized buildings. Furthermore, as previously mentioned, the construction projects in Sweden are closely tied with tendering as a dominant purchasing strategy. Many of the industrial or public customers in this industry have considerable bargaining power and place immense pressure on prices.

“It’s (the profit margin) squeezed by the way they purchase public tenders... When you set the price, you can always find someone who does it cheaper... And sometimes we win, sometimes we lose, and sometimes we win by a lot and sometimes we lose by a lot.” (CFO, 2018)

In addition, according to the CEO, the price-based competition further intensified around 2007, when lower-wage builders from other EU countries entered the Swedish market. In general, catalogue buildings can realize the full potential of modular production. According to the CEO, this is thanks to cost reductions, improved quality and a considerable decrease in the production time for the company. Furthermore, the CEO argued that customer satisfaction can also be higher for standardized offerings compared with customized buildings, since in case of standardized offerings, the customer knows exactly what to expect at the time of delivery whereas there is always a risk that customers’ expectations will be different to the end-result of customized offerings. In addition, external factors beyond the company’s control, such as the unpredictability of contractors’ performance, can also play a role with customized offerings.

In 2010, Prefab Co. also decided to improve its internal operations with better digital systems. According to the interviewees, these digital systems had until then been limited to CAD drawings and a not fully updated ERP system.

“What is very common in the construction company is to solve issues on-site. They have to solve the problem when it comes up. Because it wasn’t correctly constructed from the beginning... and then we said we can’t afford it. We have to solve the problems using the computer before we go into production process.” (CEO, 2018)

In line with this decision, the company's BIM was implemented in 2010, followed by a 3D planning system in 2011 (annual report). Both the CEO and the CTO believed that the new generation of staff also played a positive role in digitalization of internal systems. Furthermore, the CEO mentioned the considerable drop in the price of the required software and its user-friendliness as additional positive aspects of digitalization.

"The younger ones... all the engineers we hire from university, they are using [the new generation of BIM] and 3D as standard. It's natural for them, 2D and [older generations of BIM] are unnatural. So that helps us a lot. Because when they start, they are pushing us forward because they have used [the brand of new BIM software] in ways that we have not been using it here..." (CTO, 2018)

However, as stated in the company's annual report (2011), the implementation of the 3D planning system caused operational disruption at the factory producing catalogue and customized buildings.

Changes from 2013 to 2018

As can be seen from Prefab Co.'s timeline of key events, the various efforts to update and digitalize internal systems continued throughout this period. However, the digitalization of internal operations using systems such as ERP, BIM and other production systems brought its own challenges. According to the company's CTO, Prefab Co. currently has several different databases linked separately to each of these systems. For these systems to function well together, all these databases need to be integrated. This is a difficult and time-consuming process, which the company has not managed to achieve yet. In addition, two of the interviewees mentioned that although the initial objective of having more digitalized operations was to save time, so far, this objective has not been met. The CTO further explained that digitalized systems have considerably increased the accuracy of the company's product designs and provided detailed drawings. However, they have not expedited the operation process yet because it takes time to enter all the detailed specifications into the system during the design phase.

"But this is good, because it forces us to take decisions earlier in the process and that is valuable for us. So, the process in 3D is better but there haven't been any good effects, in terms of time, as we had hoped..." (CTO, 2018)

In 2015, the ownership of Prefab Co.'s holding company changed (annual report). The change in the ownership was then followed by strategies for waste minimization and automation of production processes. As a result, lean-thinking practices were introduced on the production floor. Moreover, the company's biggest investment in automation machinery was made in 2018. However, as also evident from Prefab Co.'s timeline of key events, the company has always struggled to maintain a balance in its order mix between site huts, standard catalogue buildings and customized buildings for special projects. This issue has been referred to in several of the company's annual reports, and was mentioned by majority of interviewees. Prefab Co.'s CFO believed that the small scale of the company's operations and its lack of power to influence customers' orders prevents the benefits of automation from being achieved.

"To start a business like this today and try to have at least some level of automation, I would say it's very costly. And then of course if you don't have standardized products, it's even more costly because you need to have machinery or equipment that can handle a lot of different types of projects... We try to promote standard projects, but it's the buyer on the other side who decides what they want to buy. Then it becomes a totally different question from a financial perspective." (CFO, 2018)

Moreover, according to the CEO, the company's small scale also limits the types of strategies that it can follow.

"Prefab Co. is an SME. So, we don't have those people and resources that can predict the future. If anybody can, I don't know. But for example... those big companies, of course they try to understand what the next step in the environmental policy will be and so on. But we are more, you might say, reactive than proactive." (CEO, 2018)

4.5.2 Prefab Co.'s Business Models

Figures 4.26, 4.27 and 4.28 represent the company's BMs at three points in time. The BMs are depicted based on the changes discussed in the previous sections and with the help of supplementary information from the company's annual reports and interviews. With the aim of avoiding redundancy, the BMs in T1 and T2 only represent the changes that took place in different BM components. Furthermore, the changes in the Cost

Structure component of the BMs are shown purely based on the company's financial figures and are the average of the past five years in each of the BMs. The respondents did not mention any significant change in the company's cost structure during the interviews.

As mentioned by the CEO, the customers in their industry have two main initial questions that need to be answered: the final cost and the time of delivery. Changes in the final price of the building, after delivery, are therefore not desirable for customers. Therefore, the value that the company's fixed-price catalogue housing brings lies in answering these two questions from day one.

“An old boss of mine said one day, ‘OK, now we are going to build a house for 10 million, I wonder how much it is going to be?!’ It’s important to predict the price. And Prefab Co. has the capability to say this is going to cost 11 million and then it costs 11 million. Then it’s a good thing for the buyer.” (CEO, 2018)

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> ○ Labour-intensive production ○ Skilled workforce in sales, design and production stages ○ Digital systems in resource planning (ERP) and design (CAD) ○ Three factories in three cities: One for customized/catalogue modular buildings, one for rental modular buildings and one for standardized site huts 	Products and services: <ul style="list-style-type: none"> ○ Turnkey projects of one-/two-storey modular buildings ○ Rental modules ○ Fully standardized site huts ○ Building schools, pre-schools, offices, non-family housing and site huts. 	Customer segments: <ul style="list-style-type: none"> ○ Target market is professional purpose buildings and non-family housing ○ 65% public customers: municipalities and county councils ○ 35% private customers: real estate companies, businesses, private schools, pre-schools, etc.
Key activities: <ul style="list-style-type: none"> ○ Tender preparation, cost calculation ○ Design, sales ○ Off-site manufacturing of modules, transport, on-site assembly and completion 	Value proposition: <ul style="list-style-type: none"> ○ Prefabricated constructions that maintain the quality and standard of traditional buildings, but with lower price ○ Leasing possibilities for temporary needs ○ Low-price standardized site huts for efficient, basic use 	Key actors and relationships: <ul style="list-style-type: none"> ○ Municipalities as one of the main customers, have strong bargaining power and are price-sensitive ○ Long-term relationship with most suppliers ○ Collaboration with sister companies for rent and leasing of modular buildings ○ Long-term relationships with several returning customers but in need of more
Cost structure: <ul style="list-style-type: none"> ○ Costs of goods sold: 93% ○ Sales cost: 3% ○ Administrative cost: 4% 	Revenue model: <ul style="list-style-type: none"> ○ Selling based on industry's standard payment plans ○ Leasing options for catalogue modular buildings and site huts 	Channels: <ul style="list-style-type: none"> ○ Submitting tenders as the most common means of getting orders for modular buildings ○ Several returning customers ○ Direct personal sales ○ Website with basic information ○ Marketing via fairs and mail

Figure 4.26: Prefab Co.'s BM at T0

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> ○ Dramatic decrease in number of employees (42%) ○ Digital systems in ERP and design (CAD, 3D Planning and BIM) 	Products and services: <ul style="list-style-type: none"> ○ Offering catalogue houses: fixed price and fixed completion date 	Customer segments: <ul style="list-style-type: none"> ○ 75% public customers ○ 25% private customers ○ Highly fluctuating mix of modular buildings, site huts and rental module; unfavourable at times
Key activities: <ul style="list-style-type: none"> ○ More digitalized process via BIM 	Value proposition: <ul style="list-style-type: none"> ○ Turnkey projects with fixed price and fixed completion date as an advantage 	Key actors and relationships:
Cost structure: <ul style="list-style-type: none"> ○ Costs of goods sold: 91.5% ○ Sales costs: 4% ○ Administrative costs: 4.5% 	Revenue model:	Channels: <ul style="list-style-type: none"> ○ Improved website for information sharing

Figure 4.27: Prefab Co.'s BM at T1

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none">○ 38% increase in number of employees○ Invested in automated production machinery○ Further developed digital systems	Products and services: <ul style="list-style-type: none">○ Unfavourable product mix of modular buildings: 50% catalogue buildings and 50% customized buildings	Customer segments: <ul style="list-style-type: none">○ 54% public customers○ 46% private customers
Key activities: <ul style="list-style-type: none">○ Undergoing the process of lean thinking, continuous improvement and minimizing waste through production re-planning, digital processes of paperless communication and record of internal disruption	Value proposition:	Key actors and relationships: <ul style="list-style-type: none">○ Collaboration with universities, digital service providers and competitors
Cost structure: <ul style="list-style-type: none">○ Costs of goods sold: 93.9%○ Sales costs: 2%○ Administrative costs: 4%○ R&D: 0.1%	Revenue model:	Channels: <ul style="list-style-type: none">○ Comprehensive website○ Digital sales material

Figure 4.28: Prefab Co.'s BM at T2

4.6 Housing Co.

Housing Co. is a family-owned business established in 1944. The company currently has around 200 employees and has manufactured high-quality, single-family houses for the past few decades. A recent development for this company began in 2017 with the production of modular and prefabricated one- or two-storey multi-family housing. In general, the offerings of companies active in this segment range from highly standardized catalogue houses to fully customized family housing. Companies may also offer special buildings such as schools or health centres (Nord and Brege, 2014). As explained by Housing Co.'s CEO, the Swedish house segment generally has three groups of offerings. First is budget-priced housing. The houses in the budget group are the so-called catalogue houses, where everything – except for minor alterations that are tailored to customer preferences – is standardized. The second group is mid-range priced houses. Despite the majority of the offering being in a standard format, compared with the budget group, there is more room for customization in the mid-range category. Last comes the premium, high-priced group. In premium houses, buyers can customize their houses to a high degree based on their preferences. The house segment in Sweden comprises around 40 companies with a total of approximately 3300 employees, or an average of 83 employees at each company. Housing Co. falls well above the segment average when it comes to both the number of employees and its turnover, as shown in Figure 4.29 below. An interesting observation is that, except for the slight drops in 2009 and 2012, the company has maintained a fairly high turnover during the years of economic recession.

Figure 4.29: Housing Co. 's Turnover and Segment Average Turnover

Furthermore, studying the profit margin and ROC trends of Housing Co., which are depicted in Figure 4.30, indicates the superior financial performance of the company over the past decade. Despite experiencing sharp drops in both profit margin and ROC in some years, the company has maintained a high and above average profit margin and ROC in recent years.

Figure 4.30: Housing Co. 's Profit Margin & ROC and Segment Averages

However, as also previously mentioned, some of the dramatic fluctuations in these key figures can be explained by certain changes at the company. The next section will therefore focus in greater depth on the various changes that the company has gone through over the past decade.

4.6.1 Changes at Housing Co.

Figure 4.31 depicts the main events that took place at Housing Co. between 2007 and 2018. These events were identified based on the interviews, a study of the company's and its holding company's annual reports, and the company's website and brochures. These events come in a wide variety of forms and include ownership changes and acquisitions, changes in resources, internal systems and operations, products, turnover, etc. As can be seen from the figure, the timeline is marked at three points in time (i.e. T0, T1 and T2), dividing the ten years into two time periods. The next two sections will delve deeper into the changes that took place during each period.

Figure 4.31: Timeline of key events at Housing Co.

Changes from 2007 to 2012

As was also evident from the company's financial figures, the company was performing well in 2007 and early 2008, with turnover, profit margin and ROC well above the Swedish housing segment's average figures. These two years were also associated with investments in improvements and modernization of the factory floor (annual reports, 2007 & 2008), including investments in new buildings for timber storage, renovating workstations (annual report, 2007) and introducing CAM/CAD for off-site production of two-layer exterior walls (annual report, 2008). However, the start of the economic recession in late 2008 and early 2009 also took its toll on Housing Co., which led to dramatic drops in the company's turnover and profit margin (annual report, 2012). During this period, the company introduced its first budget house for a new customer group, which was more of a standardized catalogue house (annual report, 2010 and interviews). This was followed by the launch of the second catalogue house in the budget housing series in 2012 (annual report, 2012).

Despite the period of recession between 2009 and 2012, the company has managed to keep its financial figures above the average for Sweden's housing segment. Moreover, in order to boost the return on assets, the holding company increased its active securities trading (annual report, 2011). This period has also been positive with regard to company's exports. The exports to Germany have continued to increase (annual report, 2011) and Housing Co. managed to enter the Norwegian market for the first time in 2012 (annual report).

Changes from 2013 to 2018

By 2013, the Swedish economy was stabilizing again with evidence of a significant boost in consumer demand (annual report, 2014). In 2014, Housing Co. acquired a premium housing manufacturer and its brand. According to the annual report for that year, this purchase aimed partly to expand the company's production capacity for prefabricated houses and partly to develop the premium brand. However, in mid-2015, the board decided to discontinue operations under the premium brand, in order to fully invest in existing operations and the upcoming project for producing prefabricated modular housing (annual report, 2015). This was followed by the full transfer of operations from the premium factory to the existing operations in 2017 (annual reports, 2016 & 2017).

The premium manufacturer's premises were also rented out during this period (annual report, 2017). Instead of the focus on offering premium housing, at the end of 2018 Housing Co. launched eight different models of its budget house series.

Furthermore, during this period, Housing Co. invested several million kronor in machinery and premises (annual report, 2017). Some of these investments had a focus on digitalizing operations in 2017 and 2018. According to the interviews, this included introducing a new ERP system and turning internal operations paperless. The use of tablets for communicating internal documents and drawings at production and construction sites began in this period. According to the Sales Manager, the idea of investing in tablets initially came from their contractors.

"It is our contractors that we work with who have demanded this... We have a very good relationship with them. So, once a year we have a construction meeting where they give their views on products and we can provide information. And it was on one of those occasions that the question came up. And then we have considered it and carried out testing with digitalization on the construction site." (Sales Manager, 2018, translated from Swedish)

As stated on the company's website, Housing Co. has recently started low-scale collaborations with other entities to provide smart housing solutions. However, the CEO of Housing Co. has expressed his uncertainty about the current situation in terms of the existence of several smart housing platforms in the market. He explained that there is currently no standard platform to which all smart home products, such as windows, doors, lighting, etc., can be connected, because each of the market leaders is introducing its own version and its own different apps. This makes it difficult for house manufacturers to adapt to all these different platforms. He further added that, at this point, it is uncertain how complex the future of smart housing solutions will be, with a wide span from highly connected houses to having only few smart products. It is not clear where within this spectrum the future of smart housing will be. As a result, Housing Co. has decided not to take much immediate action in this regard until the smart housing market is more mature and certain standard platforms are available on the market.

The final major change that Housing Co. underwent during this period was the inauguration of its factory producing prefabricated multi-family housing in 2017 (annual

reports and interviews). Both the exteriors and interiors of these modular buildings are constructed almost entirely off-site in the factory. According to the interviews, the company received its first order in 2017 and the project was completed in 2018. The first round of buyers moved into the prefabricated family houses at the end of 2018. The decision to start this operation was triggered by several factors, including the difficulties associated with on-site construction and the shortage of competent contractors to carry out the process efficiently. The CEO also mentioned that, despite the availability of competent foreign contractors/workforce, it is not always easy to work with them.

“There is absolutely nothing wrong with foreign labour in Sweden. The problem is that there is no Swedish person at the construction site when the drawings and construction plans are in Swedish. So, you bring in people from the other side of the Baltic Sea, who come here, who are very good carpenters, but they can’t read the drawings. Then we have a problem. It’s also something... you don’t normally think about. You just think that they are skilled craftsmen.” (CEO, 2018, translated from Swedish)

Furthermore, the boom in the construction of multi-family housing is another contributing factor. According to the interviews, this has also led to municipalities being inclined to provide land mainly for the construction of multi-family housing. Difficulties in obtaining access to buildable land has also motivated the company to provide and sell buildable land to consumers themselves, as part of the company’s offerings.

“Then there is one more thing: the municipalities do not provide enough buildable land for us, to the extent that we would need for our single-family houses. We have sellers from Umeå in the north down to Skåne in the south, and most say that there is great demand for the houses. But they have nowhere to build. There is no buildable land, and the municipalities have not produced ‘detailed development plans’. It is quite common right now, we see that the municipalities produce ‘detailed development plans’ during boom times, instead of preparing them during the recession and having them ready, as we suggest. And when there is a boom, you can pick these up.” (CEO, 2018, translated from Swedish)

Alongside starting modular building operations, the holding company of Housing Co. also invested in a new subsidiary, owning 51% of that company (annual report, 2017). This new subsidiary focuses on development and sales of housing projects for modular

buildings. At the time of the interviews in December 2018, the Sales Manager pointed out that although it is also possible to manufacture single-family houses with modular and off-site production, they have decided to not do so now, as that would have led to internal competition between the two sales teams responsible for single-family housing and modular multi-family housing.

4.6.2 Housing Co.'s Business Models

Figures 4.32, 4.33 and 4.34 represent the company's BMs at three points in time. The BMs are depicted based on the changes discussed in the previous sections and with the help of supplementary information from the company's annual reports and interviews. With the aim of avoiding redundancy, the BMs in T1 and T2 only represent the changes that took place in different BM components. In addition, considering that the newly inaugurated modular building operation runs through a completely separate organizational setting, Figure 4.35 individually depicts its current BM. Furthermore, the changes shown in the Cost Structure component of the BMs is shown purely based on the company's financial figures and is the average of the past five years for each of the BMs. The respondents did not mention any significant changes in the company's cost structure during the interviews.

The company prides itself on producing high quality housing. Housing Co. has recently won the House of the Year award in a Swedish competition (annual report, 2017). According to the Sales Manager, the company's house prices may at first seem high, but the starting price includes many options that are considered to be add-ons by other companies. However, she believes that the company is less strong at communicating its values to consumers than it should be, considering that the quality of its offerings equates with the top actors in the segment.

“The values and goals are about the same (over these years), we have not twisted and disputed them much. I think about what our company's founder used to say. He said: ‘We are going to build really good houses that are better than the others.’ That was the goal. And perhaps it sounds a little... cocky, but this message is still with us to some extent. So that goal remains.” (Development Manager, 2018, translated from Swedish)

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Four generation family ownership Skilled workforce in design and production Up-to-date production facilities Strong financial position Secured access to timber via sister company Ownership of land, premises and machinery Local sales offices in Sweden and Germany 	Products and services: <ul style="list-style-type: none"> Villas are the core competence and offering Single-family housing in general Made of wood, mix of wood and stone, or with creative architecture One-, 1.5- or 2-storey houses Ranges from part-customized to highly customized designs Mid-range offerings that are positioned close to premium Garages 	Customer segments: <ul style="list-style-type: none"> Individual home buyers 95% in Sweden, 5% in Germany Mainly mid-ranged price and some premium buyers
Key activities: <ul style="list-style-type: none"> Purchase and procurement of raw materials Marketing, sales and order taking, also involving architects Design process Production of components in the factory Mainly on-site construction Contractors in charge of on-site construction and assembly 	Value proposition: <ul style="list-style-type: none"> Summarized as: “Safety, knowledge, long-term and cost awareness” Offering high quality houses that last for a lifetime The starting price may seem high to customers at first, but they will notice that the starting price comes with a high standard and includes features that are considered add-on options by many other companies 	Key actors and relationships: <ul style="list-style-type: none"> Long-term relationships with several suppliers Transport services provided by a sister company Timber provided by the other sister company Collaboration with builders and contractors for the construction phase Collaboration with municipalities Some collaboration with competitors
Cost structure: <ul style="list-style-type: none"> Raw materials and consumables: 59% Other external expenses: 25% Personnel costs: 15% Depreciation of tangible goods: 0.8% Other operating expenses: 0.2% 	Revenue model: <ul style="list-style-type: none"> Selling based on industry’s standard payment plans 	Channels: <ul style="list-style-type: none"> Printed materials in relevant magazines and mail Sales offices around Sweden and in Germany Company website with basic information

Figure 4.32: Housing Co.’s BM at T0

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> ○ CAD/CAM for production of two-layer exterior walls ○ Strong financial position and increased investment in securities ○ Transport facilities as part of internal resources 	Products and services: <ul style="list-style-type: none"> ○ Two models of budget series: standardized houses 	Customer segments: <ul style="list-style-type: none"> ○ Entered Norwegian market ○ From higher quartile budget buyers to lower quartile premium buyers
Key activities: <ul style="list-style-type: none"> ○ Mainly on-site construction, only walls are prefabricated off-site 	Value proposition: <ul style="list-style-type: none"> ○ Budget series maintains high standards, minus the flexibility 	Key actors and relationships: <ul style="list-style-type: none"> ○ Merged with the sister company providing transport services
Cost structure: <ul style="list-style-type: none"> ○ Raw materials and consumables: 58% ○ Other external expenses: 21% ○ Personnel costs: 19% ○ Depreciation of tangible goods: 1.8% ○ Other operating expenses: 0.2% 	Revenue model:	Channels: <ul style="list-style-type: none"> ○ Developed company website for information sharing ○ More online presence in advertising

Figure 4.33: Housing Co.'s BM at T1

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> Local sales offices around Sweden only Acquired a new high-end brand and factory Investments in digital systems New CEO 	Products and services: <ul style="list-style-type: none"> Eight catalogue models of budget series standard houses Smart solutions in housing Services and offerings for buying buildable land 	Customer segments: <ul style="list-style-type: none"> 94% in Sweden, 5% in Germany, 1% in Norway From higher quartile budget to higher quartile mid-range buyers
Key activities: <ul style="list-style-type: none"> More digital internal information sharing Embracing lean thinking and waste reduction in production Implementing new ERP system 	Value proposition: <ul style="list-style-type: none"> Budget series maintains high standards minus the flexibility, now with more variety Tackling the problem of shortage of land 	Key actors and relationships: <ul style="list-style-type: none"> Merging and bringing the acquired brand under company's own brand Only using the real estate function of the newly acquired brand Increased collaboration with municipalities for changes in regulations and land availability Collaborations for smart housing
Cost structure: <ul style="list-style-type: none"> Raw materials and consumables: 60% Other external expenses: 20% Personnel costs: 17.6% Depreciation of tangible goods: 2.2% Other operating expenses: 0.2% 	Revenue model:	Channels: <ul style="list-style-type: none"> Very few printed materials in relevant magazines and mail Dominant presence in social media advertising Sales offices in Sweden only Developed company website, for information sharing and as a first step for placing orders

Figure 4.34: Housing Co.'s BM at T2

Operational platform	Offering	Market
Key resources: <ul style="list-style-type: none"> o Skilled workforce in design and production o Benefiting from existing competence in the sister company o Ownership of premises and highly automated production facility o Strong financial position through the holding co. o Secured access to timber via sister company o Four generation family ownership 	Products and services: <ul style="list-style-type: none"> o Single- or multi-storey multi-family housing o So far, only one- and two-storey housing constructed, in the form of terraced, detached and semi-detached houses o Fully modular, prefabricated buildings, in the form of turnkey projects 	Customer segments: <ul style="list-style-type: none"> o First-time home buyers with lower budgets
Key activities: <ul style="list-style-type: none"> o Purchase and procurement of raw materials o Design of standardized modules o Marketing, sales and order taking through sister company o Production of off-site prefab modules in standardized automated process o Following lean thinking in factory and use of digital tablets o Transport by the sister company o Final on-site assembly 	Value proposition: <ul style="list-style-type: none"> o Summarized as: "Safety, knowledge, long-term and cost awareness" o Offering high quality housing that lasts for a lifetime, with good floor plans designed by knowledgeable architects at reasonable prices 	Key actors and relationships: <ul style="list-style-type: none"> o Long-term relationships with several suppliers o Timber and transport services provided by sister companies o Collaboration with builders and contractors for the construction phase o Collaboration with municipalities and housing associations for regulations and availability of land
Cost structure: <ul style="list-style-type: none"> o No info available at the time of data collection 	Revenue model: <ul style="list-style-type: none"> o Selling based on industry's standard payment plans for condominiums 	Channels: <ul style="list-style-type: none"> o Printed materials in relevant magazines and mail o Sister company in charge of sales and marketing operations o Company website as a source of information sharing

Figure 4.35: Housing Co.'s Modular Construction BM at T2

4.7 Summary of the Chapter

This chapter was dedicated to shedding light on the empirical context of the thesis. It started by providing background information on the industry in question. The chapter then proceeded by describing each of the five case studies and their changes separately. Table 4.4 briefly summarizes the main changes that took place in each of the five case studies between Time 0 and Time 1, and between Time 1 and Time 2. In addition, based on the empirical information provided in this chapter, the changes in each of the case studies are structured and categorized into *series of changes*. This information is included in section B of the Appendix. These series of changes are structured by first pinpointing the initial internal and external triggers that started each series, after which the specific sets of changes which were the result of these triggers are listed. The challenges associated with some of these changes are discussed, and finally the BM components affected as a result of each series of change are mentioned.

In the next chapter, empirical information from the case studies will be used to carry out the analysis.

Table 4.4: Summary of the main changes at case companies between 2007 and 2018

Name	T0-T1	T1-T2
Stairs Co.	<ul style="list-style-type: none"> - Large investments in automated machinery - 3000 m² factory expansion - End of collaboration with the external sales organization, building own sales unit - Change of brand name - Start of the digitalization journey for internal operations - Founder company sold ownership to a holding company 	<ul style="list-style-type: none"> - Major investments (time and money) in digitalization of operations - Focus on efficiency rather than increasing turnover - Time- and action-based pricing instead of cost-based pricing - Wider offering of assembly services - Change of brand name - Increase in collaboration with Norwegian sister company
Windows A	<ul style="list-style-type: none"> - Intensive round of acquisitions by the holding company, including a few production units for Windows A - Focus on synergy, unified platforms and cost reductions to benefit from economies of scale - Merging and closing some of the production units. - Higher and unfavourable mix of industrial customers 	<ul style="list-style-type: none"> - Became a publicly listed company - Growing focus on innovation and NPDs - Growing focus on developing smart solutions - Focus on production efficiency and waste minimization - Investments in automation - Introduced e-commerce and an installation service concept - Organizational restructuring and decentralization at group level, due to not benefiting from economies of scale - An increasingly unfavourable mix of industrial customers
Windows B	<ul style="list-style-type: none"> - Change in the ownership from an industry businessman to a holding company - Withdrew collaboration with the sales company, started own sales operation - Started providing assembly services 	<ul style="list-style-type: none"> - Biggest order in its history (SEK 25 million) - Wound down the assembly service business - Increase in the level of control from the holding company, increased collaborations with sister companies - Major investments in automated machinery with the goal of increasing production volume
Prefab. Co.	<ul style="list-style-type: none"> - Fixed-price catalogue buildings introduced - Highly affected by the economic situation turmoil - Initial start of some digitalization in internal operation with BIM 	<ul style="list-style-type: none"> - Continued efforts in digitalization and automation - Change in the ownership of the holding company - Major investments in manufacturing automation machinery - Start of focus on lean management - Setbacks in internal operations and increase in the workload of white-collar workers
Housing Co.	<ul style="list-style-type: none"> - A shift towards targeting lower income customer groups - Introduced a budget series with standardized houses 	<ul style="list-style-type: none"> - Bought a premium, high-end brand and factory, but did not proceed with its operation - Introduced more variety in budget series models - Some digitalization of internal operations - Started offering buildable land for sale to customers - Started modular production operations

5. Analysis

This chapter will follow the model of analysis presented at the end of the frame of reference. In the frame of reference, the applicability of descriptive BMs as tools to study organizational change was argued for. The different dimensions in organizational change studies were discussed, and the change dimensions to be studied in this thesis were delimited to *scope* and *degree*. This chapter will first focus on the operationalization of measuring scope and degree of changes in BMs. These proposed operationalizations will then be applied to measure the changes in case companies' BMs by the end of T1 and T2. Finally, the findings from companies' BM changes will be used when proposing a typology of BM change.

5.1 Measuring BM Changes

“We learnt over the past three decades that measuring organizational change is not simple” (Burke, 2002, p. 126). Almost two decades later, I believe it is safe to say that measuring organizational change is still difficult. There have also been very few works within the BM literature with a focus on measuring BM innovation, such as Spieth and Schneider (2016) and Clauss (2017). Both these studies follow a similar approach and are

based on an intensive review of literature, coming up with three main BM dimensions in their BM framework. These are the same dimensions that were touched upon in Table 2.2 in the Frame of Reference chapter. This thesis has also taken a similar approach when developing its BM framework. In the next step, and in accordance with the line of thinking in this thesis, both studies introduce the components of these BM dimensions. These are labelled as *elements* by Spieth and Schneider (2016) and *sub-constructs* by Clauss (2017). Spieth and Schneider (2016) conceptualize BM innovation as a ‘new-to-firm’ change, arguing that BM innovation can take place when at least one of the three BM dimensions is affected. Clauss (2017), on the other hand, has a stricter definition of BM innovation and argues that for a BM innovation to take place, all three BM dimensions need to be changed. However, he (ibid.) also conceptualizes BMI as a new-to-firm change. Similarly, in this thesis, BM change is viewed as a new-to-firm change. Furthermore, both studies propose a set of indicators of innovativeness for each BM dimension, such as “changes in products or target market” (Spieth and Schneider, 2016) or “employees receiving training to develop new competence” (Clauss, 2017). They then quantitatively test these indicators by using them to produce questionnaires for a selected group of managers. The result is a proposal for a more refined set of indicators to measure BM innovations. These two papers have not applied their proposed frameworks to an empirical context. In addition, neither of them discusses the possibility of having different types of BMI based on their proposed measures, i.e. whether there is a difference when, for example, only one of the BM dimensions has been changed compared with when all three dimensions are changed, or what will happen if some but not all of the indicators for BMI are met. Will there be a different type of BMI in that case?

This study has both similarities and differences with these two works (Spieth and Schneider, 2016; Clauss, 2017). To the best of my knowledge, they are among the few works in BM literature that provide a means with which to measure BMI. As already discussed, I have also used a literature review to identify the three main dimensions of the BM, as well as their constituent components. However, both these studies attempted to measure BM *innovation*, whereas this study has a focus on BM *change* in general, which can also entail lower degrees of change in BMs that may not necessarily be characterized as innovation. Therefore, the organizational change literature will be used to measure BM change in this study. Furthermore, these two papers take a relatively

deductive and ex-ante approach to proposing measures. On the other hand, as previously mentioned, this thesis follows Demil and Lecocq’s (2010) line of thinking in proposing the study’s BM framework, which is more of an abductive approach. As a result, measuring BM changes in this study will also follow a more abductive approach. This is because I believe that context-specific empirical information is an important contributor to a study of BM changes. The operationalization of two dimensions of scope and *degree* of change will be discussed below.

5.1.1 Scope of Change in BMs

The scope of change in BMs has been more frequently addressed in literature in studies such as Saebi (2015) and Fallahi (2017). Its operationalization takes a relatively straightforward approach, which has already been described in the frame of reference. In this study, the scope of change is explained by the three orders of change proposed by Kimberly and Nielsen (1975). The *first-order change* takes place when a BM component has changed, or when there have been changes in several components but as independent events, in other words when the change in one component has not been a consequence of a change in another. The *second-order change* is when changes take place in more than one component, but as a result of a chain reaction. This can involve either changes in different components of a single BM dimension or changes in one component as a result of a change in a component of another BM dimension. Lastly, *third-order change* takes place when the majority of BM components in all three dimensions undergo changes. These are the result of more than one first- or second-order change (Kimberly and Nielsen, 1975; Burke, 2002). Table 5.1 summarizes the operationalization of the scope of change in BMs.

Table 5.1: Indicators for scope of change in BMs

Scope of Change in BMs	Indicators
<i>First-order change</i>	One or more BM components are changed as independent events.
<i>Second-order change</i>	More than one BM components are changed as a consequence of an initial change, either within a single BM dimension or across different BM dimensions.
<i>Third-order change</i>	The majority of BM components in all three BM dimensions are changed as a result of more than one first- or second-order change.

The assessment of the scope of changes in each case is based on the information presented in section B of the Appendix, where the affected BM components in each series of changes within the companies were identified. As can be seen from the information on the series of changes tables in the Appendix, there is usually more than one series of changes happening during each time period (i.e. T0-T1 or T1-T2). The scope of change in each of these series can be identified as first, second or third order. However, when it comes to making a decision about the overall scope of change during each time period, an important consideration is the total number of BM components affected. Based on the indicators proposed in Table 5.1, the scope of change is only characterized as third order when the majority of BM components in all three dimensions are affected. The results from assessing the scope of BM changes in each case, during the two time periods, are included in section C of the Appendix.

5.1.2 Degree of Change in BMs

Understanding the degree of change is more complicated. Few studies in the organizational change or BM change literature focus on the operationalization of the degree of change. Furthermore, the author's own judgment based on the empirical specificity of each organization cannot be disregarded when analysing the degree of change. As mentioned in chapter two, when studying the degree of change, I will only focus on its two extremes, categorizing the degree of change as *refinements* and complete *renewals* in each of the BM components. Accordingly, these two different degrees of change are associated with certain characteristics of their own. In this study, I characterize the *refined* BM component in accordance with Kindler's (1979) definition of incremental change, which is "based on precedent; it is intended to do more of the same but better" (Kindler, 1979, p. 476). This involves variations that occur within a BM component, and that leave the overall functionality of the component unchanged (Watzlawick, Weakland and Fisch, 1974; Golembiewski, Billingsley and Yeager, 1976). A *renewed* BM component, on the other hand, involves a complete renewal (Watzlawick, Weakland and Fisch, 1974), major restructurings and frame-breaking changes in the component (Maes and Van Hootegeem, 2011).

For further clarification, I refer back to Cavalcante, Kesting and Ulhøi's (2011) argument about what characterizes a BM change in the first place. They claimed that "not all

changes lead to a change in the business model, however. If this were the case, then the business model concept would lose its model properties” (Cavalcante, Kesting and Ulhøi, 2011, p. 1330). As a result, they (ibid.) emphasize that only changes affecting the standard repeated processes of a business entail a change in the BM. They define these processes as “a set of related activities repeatedly carried out to meet a priori specified goals” (Cavalcante, Kesting and Ulhøi, 2011, p. 1329). According to my understanding, based on their claims and when adapting them to the BM framework of this study, these standard repeated processes are not the same as the Key Activities component of the BM. That BM component is a representation of the ‘key’ activities involved in doing the business. Based on the context of this study, these key activities are considered to be purchasing raw materials, product design, settings prices for tenders/quotations (sales), manufacturing and product assembly (Nord, 2005). On the other hand, when talking about the standard repeated processes carried out to meet specified goals, I consider these to be the specified goals of each of the BM components. For instance, the goal of the Customer Segments component in segmenting the customers in a certain way, and the goal of the Channels component in reaching the customers in certain ways. There will therefore be underlying repeated processes in order to achieve each of these goals. If these processes are not affected, no change in BM components has taken place. I therefore argue that the criterion for a change in BM component to be regarded as a BM change in the first place is its effect on standard repeated processes. As a result, *both refined and renewed* components need to meet this criterion.

Up until this point, I have argued that for a change in a BM component to be considered as either *refined* or *renewed* it needs to affect the standard repeated processes in that component. The second criterion for a *refined* component is an improvement that takes place without changing the overall function or structure of that component. On the other hand, there are several other criteria that need to be met in order to categorize a change in a BM component as a *renewed* one. As explained above, one criterion is the recreation or introduction of a new function in that component. Furthermore, based on the system theory as an underlying assumption of BMs in this study, BM components are separate, but *interrelated*, parts of a system, which is the business model as a whole (Tushman and Nadler, 1980; Morris, Schindehutte and Allen, 2005). Therefore, due to the interrelatedness of the BM components, a change which is significant enough to be

characterized as a *renewed* change in a BM component will most likely cause changes in other BM components as well. This will therefore be another possible indicator of a *renewed* BM component change. Furthermore, the abductive approach in this study also calls for certain empirical indicators to be included in measuring these changes. Throughout the data collection in this study, I observed that the changes which have been considered the biggest in the organization by the respondents were those that consumed a large amount of companies' resources. This can be company's human, financial or other tangible resources. As a result, another criterion for a *renewed* BM component is changes that consume a considerable amount of resources. Due to differences in companies' sizes and the types of resources consumed, it is not possible to give an exact definition of what 'considerable' means. It is therefore the responsibility of the analyst to make this decision as objectively as possible based on his or her knowledge of the companies. Lastly, another criterion for measuring change is one that is also used as one of the qualitative measures of organizational change in the work of Romanelli and Tushman (1994). These are changes that are communicated in companies' documents, such as annual reports and press releases, or external publications such as other news sources (Romanelli and Tushman, 1994). Therefore, in this study, another criterion for a *renewed* change in a BM component is the changes which are communicated formally.

However, given that *refined* and *renewed* degrees of change are the two extreme ends of a spectrum, a wider range of change may be included in each category. For instance, there might be changes that lead to the recreation of a function, and to changes in another BM component, but which were not formally communicated. Alternatively, there might be changes that fit all the other criteria but did not necessarily create a new function and are more like large-scale improvements in an existing function. These changes are still more than simply refinements in a BM component. On the other hand, the same argument applies in the case of refined components. There may be changes that, despite creating a new function, do not meet the rest of the criteria for being categorized as a renewed component. In other words, they are not large scale to the extent of a complete renewal of a BM component. Thus, these changes still fall into the category of *refined* BM components. It therefore seems appropriate to leave some margin of error for these measures. As can be seen in Table 5.2, the arguments made in this section are summarized as six different indicators. For a change in BM component to be characterized as *refined*,

at least two of the first three indicators need to be met. These three indicators are marked with the letter “x” under the Refined column in the table. On the other hand, the changes in BM components will be considered as *renewed* when five of the six indicators are true. These six indicators are marked with the letter “x” under the Renewed column in the table. However, as initially mentioned, the prerequisite for any change to be considered as *renewed* or *refined* is meeting the first indicator, i.e. changes affecting the repeated standard processes.

Based on the empirical information from case studies, the degree of change in each of the BM components of the organizations has been assessed. The results of the assessments and the decisions made on the degree of these changes are included in section D of the Appendix.

Table 5.2: Indicators for degree of change in BMs

Indicators	Refined	Renewed
The obligatory indicator:		
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company’s resources (Financial, Tangible, Human) been dedicated to changes?		x
Are the changes formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined if 2 out of 3 met	Renewed if 5 out of 6 met

As can be seen in section D of the Appendix, there are certain changes that did not qualify as a change in BM components. For instance, in several cases, the changes in the Customer Segments component could not be considered as a *refined* or *renewed* change, despite affecting the repeated processes. In these cases, the changes were due to an unfavourable mix of different customer segments in a company, caused by market

conditions. These changes affect the standard repeated processes, as the company needs to tailor its offerings to different customer segments. However, they neither improve nor recreate a function. As long as the changes are not accompanied by new *realized strategies* (Mintzberg and Waters, 1985) of the firm to change its segmenting, they are considered as *misfits* in that BM component (Morris, Schindehutte and Allen, 2005) and not BM changes. As mentioned in the Frame of Reference chapter, BMs are perceived in this study as reflections of a firm's realized strategies (Cavalcante, Kesting and Ulhøi, 2011). In addition, in case of the Value Proposition component, the mere act of communicating new values for the company's offerings, without affecting the standard repeated processes or improvements in the system, does not qualify as a change in that component.

In the next section, using the operationalization measures proposed above, a cross-case analysis of companies' BM changes will be undertaken, providing a more abstract view of the changes that have taken place in the industry.

5.2 BM Changes in Case Companies

The empirical information in chapter four has resulted in a depiction of each case company's BM at three points in time, as well as a more in-depth within-case analysis, included in section B of the Appendix. The proposed operationalization of the scope and degree of BM changes discussed in the last section, has used the case study results to measure BM changes in each company. Sections C and D of the Appendix include information about assessing the scope and degree of change in the BM components of the case companies by the end of Time 1 and Time 2. In the next two sub-sections, these findings will be further analysed and discussed.

5.2.1 Scope of BM Changes

Based on the findings from sections B and C of the Appendix, the five upcoming figures represent the scope of changes in companies' BM components after each series of changes. The scope of changes is depicted for both time periods (i.e. T0-T1 and T1-T2) that are the focus of this study. As can be seen in these figures, each series of changes is numbered based on the same chronological order in the series of changes tables in section B of the Appendix. Furthermore, the internal and external triggers leading to each series of changes are also included in these figures. These triggers have been discussed in detail,

both in chapter four and in the series of changes tables in the Appendix. It should be noted that in the case of Housing Co. in T1-T2, series of changes 4 also resulted in the creation of a completely new parallel BM. This new BM is not included in corresponding Figure 5.5.

Certain observations can be made by studying these figures. One is the sharp focus on the Operational Platform dimension, specifically its Key Resources and Key Activities components, throughout different series of changes. These two components have a consistent presence in the majority of change series. In fact, in many cases, the scope of change does not go much further than the two BM components of Resources and Activities.

Furthermore, as can be seen in the figures, the strategic directions given by a case's ownership or mother company are a very common trigger in most series of changes. Interestingly, however, there does not appear to be a wide scope of change, unless these internal strategic triggers are coupled with external triggers of change. These external triggers of change include changes in the economic cycles of the construction industry, the preferences and demands of different customer groups, overall changes in the industry's market structure and factors related to suppliers providing installation or contracting services. In line with the above observation, it also appears that the series of changes which are solely triggered by either internal or external factors do not lead to a wide scope of change.

Lastly, and as can be expected, different case companies – or the same companies at different points in time – react differently to similar triggers. At times, change triggers have a narrow scope that is limited to a single BM dimension, while at other times these change triggers encompass many of the companies' BM components. It is also imperative to point out that the nature of change triggers plays a role in their impact. For instance, when an internal change trigger has been initiated based on a company's operational factors, it is unlikely that the company's entire BM will be affected by it.

Figure 5.1: The scope of changes in **Stairs Co.**'s BM components

Figure 5.3: The scope of changes in Windows B's BM components

Figure 5.5: The scope of changes in Housing Co.'s BM components

5.2.2 Degree of BM Changes

Based on the findings from section D in the Appendix, Figure 5.6 represents an abstract view of the degree of changes in companies' BM components. The degree of changes is depicted at the end of Time 1 and Time 2. The first major observation from this figure, in the case of Housing Co., is that two parallel BMs are operating by the end of Time 2. This is commonly referred to as a portfolio of BMs (Kindström, 2010; Höök, Stehn and Brege, 2015). Among the cases, this has only happened in Housing Co. as the company started a complete separate operation for its multi-family modular buildings. The new company started operating as a sister company to Housing Co. in 2017, with a separate factory, offerings, customer segment and sales operation; in short, a completely new BM. Even though Windows A also started a new sales channel and service concept for a new customer segment (i.e. end-users), it still shares many of the BM components with its existing BM, such as its factory operations and products. Therefore, in the case of Windows A, these changes have led to the renewal of several components of its existing BM and not the creation of a parallel BM.

Another observation is the sharper focus on the renewal of components from the Operational Platform dimension, i.e. Key Resources and Key Activities. The timelines of key events showed that, in majority of the case companies, these two components were the first areas to undergo change. This is in line with industry trends, in terms of price pressures and a clear focus on automation and activities related to internal efficiency (Nord, 2008; Nord and Widmark, 2010; Hurmekoski, Jonsson and Nord, 2015). It is also in line with the characteristics of mature industries in terms of focusing on innovations in manufacturing operations and processes (Williams *et al.*, 1995; Klepper, 1997). Interestingly, however, the only BM component that has not undergone change in any of the companies was the Cost Structure component. Even though some very minor changes took place in companies' cost structures, these could not be directly traced to any of the changes in other BM components. In addition, the information collected from the interviews has also shown that despite the effort and focus on improving the cost structure, no palpable or desired change has taken place in the companies over the years. However, considering the ongoing focus of changes in most of the case companies on cost reductions, a future study of BMs may reveal more visible changes in cost structures.

Refined
Renewed

			Stairs Co.		
			T0 to T1	T1 to T2	
Op. Plat.	Offering	Market	Op. Plat.	Offering	Market
Resources	Products & Services	Customer Segments	Resources	Products & Services	Customer Segments
Activities	Value Proposition	Key Actors & Rel.	Activities	Value Proposition	Key Actors & Rel.
Cost Structure	Revenue Model	Channels	Cost Structure	Revenue Model	Channels
			Windows A		
			T0 to T1	T1 to T2	
Op. Plat.	Offering	Market	Op. Plat.	Offering	Market
Resources	Products & Services	Customer Segments	Resources	Products & Services	Customer Segments
Activities	Value Proposition	Key Actors & Rel.	Activities	Value Proposition	Key Actors & Rel.
Cost Structure	Revenue Model	Channels	Cost Structure	Revenue Model	Channels
			Windows B		
			T0 to T1	T1 to T2	
Op. Plat.	Offering	Market	Op. Plat.	Offering	Market
Resources	Products & Services	Customer Segments	Resources	Products & Services	Customer Segments
Activities	Value Proposition	Key Actors & Rel.	Activities	Value Proposition	Key Actors & Rel.
Cost Structure	Revenue Model	Channels	Cost Structure	Revenue Model	Channels
			Prefab Co.		
			T0 to T1	T1 to T2	
Op. Plat.	Offering	Market	Op. Plat.	Offering	Market
Resources	Products & Services	Customer Segments	Resources	Products & Services	Customer Segments
Activities	Value Proposition	Key Actors & Rel.	Activities	Value Proposition	Key Actors & Rel.
Cost Structure	Revenue Model	Channels	Cost Structure	Revenue Model	Channels
			Housing Co.		
			T0 to T1	T1 to T2	T2
Op. Plat.	Offering	Market	Op. Plat.	Offering	Market
Resources	Products & Services	Customer Segments	Resources	Products & Services	Customer Segments
Activities	Value Proposition	Key Actors & Rel.	Activities	Value Proposition	Key Actors & Rel.
Cost Structure	Revenue Model	Channels	Cost Structure	Revenue Model	Channels

Figure 5.6: The degree of changes in companies' BM components

Furthermore, another component that – except for the case of Stairs Co. – has remained unchanged in all companies over time is the Revenue Model. Even in the case of Stairs Co., the shift to action- and time-based pricing of its products, from traditional cost-based pricing, is in its very early stages. Stairs Co. is trying to draw a distinction between the

prices for its stairs, which may have the same production procedures but different pre-order procedures. In this way, the customer groups with more time dedicated to their entire ordering processes need to be charged more accordingly. One reason why the case companies' revenue models have not changed can be traced back to the conservative, traditional industry that they are part of, which features many powerful professional customers. Lastly, there has also not been a sharp focus on changes to the Value Proposition component. Windows A, a market leader in this industry, has dedicated significant resources to recreating and renewing its value proposition through its smart products and solutions. However, until now, these efforts have not been well-received in the market. This may be due to both operating within a traditional industry and widespread resistance to new technologies until they are adopted by the majority of actors. Housing Co., on the other hand, has based the changes in its value proposition on requirements and feedback. These include offering lower-priced houses and buildable lands due to shortages. In the short term at least, these will result in more positive reactions from customers.

In this section, operationalizing the degree and scope of change in the case companies is facilitated a more abstract view of changes within these organizations. This abstract view has visualized the patterns of BM changes, which can be beneficial when proposing a typology of changes in this study.

5.3 Typology of BM Changes

In the Frame of Reference chapter, I argued for the benefits of BMs as analytical tools to study organizational changes. I also discussed how BMs can facilitate a departure from dichotomist views in change studies, by providing a more systemic view (Maes and Van Hootegeem, 2011). This means that, with the help of BM as a tool, organizational changes can be studied from more than one change dimension. This thesis will be studying BM changes from the two dimensions of *degree* and *scope*. Furthermore, the benefits of models in terms of building typologies (Demil and Lecocq, 2010) have been discussed in the frame of reference. Examples from the BM typologies of change and innovation proposed in the literature have also been reviewed, as shown in Table 2.3 in that chapter, I pointed out that the majority of the BM typologies proposed in the literature have an abstract view and a highly generic definition of BM. Those works proposing a more

granular definition of BM frameworks, such as Chesbrough (2007) and Aversa *et al.* (2015), explain little about the role of the BM components when characterizing the different types of BM change and innovation. This study attempts to address both the issues discussed above: incorporating two change dimensions in BM change studies and proposing BM change typologies that consider the role of different BM components.

There are many examples in BM literature where the authors borrow notions from product innovations and apply them to BM innovations. To explain the concept of BM, Casadesus-Masanell and Ricart (2010) even use the analogy of a machine as a mechanical device transmitting energy to perform tasks. Furthermore, Bucherer, Eisert and Gassmann (2012) argue that the concepts established for product innovations are useful in studies of BM innovations. On observing the changes in the BMs of cases in this thesis, similarities with a classic typology of technological change surfaced. This is the innovation framework proposed by Henderson and Clark (1990), who draw a distinction between different components of a product and how these components are integrated into a system, i.e. the product per se. Their framework for new product development takes the form of a matrix. One axis shows the impact of innovations on a product's core design concepts, and the other captures the innovation's impact on the linkage between product components and the core concepts they embody (Henderson and Clark, 1990). This is similar to the two change dimensions of *degree* and *scope* which are the focus of this study. Their proposed framework is depicted in Figure 5.7. In this matrix, incremental and radical innovation are at the two extreme ends (Henderson and Clark, 1990). In the case of incremental change, the core concept is only reinforced and no change in the linkages between core concepts and components has taken place. In radical innovation, on the other hand, both the linkages are changed and the core concepts are overturned (Henderson and Clark, 1990). The other two types of innovations are modular and architectural innovations. Modular innovation is where the core concepts have been overturned without changing the linkages between components and core concepts. In architectural innovation, on the other hand, the linkages between components are changed and refinements are only carried out in the core concepts (Henderson and Clark, 1990). The core design concepts of a product explained by Henderson and Clark (1990) also resemble the three main BM dimensions proposed in this study: Operational Platform, Offering and Market.

		Core Concepts	
		Reinforced	Overturned
Linkages between Core Concepts & Components	Unchanged	Incremental Innovation	Modular Innovation
	Changed	Architectural Innovation	Radical Innovation

Figure 5.7: A framework for defining innovation

*Adapted (with permission) from Figure 1 in
Henderson and Clark (1990, p. 12)*

Inspired by Henderson and Clark's (1990) framework, I will propose a typology of BM changes that is adjusted to the theoretical and empirical context of this study. Therefore, there will be conceptual differences between the proposed BMC typology in this study, and Henderson and Clark's (1990) framework. This typology will not be in the form of a 2x2 matrix, but a 2x3 one, showing the spectrum of changes in degree and scope dimensions. The scope of change on the horizontal axis will be labelled as first-order, second-order and third-order changes. The degree of change will appear on the vertical axis and the spectrum will be labelled on its two extreme sides as refined and renewed BM components. The diagram is presented in Figures 5.8 and 5.9 on page 165.

In line with the literature of organizational change and innovation, the BM change type with the least change will be labelled **incremental BM change (BMC)** in this thesis. Incremental BMC happens when the majority of changes that take place in a company's BM are independent refinements of components. This is the least likely type of BMC, considering that the systemic nature and interrelatedness of components in a BM usually lead to changes that are not entirely independent of each other. Incremental BMC may, however, happen more often in the case of smaller companies that lack the resources of larger companies for change. It cannot therefore be claimed that any of the BM changes taking place within the companies can be strictly categorized as incremental BMC.

However, the closest example to an incremental BMC may perhaps be the case of Prefab Co. from Time 0 to Time 1, or Windows B from Time 1 to Time 2. As can be seen from the companies' scope and degree of change figures, and from the series of changes table in the Appendix, many of the changes in these two companies were independent refinements. These independent BM component refinements did not affect other components in any significant manner.

The second type of BM change is **modular BMC**. This is where the changes are mainly focused on only one BM dimension, without having significant effects or focus on any other dimension. In the case of a modular BMC, the majority of components in that dimension will be renewed. Due to the focused nature of this change, the scope of change does not go further than the second order in this type of BMC. Looking back at Figure 5.6 and the degree of changes in the BMs of the case companies, the best example of a modular BMC is Prefab Co. from Time 1 to Time 2. During this period, Prefab Co. focused on renewing its Operational Platform dimension. Significant investments were made in machinery, digital systems and changes in routines and activities as a result of digitalizing the processes. However, there were no other significant changes in the company during this period regarding its offering and market. The refinements in the Channels component were also in line with the digitalization efforts and improvements to company's website and digital sales materials. These changes were the result of changes to the Activities component, but they were not particularly significant.

Architectural BMC is the third proposed type of BM change in this study. This can be considered to be the most common form of change in BMs for low-tech mature industries. The changes in architectural BMC are not sharply focused on renewals in one BM dimensions, as in modular BMC, or on independent refinements in different components of BM, similar to incremental BMC. One important characteristic of an architectural BMC is the second- and third-order scope of its changes, i.e. changes in the overall architecture of an existing BM and in at least two of its dimensions, due to one initial change. A good example of an architectural BMC is the change in the BM of Stairs Co. from Time 1 to Time 2. In this case, changes took place in most of the BM components and the majority of the changes are refinements of these components. In addition, the changes in different components were related to each other and, as a result, led to a chain of changes. With the new ownership, changes originated in the Operational Platform

dimension through investments in new resources and changes in the company's routines and activities. These were then reflected in the company's value proposition, revenue model, key actors and relationships.

Lastly, the other extreme ends of both axes will form **transformational BMC**. This type of BM change takes place when the scope of change in the BM components is of the third-order and the majority of BM components in all three BM dimensions have been renewed. As can be seen, this is the only BMC type that does not use the same terminology as Henderson and Clark's (1990) framework. As previously discussed in the Attributes of Change section of the Frame of Reference chapter, a decision was made not to use the term 'revolutionary' in this thesis, considering its emphasis on the process (Maes and Van Hootehem, 2011). 'Transformation' is a better reflection of change in content, which is the main focus when studying the changes in the BM components in this study. As for the term 'radical' used by Henderson and Clark (1990), the connotation of *speed* implied by this term was not deemed appropriate in a study where the *degree* and *scope* of change are the main focuses. A good example of transformational BMC among the cases is the changes in Windows A from Time 1 to Time 2. As can be seen in Figure 5.6, apart from the Cost Structure and Revenue Model components, all other BM components have been renewed in Windows A. This was the result of a series of group-level strategies of organizational restructuring and introducing more innovative products and services that proposed new values and targeted a new customer segment. As a result, this also affected the company's relationships and channels. These changes have been fairly interlinked, so that no single second-order change was the result of all the transformations. Table 5.3 summarizes the description of each of the BM change types proposed in this study.

In upcoming Figures 5.8 and 5.9, the BMC diagrams of the two time periods and the approximate position of each case's BMC are depicted. Based on the provided description of the BMC typology, the four types of BMC are also positioned on the figures. These four BMC types are shown using dashed lines, indicating their approximate position. As can be seen, the new parallel BM created by Housing Co. is not present in Figure 5.9. This is because a completely new BM was created which does not fall into the category of a BM change.

Table 5.3: Brief description of BMC typology

BMC Typologies	Description
Incremental BMC	Mainly refined BM components, taking place independently from each other (first-order change)
Modular BMC	Majority of BM components in only one dimension are renewed, with either a first- or second-order change scope
Architectural BMC	Majority of BM components in at least two BM dimensions are refined/renewed, with a second- or third-order change scope
Transformational BMC	Majority of BM components in all three BM dimensions are renewed, with a third-order change scope

5.3.1 Case Companies' BMCs from T0 to T1

Despite differences in the types and timing of changes, all companies' BMCs fell into the category of architectural BMC. Interestingly, the BMCs of three out of the five cases had a dominant focus on renewals in the Operational Platform dimension. This was a period with a high degree of uncertainty within the industry, due to the global economic recession and the subsequent construction recession. It is therefore plausible that the majority of the companies decided to adjust different components of their BMs, which of course varied from case to case, to perform at their best during the time of recession.

During this period, Housing Co. and Prefab Co. reacted similarly by refining their products and services, providing budget-friendly standard housing/construction series. However, this change did not lead to equally positive outcomes in case of Prefab Co., considering the influence of large industrial customers over their offerings. Stairs Co. & Windows B, on the other hand, reacted similarly during this period. They both launched a limited offering of installation services for their products. They also went through a similar phase that coincided with this period. Both companies started internal sales and marketing operations, which had previously been carried out externally by another wood manufacturing group. However, due to differences in their offerings and customer segments, this change process went more smoothly for Windows B. This is because of Windows B's niche focus on producing project-based and highly customized windows for construction companies. Thanks to its established position in the market, maintaining its existing customers was not difficult. Stairs Co., on the other hand, had a wider range

of offerings to different groups of customers, each with different requirements. As a result, the process of branding its products independently from the previous external sales organization presented more challenges. Lastly, Windows A pursued a different path during this time period due to its distinct market position. By trying to acquire the largest market share, Windows A spent this period upscaling its operational platform through a series of mergers and acquisitions, followed by restructuring and capacity adjustments via centralization efforts in their operations.

Figure 5.8: Different types of BMC in T0-T1

Figure 5.9: Different types of BMC in T1-T2

5.3.2 Case Companies' BMCs from T1 to T2

This was the period after the recession, and although certain regulatory changes may have presented impediments and challenges for some of the organizations, this was generally a period of growth. This is reflected in the less cautious changes that took place in all the cases. As Figure 5.9 shows, there is evidence of all types of BMC in this period, with transformational, modular and architectural BMC, and one case that is close to incremental BMC. One feature of this period is the focus on production efficiencies, lean management and standardized production processes in all cases, albeit not at exactly the same time or with the same level of focus in all companies. This was also supported by literature characterizing mature industries, where companies tend to have more standardized and linear production flows (Abernathy and Utterback, 1987). Furthermore, digitalization-related activities seemed to surface more prominently during this period. These activities were reflected in both operational process improvements and bringing the companies closer to end-users. This brings us to another observation regarding this period: a focus on designing offerings and sales processes in order to reach end-users directly, bypassing the retailer stage. This was done both through digitalization attempts to make the online ordering process more easily available, and by some of the case companies offering a wider range of installation services. Windows B, however, was the only case where a decision was made to withdraw from offering installation services, since – according to its CEO – the company was competing with its own customers.

Aside from these patterns of similarities, as also reflected in the BMC types shown in Figure 5.9, the companies seem to have had different goals for change. Stairs Co. appeared to be aiming to achieve better profitability as opposed to increasing its turnover and volume. Windows A was aiming to maintain its market-leading position, through proactiveness and a focus on offering connected products and smart solutions. Windows B, on the other hand, underwent the least amount of change and focused on increasing its production and volume capacity. Prefab Co had a more critical situation compared with the rest, and seemed to make changes focused mainly on the basis of the company's survival. Lastly, Housing Co., which was in a better financial position compared with the other case companies, had a focus on quick market responsiveness. The company made its change decisions based mainly on external feedback.

In this chapter, the scope and degree of change in the BM components of the case studies were operationalized in view of the measures introduced. Based on the findings from measuring the changes in these BMs, and based on the change and innovation literature, a typology of BMC was proposed. Subsequently, the BM changes that took place in the five case studies were plotted on the proposed BMC typology during both time periods examined in this study. The results from analysing the different types of BM change during the past ten years in these five case studies highlight certain patterns of change in this industry. The change patterns – as well as the triggers and challenges associated with these changes– will be discussed further in the next chapter.

6. Discussions

This thesis aimed to provide answers to three main research questions: How can BM changes be measured, characterized and affected by contingency factors in a specific context? The analysis chapter mainly addressed the first question by proposing indicators for measuring BM changes. These operationalizable measures were then applied to the collected empirical data from the case studies. The results have revealed certain patterns, highlighting the characteristics of BMCs in such industries, as well as the role of different contingency factors in this process. The following two sections in this chapter will further discuss these patterns. This chapter then concludes with a discussion on change strategies in mature low-tech industries.

6.1 BMCs in Mature Low-tech Industries

The analysis chapter demonstrated the scope and degree of changes in case companies' BMs over the ten-year period. This led to proposing a typology of BMCs for mature low-tech industries. The result of these analyses has revealed insights into the characteristics of BMCs in mature low-tech industries, which will be further discussed in the next three sub-sections.

6.1.1 Fine-tuning in BMs

When the BMCs of case companies were plotted on the BMC typology in the two time periods, the first observation was the high number of architectural BMCs in both time periods. This included the BMCs in all five cases from Time 0 to Time 1. As for the BMCs in the next time period, three out of the five cases have gone through some form of architectural BMC. It can be said that architectural BMC takes place when there is fine-tuning in most BM components of most BM dimensions.

It is reasonable to expect to witness this type of BMC more than any other type in mature low-tech industries as, from the business model point of view, BM changes begin when there is a misfit between the BM components (Morris, Schindehutte and Allen, 2005). As Weick and Quinn (1999, p. 365) put it, “divergence is the result of growing misalignment between an inertial deep structure and perceived environmental demands”. One example of such environmental demands is the economic recession that took place during the first time period. Furthermore, as supported by industry life cycle literature, the types of changes in mature industries are usually more likely to be improvements and developments in different parts and processes, and less likely to take the form of significant innovations (Williamson, 1975; Abernathy and Utterback, 1987; Klepper, 1997). Therefore, by mainly refining the different BM components, companies in these industries aim to resume the initial fit between the BM dimensions and components in their BMs. Abernathy and Utterback (1987) argue that the nature of innovation in mature industries shifts from fundamental changes to refinements of established designs and small alternations to products. This can perhaps be one explanation for the low focus on making changes to the Offering dimension in case companies’ BMs, considering that few changes have taken place in the Value Proposition component of this dimension. There was also almost no change in the Revenue Model component of the Offering dimension in case companies’ BMs. Products and services on the other hand, were the only BM component that had been refined and, in a few cases, renewed in all case companies.

The discussions on resuming fit between BM components can be likened to the classic congruence concept in organizational change literature and its arguments around evolving towards a fit between a company’s strategy, structure and skills to reflect the changing markets and technologies (Tushman and O’Reilly III, 1996). Along the same line of

reasoning, architectural BMC shares similarities with Tushman and Nadler's (1980) proposed congruence model. As they point out, the congruence of organizational components can be a "double-edged sword" (Tushman and Nadler, 1980, p. 195). They further explain that congruency is a desirable state, since in the short term it appears to be associated with good performance and efficiency. However, high congruency can also lead to resistance to change and isolation from outside influences, which may delay responses to new situations (Tushman and Nadler, 1980). This can be applicable in the case of architectural BMC, as it raises the question of how long the company can sustain its BM in an industry that is undergoing change, by simply fine-tuning its components to resume the initial fit.

In the case studies, even though the majority of the companies have undergone some form of architectural BMC, there was evidence of other types of BMC, especially during the second time period. The following sub-sections will look deeper into these types and discuss the possible implications of each of them. The second type of BMC that the case companies have undergone was modular BMC. This will be further discussed in the next sub-section.

6.1.2 Resource-based Changes in BMs

One perfect example of a modular BMC was seen during the T1 to T2 period within the case studies. In addition, three out of five cases during the T0 to T1 period had a focus on renewing their operational platform dimension. In all these cases, the focus had specifically been on renewals within the Key Resources and Key Activities components. These renewals were in the form of high investments in automated machineries, restructuring the manufacturing procedures and introducing lean thinking in operations. It should be noted that digitalization of operational activities has also been broadly evident in the case companies, especially during the T1 to T2 period.

Some of the empirical findings are in line with and support the literature discussed in the Frame of Reference chapter. However, there is also some evidence of contradictions between the empirics and the theories. Mature industries are characterized as having routinized technological regimes (Audretsch and Feldman, 1996), with rationalized and linear workflow operations, where skilled workers are replaced by specific equipment (Abernathy and Utterback, 1987). Automation in these industries is a common tactic for

tackling price pressures through cost reductions (Nord and Widmark, 2010). These characteristics are in line with the BMC trends based on the findings from the case studies. On the other hand, there was also evidence in some of the cases of upscaling operations and capacity, with the aim of expansion. This is not aligned with the common arguments from the literature on mature industries. It is believed that firms in such industries do not normally undergo capacity expansions and inventory build-ups, as these activities tend to reduce their cash flows (Hambrick, 1983b).

Furthermore, as previously discussed in the Frame of Reference chapter, RBV is considered to be one of the theoretical bases of BMs examined in this thesis. RBV highlights the importance of companies' internal resources and competences as a source of competitive advantage (Prahalad and Hamel, 1990; Barney, 1991). The sharp focus of case companies' modular BMCs on the operational platform dimension of their BMs reflects a high degree of resource-based changes. However, Barney (1991) argues that internal resources should possess four attributes to be able to guarantee a sustainable competitive advantage. They need to be valuable, rare, imperfectly imitable and sustainable (Barney, 1991). Yet, when it comes to mature low-tech industries, competition has stabilized and the internal resources of actors are more homogenised across the industry (Hambrick, 1983b), leaving prices as one of the main sources of competitive advantage (Hambrick, 1983b; Klepper, 1997). Therefore, a high degree of focus on upscaling operations and investments to develop internal resources in an industry with homogenised resources cannot necessarily be a winning change strategy. Furthermore, as discussed earlier, the point of departure from the traditional RBV and positioning views towards business models lies in shifting the focus from competitors to customers. In other words, the offering dimension of the companies' BMs should be the result of both a push from the operational platform and a pull from the market. This indicates that when companies focus solely on renewing their operational platform dimension, this cannot always be expected to achieve the desired outcomes. In order to realize the potential of their BMs, companies need to have a better interplay with the other two dimensions as well.

During the T1 to T2 period of this study, two of the cases attempted to reflect the intertwined role of their operational platform and market dimensions when changing their offerings. They have, however, done so in two different ways. Windows A had a

transformational BMC, while Housing Co. went through a third-order architectural BMC and the creation of a parallel BM. Their two change approaches will be discussed further in the next sub-section.

6.1.3 Parallel BMs

Windows A was the only case company that has undergone a transformational BMC. In the Operational Platform dimension, they have invested in automated machinery and efficiency improvements on the factory floor with the help of lean management and digitalization. This was with the aim of cutting production costs. Within the Market dimension, on the other hand, they have attempted to target all customer groups. This was also with the goal of securing their market-leading position. When it came to the Offering dimension, they offered a wide range of windows from fully standardized to highly customized. They also added installation services for one of the customer groups. In addition, they aimed to establish a market position by offering smart products and services. These smart products also required a different set of machinery. In short, through the transformational BMC, Windows A was fighting all the battles at once. As can be expected – and as supported by previous scholarly works – this change strategy is associated with several major challenges for the company. As Zott and Amit (2007) put it: “We find indications of potential diseconomies of scope in design; that is, entrepreneurs’ attempts to incorporate both efficiency- and novelty-centred design elements into their business models may be counterproductive.” (Zott and Amit, 2007, p. 181.) A similar situation was also evident in the case of Stairs Co. Although the company had gone through an architectural BMC, the attempt to offer both standardized and highly customized products while maintaining an efficient and cost-effective operation had risked overstretching an existing BM. These cases resemble what Porter (1980) refers to as ‘stuck-in-the-middle strategies’, which are not ideal for organizations.

Housing Co., on the other hand, followed a different approach during the period T1 to T2. While fine-tuning their existing BM via an architectural BMC, they also created a parallel and completely new BM. Their existing BM had a focus on constructing single-family housing and, to a varying degree, customized housing, while the new BM had a focus on highly standardized multi-family housing that was constructed off-site. These two BMs did not share any of their components in common, which is how the BMC

differs from a transformational BMC. The BMs had two completely distinct operational platforms, as it is not easy to maintain the right flow in production by switching between production of standardized and customized houses. This was, in fact, a major challenge mentioned by the interviewees at Windows A, Stairs Co. and Prefab Co. In addition, the two parallel BMs at Housing Co. each targeted different customer groups, used different channels to reach them and proposed different types of values to their customers. These decisions took away the risk of internal competition and overlaps in the responsibilities of different business units, which has been the challenge in other case companies.

Operating two or more parallel BMs is commonly referred to in the literature as having a portfolio of BMs (Kindström, 2010; Höök, Stehn and Brege, 2015; Karimi and Walter, 2016), a co-existence of BMs (Adrodegari and Saccani, 2017) or hybrid BMs (Tian, Martin and Deng, 2008). Having a portfolio of BMs has been argued to be a good change strategy for companies, instead of stretching an existing model to the extent that it causes misfit, instead of a BM change (Höök, Stehn and Brege, 2015). Flammini *et al.* (2017) propose parallel BMs as a viable strategy for innovation in mature industries. The findings from the case studies appear to point towards the same line of argument, considering that the attempts at serving all groups of customers and a wide range of offerings under one BM has not been a feasible strategy for the companies in this industry. However, the notion of running parallel BMs raises both theoretical and managerial questions.

At the beginning of this thesis, I argued for the importance of clarifying the level of abstraction and the boundary-spanning conditions of BMs in every study. The stances of this work on BMs have been clearly described in chapter two. The BM applied as an analytical tool in this thesis is firm-centric, with quite a high level of granularity. It can be argued that in a wider boundary or at a more abstract level of BM, it would not have been possible or easy to identify two parallel BMs, as in the case of Housing Co. in this study. The other extreme is also true. By the other extreme, I refer to a business unit-centric BM or lower levels of abstraction, to the extent of viewing BMs as detailed operational plans. In these scenarios, a company can essentially always run with a portfolio of BMs that individually depicts either different business units or systems of interdependent activities of the firm (Amit and Zott, 2001). Hence, too high or too low a level of abstraction can blur the important distinguishing factors or lose sight of the big

picture respectively. It is, therefore, imperative for the analyst to use a level of abstraction that is appropriate for the purpose of every study.

The managerial question that arises is how far an existing BM can be stretched to realize its full potential, before it turns counterproductive (Zott and Amit, 2007). Based on the findings of this study, it appears that context-specific considerations play an important role in this decision. As will be further elaborated on in the next section, context-specific contingency factors – such as the nature of the industry’s offerings, the technologies used in production and industry actors’ power dynamics – can influence the BMCs and their outcomes.

6.2 Contingency Factors

In this study, the triggers of changes have been identified with the help of collected information from the industry and case studies. The findings have also shed light on the challenges associated with these changes. In the analysis of these findings, both triggers and challenges were divided into internal and external forces, according to where they were initiated. Based on these findings, the main contingency factors that mature, low-tech industries can be influenced by are summarized in the table below. These contingency factors have acted as change driving forces, resistance or both in the industry. They will be discussed further in upcoming sub-sections.

Table 6.1: Industry’s main contingency factors

Internal	External
The nature of offerings	Economic cycles of construction
Strategic directions	Industry type (conservative)
Organization’s size	Industry structure (customers, competitors, suppliers)
Organization’s operational structure	Regulations

6.2.1 Change Driving Forces

In the Analysis chapter, there was a focus on the internal and external triggers, and the scope of their impact on companies’ BM changes. This revealed interesting patterns with

regard to the driving forces of change in this industry. As can be expected, changes in the strategic direction of companies that were dictated by their holding groups or new ownership have been the most common driving force of BMCs in all case companies. However, the analysis results have shown that, in most cases, unless these strategic directions were coupled with external triggers, the scope of the changes was not wide and would not normally go further than two BM dimensions. This observation could also be made in the case of other internal and external triggers of change, meaning that – in most cases – neither solely internal nor solely external triggers had a wide chain-effect of changes on the organizations' BMs. In other words, forces coming from both internal and external directions together can have a more all-encompassing effect on BM components.

Therefore, it can be argued that for a change to be impactful, the change strategies need to be aligned or coupled with the company's external driving forces. On the other hand, the external driving forces alone cannot always result in a wide scope change. There is a need for the company's internal resources and correct strategies to be in place in order to accommodate wider scope changes. Pateli and Giaglis (2005) had arrived at similar findings in their study of technology innovation-induced BM change, with a contingency approach. They contended that "the development of future BMs will be determined by a number of factors affecting the organization, both external (industry-related) and internal (firm-specific)" (Pateli and Giaglis, 2005, p. 173). These claims are also supported by the research carried out in the field of strategy. The previous empirically tested works support the notion that both industry-related factors and internal factors (combined strategy and resource-based factors) are considered as significant contributing factors to performance (Henderson and Mitchell, 1997; Spanos and Lioukas, 2001). It should, however, be remembered that this thesis did not have a direct focus on the firms' performance and outcomes of BMCs, considering that all case companies were currently undergoing change. However, based on the theoretical assumptions of BM, it can still be posited that BMCs with a wider scope of change are generally a more desirable state. This is due to the systemic nature of BMs and interdependency between BM components.

6.2.2 Change Resistance

The effects of contingency factors on BMs have also been looked at in terms of the resistance to change caused by different factors.

Digitalization and automation efforts have been a common enabler of change in most case companies. However, the operational structure of companies in this industry and the complex and mainly customized nature of most offerings (Nordin, Lindahl and Brege, 2013), present obstacles to reaching the full potential of these efforts. In several cases, digitalization and automation efforts have led to increased lead times and inflexibility in production. In addition, the made-to-measure nature of products has turned the integration of different digital systems into a lengthy and cumbersome process. Furthermore, the size of these companies appears to be a disadvantage in the process of change. On the one hand, the larger companies in this industry do not have the right amount of flexibility needed to produce customized orders efficiently. On the other hand, these companies do not usually get large enough standard orders to justify investing in automated machinery.

The conservative nature of this industry is also considered to be one of the main sources of resistance to change. Both conservative suppliers and industrial customers resist the technological changes introduced in the companies. Furthermore, powerful industrial customers impose price pressures that do not allow companies to make desirable changes in the Cost Structure and Revenue Model components of their BMs. Lastly, the technical details involved in wood manufacturing products do not appear to be the type of value that can be easily communicated to end-users. This issue imposes a challenge in terms of renewing the Value Proposition component in the case companies' BMs. It is also likely that, despite being communicated well, technical sophistication is not a product quality that is sought-after by end-users. Service add-ons, on the other hand, and intangible values in general may well be a better area of focus for changes in companies' value propositions.

6.3 Change Strategies

Based on the discussions in this chapter, some conclusions can be drawn on companies' change strategies in mature low-tech industries. In chapter two, it was explained that this thesis views BM as a reflection of the firm's realized strategy (Casadesus-Masanell and Ricart, 2010). The realized strategy is the result of an interplay between a firm's deliberate and emergent strategies (Mintzberg and Waters, 1985). Therefore, when change strategies are mentioned in this section, these distinctions need to be remembered. The findings of

this study confirm the claims made by Hambrick (1983a, p. 702), stating that “*the characteristics of an environment limit the range of ‘maximally feasible strategies’*”.

Architectural BMC, and – as a result – fine-tuning and refinements in different BM components of most BM dimensions, appear to be a common change strategy in such industries. The architectural BMC takes place with the aim of resuming a disrupted fit between different BM components, due to environmental demands. This is a comprehensible strategy to follow, which is supported by previous research in the field of business models, organizational change and industry life cycles. However, some scholars argue that maintaining a constant fit or congruency in organizations can, in the long run, lead to change resistance and delayed responses to new situations (Tushman and Nadler, 1980). Consequently, the companies active in mature low-tech industries need to be vigilant about the possible long-term effects of only undergoing architectural BMCs.

Modular BMCs with a focus on renewals in the Operational Platform dimension were another change strategy followed by case companies. Although that the idea of improvements in internal operations has been confirmed as a common characteristic of firms in mature industries, major renewals in this BM dimension are not supported by the theoretical assumptions in BM and industry life cycle literature. According to RBV, resources must include a set of qualities to be able to ensure a competitive advantage (Wernerfelt, 1984; Barney, 1991). Therefore, upscaling the internal operations of firms is not necessarily associated with competitive advantages in mature industries with homogenized resources distributed across the industry. Furthermore, the business model concept argues for a departure from a focus on competitors to a focus on customers. Hence, this change strategy does not always accommodate the desirable interplay between the operational platform and market dimensions.

The findings have also shown that, due to the context-specific characteristics of this industry, undergoing transformational BMCs generally tends to be a counterproductive or stuck-in-the-middle strategy (Porter, 1980; Zott and Amit, 2007). Therefore, a more plausible option – as supported by many previous works – is creating a completely new BM, to run in parallel with the existing BM. It is, of course, not feasible for every company to create a parallel BM. It appears, however, that having a more niche-

positioning strategy in this industry can still be a better alternative than transformational BMCs.

Lastly, one of the key takeaways from this study has been the significance of congruency and the right interplay between three factors in the BMCs of mature low-tech industries. These three are external (industry-related) and internal (strategy and resource-based) factors. The findings have shown that these driving forces alone cannot usually lead to a wide-scope change in BMs on their own. These findings are also supported by previous research in the fields of business models and strategy. In other words, this notion emphasizes the importance of striking the right balance between a firm's deliberate strategy and emergent strategies from both industry-related and resource-based forces, in order to achieve a desirable state. The same argument can also be used to explain why proactive strategies, such as that followed by Windows A in T1 to T2, do not seem to be feasible in this industry, considering that proactive strategies are generally internally initiated and pushed to the market. The proactive approach is not usually the result of an interplay with the external industry demands and internal factors. Reactive strategies, on the other hand, similar to the agile responses to market needs carried out by Housing Co., can be considered to be a more viable strategy for use in mature low-tech industries.

Figure 6.1 summarizes the context-specific findings of this study.

Figure 6.1: The study's context-specific findings

7. Conclusion

This chapter fulfils the purpose of the thesis by providing answers to the research questions. It then touches upon the implications of this research, from both theoretical and managerial aspects. Lastly, the limitations of this study and suggestions for future research are discussed.

7.1 Research Questions

The purpose of this thesis was to develop a context-specific method and framework for studying different types of business model changes in organizations. This work has highlighted the importance of undertaking BM studies under specific contexts. It was argued that studying mature low-tech industries can be a valuable contribution and the right starting point for this context-specific study. The Swedish wood manufacturing industry was selected as an example of a mature low-tech industry that is currently undergoing change. Five Swedish wood manufacturing companies were purposefully sampled as the case studies for this thesis. In order to achieve the purpose of this study, three research questions were introduced. Based on the discussions throughout this thesis, these three research questions will be answered in this section.

RQ 1: How can business model changes be measured?

They can be measured by first developing a BM framework adjusted to the purpose of the study, in terms of level of abstraction and boundary conditions. Next, by selecting the change dimensions to be studied, which are suitable for the specific empirical context. Last, by incorporating the empirical information with theories from organizational change and BMs, to propose a method for operationalization.

The benefits of utilizing BMs as a tool to study organizational changes has been discussed in this thesis. It was argued that BMs are superior to many other organizational change models, as they provide a systemic view of organizations. This enables a better demonstration of the important interdependencies in organizations' internal affairs and their markets. However, there is an important prerequisite for a useful application of BM as an organizational change model; that is, choosing the right level of abstraction/granularity, boundary-spanning conditions and view on the BM as a framework. These conditions need to fit the purpose of each study. This will avoid blurring the key distinguishing factors or losing sight of the whole picture, due to making incorrect choices when developing a BM framework. The developed descriptive BM framework of this study was used to depict companies' BMs at different points in time. BM change in this study is defined as changes with a degree of novelty of newness to the firm. Changes vary in scope, from change in one component to change in an entire dimension or changes in all three BM dimensions.

One criticism of previous research in organizational change has been the dichotomist view in these works that took away the possibility to study more than one change dimension (Maes and Van Hootehem, 2011). It was posited in this thesis that the systemic nature of BMs can address this criticism by facilitating the study of more than one change dimension at once. This has laid the foundation of proposing a method for measuring BM changes. The first step was to clarify the basis for identifying different change dimensions, considering that there appeared to be some confusion in many previous research studies due to using different change dimensions, such as speed, scope, degree, frequency, etc., interchangeably. The second step was to incorporate the context-specific considerations into the choice of change dimensions. This decision was made based on the logic that studying different change dimensions does not lead to obtaining equally

valuable insights under different contexts. For instance, in a mature low-tech industry, where the changes generally take place at a slower pace compared with other industry types, studying BM change from the speed of change dimension should not, perhaps, be the first choice. Therefore, based on the above arguments, it was decided to study changes from the two dimensions of scope and degree in this study. The final step was to operationalize the proposed method for measuring change from these two change dimensions. A set of indicators was proposed for identifying the varying degree and scope of change in companies' BM components. The indicators used for measuring the scope of change could be proposed more easily based on the adopted theories. Measuring the degree of change, on the other hand, was more complicated and was proposed by also incorporating the information from the study's empirical context. Therefore, the specific context of the study has also played a role in the operationalization of BM change measures.

RQ 2: How can different types of BM changes be characterized?

They can be characterized based on the possible combinations between the study's selected change dimensions. The findings from the empirical context play an important role in BMC characterizations. The product innovation concepts can also be applied to studies of BM change and innovation.

In this study, the different types of BM changes were characterized based the two change dimensions that were used to measure companies' BMCs. The scope dimension showed how big an impact changes have on companies' BMs. It demonstrated the chain effects of changes across different BM components in all BM dimensions. Depending on the level of impact of these changes, the scope of change in companies' BMs could be identified as first-, second- or third-order change. On the other hand, the degree of change dimension showed the magnitude of change that took place in each BM component of companies' BMs. The degree of change in BM components could be categorized as no significant change, refinements or renewals in BM components.

The graphical representation of the five case studies' BM changes from the two change dimensions provided valuable insight for characterizing different types of BMCs. Furthermore, although not the direct focus of this study, the visualization of BM changes has also implicitly shed light on the change process in these organizations, since the

sequence of changes became clearer and a basic idea was provided on the means of change. That is, the understanding that the companies underwent BMCs by changing which components and in which order. The findings showed that different case companies followed different approaches to change. Few cases had independent refinements in several BM components. In other cases, the majority of BM components in one dimension have been renewed, or there have been refinements or renewals in the BM components of most dimensions as a consequence of changes in other components. Lastly, there were cases where the majority of components in a company's BM have been renewed.

This thesis was a context-specific study, where the interplay between the applied theories and empirical findings was the approach used for further theory development. Moreover, as previously tested and proposed by earlier works in this field, the concepts established in product innovation literature can also be useful in studies of business model change and innovation (Bucherer, Eisert and Gassmann, 2012). The results of the measured BM changes in the case studies have resembled the classic framework used for defining product innovation introduced by Henderson and Clark (1990). Therefore, inspired by the literature of product innovation and more specifically the work of Henderson and Clark (1990), a typology of BM change was proposed. The BMC framework introduced in this study was the result of placing the *degree* of change on one axis and the *scope* of change on the other. The four BMC types proposed as a result of possible combinations of these two change dimensions were labelled as incremental, modular, architectural and transformational BMC.

RQ3: *How do contingency factors in mature low-tech industries affect BM changes?*

Contingency factors affect BMCs, in the form of both driving forces and resistance to change. They limit the range of feasible strategies for the companies in this industry.

This thesis confirmed the claims made by previous scholars that contingency factors can limit the range of feasible change strategies for companies (Hambrick, 1983a; Pateli and Giaglis, 2005). After proposing a typology of BMC, the measured BM changes of case companies during the two time periods were plotted on the BMC typology axis. The observed patterns of BMCs within the cases confirmed many of the characteristics of mature low-tech industries in the literature. Many cases have gone through architectural BMCs, which involve fine-tuning in BM components across different BM dimensions.

This type of BMC appears to be a plausible strategy for companies active in this context, especially in the short run. The next type of BMC was modular, with a focus on renewing the Operational Platform dimension. This type of modular focus, however, cannot always be seen as a viable choice, considering the industry context and the comparatively homogenized resources distributed across the industry actors. According to RBV, this does not ensure a sustained competitive advantage (Wernerfelt, 1984; Barney, 1991). Furthermore, the findings have shown that context-specific contingency factors in this industry, including the mainly customized nature of offerings, technological aspects of operations, the organization's size, conservative industry type and powerful industrial actors, can influence BMCs in the sense that transformational BMCs do not appear to be a suitable type of BM change in this industry. Creating parallel BMs, on the other hand, is a more feasible choice.

Last but not least, this study was also in line with the propositions previously made in the field of strategy and business models, in terms of the important role of three key factors in BM changes. These three factors are external industry-related, internal resource-based and strategy (Pateli and Giaglis, 2005). The findings in this study have shown the need for the right interplay between these three aspects, in order to ensure broad BM changes. This has, perhaps, also been the reason why reactive change strategies seem to work better than proactive change strategies in this industry.

7.2 Research Implications

7.2.1 Theoretical

This thesis benefited from organizational change literature in the study of BM changes. In contrast to the focus on innovation literature in BM studies, this has not received the attention it deserves from the scholars in the field. It should be pointed out that, by providing a better understanding of BM change, the concept of BM innovation can also be better clarified, considering the criticisms that exist regarding the vague definitions of BMI in the literature.

Furthermore, this work highlighted the importance of studying BM changes within a specific context. The thesis directed attention towards mature low-tech industries which,

despite their empirical significance due to constantly undergoing changes, had been a forgotten sector in business model studies.

The field of BM studies has also been lacking in research proposing a formal approach for measuring different types of BM change or innovation. This study attempted to address this issue by proposing a framework and method for measuring BM changes from two different change dimensions of scope and degree. Incorporating two change dimensions in one study is not common in organizational change studies, due to the usual dichotomist focus on change.

7.2.2 Managerial

“In order for a business model to be useful for practitioners, it must be simple and intuitively understandable.” (Kajanus et al., 2014, p. 605.)

This study proposed a BM framework, with a standard set of components, which were loosely defined. This provides an opportunity for practitioners to describe their companies' BMs in a comparable way with their competitors, without losing touch of their company-specific core components. BMs can also be useful tools for internal communication and generating awareness within the organization. Furthermore, studying a company's BM and its components can assist managers in decision-making, planning future changes or assessing current or ongoing changes. By understanding the current BM and the importance of fit between its components, the strengths and weaknesses of the company can be identified. A company's BMs can be compared with each another at different points in time, as a means to track and assess changes. Moreover, the described characteristics and implications of different BMC types can assist managers in assessing different change scenarios for their companies.

In addition, industry-wide studies like this thesis can provide a better view and knowledge for practitioners about the environment in which their companies are active. Such studies emphasize the significant impact of external contingency factors on the change strategies that they follow. Identifying the different types of BMC that the actors within an industry go through can also be used to compare and analyse competitors. Lastly, plotting the BMCs of different industry actors on the BMC typology axis can be utilized as a benchmarking tool between competitors.

7.3 Limitations and Future Research

The proposed BM framework in this study has a firm-centric view. Therefore, changes at an individual level and at a broader network level have not been a direct focus in this study. Future BM studies, either at a more granular level or with a network view, may be promising areas of research. For instance, in one of the cases, we have witnessed how the policies of an external organization – municipalities in this case – led to major changes in the company's strategic direction. Hence, using a stakeholder or network perspective to study the effect of decisions made by other stakeholders on BM changes can be another interesting angle.

This thesis limited the study of BM changes to the two change dimensions of scope and degree. Future studies can have a focus on other change dimensions such as speed, frequency or modes of change. Moreover, within the cases, there was only one evidence of the creation of a completely new and parallel BM. Studying more cases where a parallel BM is created would be a valuable contribution, as this would provide a better foundation for discussing how far an existing BM can be stretched and transformed before it is more feasible to create a parallel BM instead.

This was a context-specific study, where the Swedish wood manufacturing industry was selected as an example of the context. Replicating this study in other industries within the same context may provide a possibility to refine the arguments put forward in this thesis. The next step will, of course, be attempts to carry out similar studies in different contexts to understand the common ground and major differences between these contexts. A quantitative study could also be a future complement to this work. However, I believe that there is a need for more theoretical developments in the field of BM change, before being able to benefit fully from quantitative studies in this area.

To study the changes in this industry, five case studies have been selected. These cases were purposefully sampled based on a pragmatic decision, to study established actors that are larger SMEs or smaller large companies. As a result, the newcomers and smaller companies in this industry have not been the focus of this work. Therefore, future studies with a wider selection of cases may provide a more comprehensive picture of the changes in this industry.

8. Reference List

- Abernathy, W. J. and Utterback, J. M. (1987) 'Patterns of Industrial Innovation', *Technology Review*, 80(7), pp. 40–47.
- Abrahamsson, M. and Brege, S. (2004) 'Dynamic Effectiveness: Improved Industrial Distribution from Interaction Between Marketing and Logistics Strategies', *Journal of Marketing Channels*, 12(2), pp. 83–112.
- Adrodegari, F. and Saccani, N. (2017) 'Business Models for the Service Transformation of Industrial Firms', *The Service Industries Journal*, 37(1), pp. 57–83.
- Ahlgren Ode, K. (2018) *Travelling Business Models*. Lund University.
- Al-Debei, M. M. and Avison, D. (2010) 'Developing a unified framework of the business model concept', *European Journal of Information Systems*, 19(3), pp. 359–376.
- Almgren, M. (2019) *Träindustrin satsar på Trä & Teknik, Building Supply*. Available at: https://www.building-supply.se/article/view/667788/trainindustrin_satsar_pa_tra_teknik.
- Amit, R. and Zott, C. (2001) 'Value Creation in E-business', *Strategic Management Journal*, 22(6–7), pp. 493–520.
- Anderson, J. C., Narus, J. A. and van Rossum, W. (2006) 'Customer Value Propositions in Business Markets', *Harvard Business Review*, (March), pp. 1–10.
- Andersson, U. and Sundberg, C. (2019) *The Future of Homes: Challenges and*

Recommendations to Reach a Unified Ecosystem. Available at:
<https://www.pwc.se/future-of-homes>.

Andrews, K. R. (1971) *The Concept of Corporate Strategy*. New York: Richard D Irwin.

Ansoff, H. I. (1965) *Corporate Strategy*. New York: McGraw-Hill.

Armenakis, A. A. and Bedeian, A. G. (1999) 'Organizational Change: A Review of Theory and Research in the 1990s', *Journal of Management*, 25(3), pp. 293–315.

Aspara, J. *et al.* (2013) 'Corporate Business Model Transformation and Inter-Organizational Cognition : The Case of Nokia', *Long Range Planning*. Elsevier Ltd, 46(6), pp. 459–474.

Audretsch, B. and Feldman, P. (1996) 'Innovative Clusters and the Industry Life Cycle', *Review of Industrial Organization*, 11, pp. 253–273.

Aversa, P. *et al.* (2015) 'From Business Model to Business Modelling: Modularity and Manipulation', *Business Models & Modelling*, 33, pp. 151–185.

Baden-Fuller, C. and Mangematin, V. (2013) 'Business models: A Challenging Agenda', *Strategic Organization*, 11(4), pp. 418–427.

Baden-Fuller, C. and Morgan, M. S. (2010) 'Business Models as Models', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 156–171.

Bankvall, L., Dubois, A. and Lind, F. (2017) 'Conceptualizing Business Models in Industrial Networks', *Industrial Marketing Management*. Elsevier Inc., 60, pp. 196–203.

Barney, J. (1991) 'Firm Resources and Sustained Competitive Advantage', *Journal of Management*, 17(1), pp. 99–120.

Beer, M. and Walton, A. E. (1987) 'Organization Change And Development', *Annual Review of Psychology*, 38(1), pp. 339–367.

Boverket (2018) *Swedish Regulations for Building Works*, National Board of Housing, Building and Planning. Available at: <https://www.boverket.se/en/start/building-in-sweden/swedish-market/laws-and-regulations/national-regulations/>.

Brege, S., Stehn, L. and Nord, T. (2014) 'Business Models in Industrialized Building of Multi-storey Houses', *Construction Management and Economics*, 32(1–2), pp. 208–226.

Bucherer, E., Eisert, U. and Gassmann, O. (2012) 'Towards Systematic Business Model Innovation: Lessons from Product Innovation Management', *Creativity and Innovation Management*, 21(2), pp. 183–198.

Burke, C. S. *et al.* (2007) 'Trust in Leadership: A Multi-level Review and Integration', *Leadership Quarterly*, 18(6), pp. 606–632.

Burke, W. W. (1994) *Organization Development: A Process of Learning and Changing*. 2nd edn. Reading: MA: Addison-Wesley.

- Burke, W. W. (2002) *Organization Change: Theory and Practice*. Thousand Oaks, CA: Sage Publications.
- Capra, F. (1996) *The Web of Life*. New York: Anchor.
- Casadesus-Masanell, R. and Ricart, J. E. (2010) 'From Strategy to Business Models and onto Tactics', *Long Range Planning*, 43(2–3), pp. 195–215.
- Cavalcante, S., Kesting, P. and Ulhøi, J. (2011) 'Business Model Dynamics and Innovation: (Re)establishing the Missing Linkages', *Management Decision*, 49(8), pp. 1327–1342.
- Chandler, A. D. (1962) *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. Cambridge, MA: MIT Press.
- Chesbrough, H. (2007) 'Business Model Innovation: It's not just about technology anymore', *Strategy & Leadership*, 35(6), pp. 12–17.
- Chesbrough, H. (2010) 'Business Model Innovation: Opportunities and Barriers', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 354–363.
- Chesbrough, H. and Rosenbloom, R. S. (2002) 'The Role of the Business Model in Capturing Value from Innovation', *Industrial and Corporate Change*, 11(3), pp. 529–555. Available at: <https://academic.oup.com/icc/article-lookup/doi/10.1093/icc/11.3.529>.
- Christensen, C. M., Bartman, T. and van Bever, D. (2016) 'The Hard Truth about Business Model Innovation', *MIT Sloan Management Review*, 58(1), p. 31.
- Clauss, T. (2017) 'Measuring Business Model Innovation: Conceptualization, Scale Development and Proof of Performance', *R&D Management*, 47(3), pp. 385–403.
- Collins, D. (1996) 'New Paradigms for Change? Theories of Organization and the Organization of Theories', *Journal of Organizational Change Management*, 9(4), pp. 9–23.
- Creswell, J. W. (2003) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. 2nd edn. Thousand Oaks, CA: Sage Publications.
- Dahan, N. M. et al. (2010) 'Corporate-NGO Collaboration: Co-creating New Business Models for Developing Markets', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 326–342.
- DaSilva, C. M. and Trkman, P. (2014) 'Business Model: What it is and What it is not', *Long Range Planning*. Elsevier Ltd, 47(6), pp. 379–389.
- Dean, J. (1950) 'Pricing Policies for New Products', *Harvard Business Review*, 28, pp. 45–53.
- Demil, B. and Lecocq, X. (2010) 'Business Model Evolution : In Search of Dynamic Consistency', *Long Range Planning*, 43, pp. 227–246.
- Denzin, N. K. (2017) *Sociological Methods: A Sourcebook*. New York: Routledge.
- Donaldson, L. (1987) 'Strategy and Structural Adjustment to Regain Fit and

Performance: In Defence of Contingency Theory', *Journal of Management Studies*, 24(1), pp. 1–24.

Doty, D. H. and Glick, W. H. (1994) 'Typologies as a Unique Form of Theory Building: Toward Improved Understanding and Modeling', *The Academy of Management Review*, 19(2), pp. 230–251.

Doty, D. H., Glick, W. H. and Huber, G. P. (1993) 'Fit , Equifinality, and Organizational Effectiveness: A Test of Two Configurational Theories', *Academy of Management*, 36(6), pp. 1196–1250.

Doz, Y. L. and Kosonen, M. (2010) 'Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 370–382.

Drazin, R. and Van de Ven, A. H. (1985) 'Alternative Forms of Fit in Contingency Theory', *Administrative Science Quarterly*, 30(4), pp. 514–539.

Drew, P. G. (1987) 'Despite Shakeout, Imaging Industry not Doomed to Being Greek Tragedy', *Diagnostic Imaging*, (November), pp. 95–99.

Drucker, P. F. (1994) 'The Theory of the Business', *Harvard Business Review*, 72(5), pp. 95–104.

Dubois, A. and Gadde, L. E. (2002) 'Systematic Combining: An Abductive Approach to Case Research', *Journal of Business Research*, 55(7), pp. 553–560.

Eisenhardt, K. M. (1989) 'Building Theories from Case Study Research.', *Academy of Management Review*, 14(4), pp. 532–550.

Eisenhardt, M. (1989) 'Agency Theory: An Assessment Review', *The academy of management*, 14(1), pp. 57–74.

Eurostat (2016) *Glossary: Enterprise Size*, Statistical Office of the European Union. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Enterprise_size.

Fallahi, S. (2017) *A Process View of Business Model Innovation*, Chalmers Reproservice. Chalmers University of Technology.

FI (2015) *Amorteringskrav på nya bolån*, Finansinspektionen. Available at: <https://www.fi.se/sv/publicerat/pressmeddelanden/2015/amorteringskrav-pa-nya-bolan/>.

FI (2017) *Proposal for a Stricter Amortisation Requirement for Households with High Loan-to-Income Ratios*, Finansinspektionen. Available at: <https://www.fi.se/en/published/news/2017/proposal-for-a-stricter-amortisation-requirement-for-households-with-high-loan-to-income-ratios/>.

FI (2018) *Den svenska bolånemarknaden*. Stockholm. Available at: <https://www.fi.se/sv/publicerat/rapporter/bolanerapporter/den-svenska-bolanemarknaden-2018/>.

Flammini, S. *et al.* (2017) 'Business Model Configuration and Dynamics for Technology Commercialization in Mature Markets', *British Food Journal*, 119(11), pp.

2340–2358.

Foss, N. J. and Saebi, T. (2017) 'Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go?', *Journal of Management*, 43(1), pp. 200–227.

Galbraith, J. A. Y. R. (1974) 'Organization Design: An Information Processing View', *Interfaces*, 4(3), pp. 28–36.

Gibbert, M., Ruigrok, W. and Wicki, B. (2008) 'Research Notes and Commentaries. What passes as a Rigorous Case Study?', *Strategic Management Journal*, 29, pp. 1465–1474.

Giesen, E. *et al.* (2007) 'Three Ways to Successfully Innovate Your Business Model', *Strategy & Leadership*, 35(6), pp. 27–33.

Golembiewski, R. T., Billingsley, K. and Yeager, S. (1976) 'Measuring Change and Persistence in Human Affairs: Types of Change Generated by OD Designs', *Journal of Applied Behavioral Science*, 12(2), pp. 133–157.

Gordijn, J. and Akkermans, H. (2001) 'Designing and Evaluating e-business Models', *IEEE Intelligent Systems*, (July/August), pp. 11–17.

Grant, R. M. (1991) 'The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation', *California Management Review*, 33(3), pp. 114–135.

Greenwood, R. and Hinings, C. R. (1988) 'Organizational Design Types, Tracks Dynamics of Strategic Change', *Organization Studies*, 9(3), pp. 293–316.

Greenwood, R. and Hinings, C. R. (1996) 'Understanding Radical Organizational Change: Bringing together the Old and the New Institutionalism', *The Academy of Management Review*, 21(4), pp. 1022–1054.

Grönroos, C. (2008) 'Service Logic Revisited: Who Creates Value? And Who Co-creates?', *European Business Review*, 20(4), pp. 298–314.

Groover, M. P. (2007) *Automation, Production Systems, and Computer-Integrated Manufacturing*. 3rd edn. Upper Saddle River, NJ: Prentice Hall Press.

Groover, M. P. (2010) *Fundamentals of Modern Manufacturing: Materials, Processes, and Systems*. 4th edn. John Wiley & Sons, Inc.

Guan, W. (2013) *The Role of Suppliers and Resellers: Cases of Timber Product Distribution Channels*. Linköping University.

Hacklin, F. and Wallnöfer, M. (2012) 'The Business Model in the Practice of Strategic Decision Making: Insights from a Case Study', *Management Decision*, 50(2), pp. 166–188.

Hambrick, D. C. (1983a) 'High Profit Strategies in Mature Capital Goods Industries : A Contin gency Approach¹', *Academy of Management*, 26(4), pp. 687–707.

Hambrick, D. C. (1983b) 'Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types', *The Academy of Management Journal*, 26(1), pp.

5–26.

Handelskammare, S. (2014) *Markbrist Stoppar Nybyggen: En Rapport om Restriktioner för Hur Marken Får Användas i Stockholms Län och Dess Effekter*. Stockholm. Available at: <https://www.chamber.se/rapporter/markbrist-stoppar-nybyggen-2.htm>.

Hansen, E., Juslin, H. and Knowles, C. (2007) 'Innovativeness in the Global Forest Products Industry: Exploring New Insights', *Canadian Journal of Forest Research*, 37(8), pp. 1324–1335.

Hansen, T. and Winther, L. (2015) 'Manufacturing in the Knowledge Economy: Innovation in Low-tech Industries', in Bryson, J. R., Clark, J., and Vanchan, V. (eds) *The Handbook of Manufacturing Industries in the World Economy*. Edward Elgar Publishing, pp. 439–450.

Henderson, R. M. and Clark, K. B. (1990) 'Architectural Innovation : The Reconfiguration of Existing Product Technologies and the Failure of Established Firms', *Administrative Science Quarterly*, 35(1), pp. 9–30.

Henderson, R. and Mitchell, W. (1997) 'The Interactions of Organizational and Competitive Influences on Strategy and Performance', *Strategic Management Journal*, 18(S1), pp. 5–14.

Hirsch-Kreinsen, H. (2008) "'Low-Technology": A Forgotten Sector in Innovation Policy', *Journal of Technology & Management*, 3(3), pp. 11–20.

Hofer, C. W. (1975) 'Toward a Contingency Theory of Business Strategy', *Academy of Management Journal*, 18(4), pp. 784–810.

Höök, M., Stehn, L. and Brege, S. (2015) 'The Development of a Portfolio of Business Models: A Longitudinal Case Study of a Building Material Company', *Construction Management and Economics*. Routledge, 33(5–6), pp. 334–348.

Hosseini, M., Brege, S. and Nord, T. (2018) 'A Combined Focused Industry and Company Size Investigation of the internationalization-performance Relationship: The Case of Small and Medium-sized Enterprises (SMEs) within the Swedish Wood Manufacturing Industry', *Forest Policy and Economics*, 97, pp. 110–121.

Hovgaard, A. and Hansen, E. (2004) 'Innovativeness in the Forest Products Industry.', *Forest Products Journal*, pp. 26–33.

Huber, G. P. *et al.* (1993) 'Understanding and Predicting Organizational Change', in Huber, G. P. and Glick, W. H. (eds) *Organizational Change and Redesign: Ideas and Insights for Improving Performance*. New York: Oxford University Press, pp. 215–265.

Hurmekoski, E., Jonsson, R. and Nord, T. (2015) 'Context, Drivers, and Future Potential for Wood-Frame Multi-Story Construction in Europe', *Technological Forecasting and Social Change*. Elsevier Inc., 99, pp. 181–196.

Johansson, R. and Johansson, P. (2018) *Experter informerade om BIM på Träcentrum, Träcentrum*. Available at: <http://www.tracentrum.se/sv/aktuellt/experter-informerade-om-bim-pa-tracentrum/>.

Josephson, J. R. and Tanner, M. C. (1996) 'Conceptual analysis of abduction', in

- Josephson, J. R. and Josephson, S. G. (eds) *Abductive Inference: Computation, Philosophy, Technology*. New York & Cambridge (U.K.): Cambridge University Press.
- Kajanus, M. *et al.* (2014) 'Business Model Design: New Tools for Business Systems Innovation', *Scandinavian Journal of Forest Research*, 29(6), pp. 603–614.
- Kang, S. P. (2015) 'Change Management: Term Confusion and New Classifications', *Performance Improvement*, 54(3), pp. 26–32.
- Karimi, J. and Walter, Z. (2016) 'Corporate Entrepreneurship, Disruptive Business Model Innovation Adoption, and Its Performance: The Case of the Newspaper Industry', *Long Range Planning*. Elsevier Ltd, 49(3), pp. 342–360.
- Khanagha, S., Volberda, H. and Oshri, I. (2014) 'Business Model Renewal and Ambidexterity: Structural Alteration and Strategy Formation Process During Transition to a Cloud Business Model', *R&D Management*, 44(3), pp. 322–340.
- Kienzler, M. (2016) *Pricing Value and Selling Value: A View on Individuals Within Organizations*. Linköping University.
- Kienzler, M. (2018) *Micro-foundations of Value-based Pricing and Selling*. Linköping University.
- Kimberly, J. R. and Nielsen, W. R. (1975) 'Organization Development and Change in Organizational Performance', *Administrative Science Quarterly*, 20(2), pp. 191–206.
- Kindler, H. S. (1979) 'Two Planning Strategies: Incremental Change and Transformational Change', *Organization Studies*, 4(December), pp. 476–484.
- Kindström, D. (2010) 'Towards a Service-based Business Model – Key Aspects for Future Competitive Advantage', *European Management Journal*, 28, pp. 479–490.
- Klepper, S. (1997) 'Industry Life Cycles', *Industrial and Corporate Change*, 6(1), pp. 145–182.
- Kowalkowski, C. *et al.* (2015) 'What Service Transition? Rethinking Established Assumptions about Manufacturers' Service-led Growth Strategies', *Industrial Marketing Management*. Elsevier Inc., 45(1), pp. 59–69.
- Lambert, S. C. and Davidson, R. A. (2013) 'Applications of the Business Model in Studies of Enterprise Success, Innovation and Classification: An Analysis of Empirical Research from 1996 to 2010', *European Management Journal*. Elsevier Ltd, 31(6), pp. 668–681.
- Langley, A. (1999) 'Strategies for Theorizing from Process Data', *Academy of Management*, 24(4), pp. 691–710.
- Lawrence, P. R. and Lorsch, J. W. (1967) *Organization and Environment*. Boston: Harvard University Business School, Division of Research.
- Lehmann-Ortega, L. and Schoettl, J.-M. (2005) 'From Buzzword to Managerial Tool: The Role of Business Model in Strategic Innovation', in *Cladea Annual Assembly, Santiago de Chile*, pp. 1–14.
- Lei, D. and Slocum, J. W. (2005) 'Strategic and Organizational Requirements for

- Competitive Advantage', *Academy of Management Annals*, 19(1), pp. 31–45.
- Lessing, J. and Brege, S. (2015) 'Business Models for Product-oriented House-building Companies - Experience from Two Swedish Case studies', *Construction Innovation*, 15(4), pp. 449–472.
- Levitt, T. (1965) 'Exploit the Product Life Cycle', *Harvard Business Review*, 43, pp. 81–94.
- Lincoln, Y. S. and Guba, E. G. (1985) *Naturalistic Inquiry*. London, England: Sage Publications.
- Linder, J. and Cantrell, S. (2000) 'Changing Business Models: Surveying the Landscape', *Accenture Institute of Strategic Change Research Report*, pp. 1–15.
- Lindstrand, N. (2016) *Drömläge för ny teknik i träindustrin*, *NTT Woodnet News*. Available at: https://www.woodnet.se/article/view/431476/dromlage_for_ny_teknik_i_traindustrin.
- Lüdeke-Freund, F., Gold, S. and Bocken, N. M. P. (2019) 'A Review and Typology of Circular Economy Business Model Patterns', *Journal of Industrial Ecology*, 23(1), pp. 36–61.
- Maes, G. and Van Hootegeem, G. (2011) 'Towards a Dynamic Description of the Attributes of Organizational Change', *Research in Organizational Change and Development*. Emerald Group Publishing Ltd, 19, pp. 191–231.
- Magretta, J. (2002) 'Why Business Models Matter', *Harvard Business Review*, 80(May), pp. 86–92.
- Mahadevan, B. (2000) 'Business Models for Internet-Based E-Commerce: An Anatomy', *California Management Review*, 42(4), pp. 55–70.
- Markides, C. C. (2013) 'Business Model Innovation', *The Academy of Management Perspectives*, 27(4), pp. 313–323.
- Markides, C. C. and Oyon, D. (2010) 'What to Do Against Disruptive Business Models (When and How to Play Two Games at Once)', *MIT Sloan Management Review*, 51(4), p. 25.
- Mason, K. and Spring, M. (2011) 'The Sites and Practices of Business Models', *Industrial Marketing Management*. Elsevier Inc., 40(6), pp. 1032–1041.
- Massa, L. and Tucci, C. L. (2013) 'Business Model Innovation', in *The Oxford Handbook of Innovation Management*. Oxford: Oxford University Press, pp. 420–441.
- Massa, L., Tucci, C. L. and Afuah, A. (2017) 'A Critical Assessment of Business Model Research', *Academy of Management Annals*, 11(1), pp. 73–104.
- McGahan, A. M. and Porter, M. E. (1997) 'How Much Does Industry Matter, Really?', *Strategic Management Journal*, 18(Summer Special), pp. 15–30.
- McGrath, R. G. (2010) 'Business Models: A Discovery Driven Approach', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 247–261.

- Meiling, J., Backlund, F. and Johnsson, H. (2012) 'Managing for Continuous Improvement in Off-site Construction: Evaluation of Lean Management Principles', *Engineering, Construction and Architectural Management*, 19(2), pp. 141–158.
- Mintzberg, H. (1979) *The Structuring of Organizations*. Englewood Cliffs, NJ: Prentice Hall.
- Mintzberg, H. and Lampel, J. (1999) 'Reflecting on the Strategy Process', *Sloan Management Review*, 40(3), pp. 21–30.
- Mintzberg, H. T. (1983) *Structure in Fives: Designing Effective Organizations*. Englewood Cliffs, NJ: Prentice Hall.
- Mintzberg, H. and Waters, J. A. (1985) 'Of Strategies , Deliberate and Emergent', *Strategic Management Journal*, 6(3), pp. 257–272.
- Monroe, K. B. (2003) *Pricing: Making Profitable Decisions*. 3 ed. New York: NY: McGraw-Hill.
- Mora Cortez, R. and Johnston, W. J. (2017) 'The Future of B2B Marketing Theory: A Historical and Prospective Analysis', *Industrial Marketing Management*. Elsevier, 66(July), pp. 90–102.
- Morris, M., Schindehutte, M. and Allen, J. (2005) 'The Entrepreneur's Business Model: Toward a Unified Perspective', *Journal of Business Research*, 58, pp. 726–735.
- Moses, J. W. and Knutsen, T. L. (2012) *Ways of Knowing: Competing Methodologies in Social and Political Research*. 2nd edn. Palgrave Macmillan.
- Nawari, N. O. (2012) 'BIM Standard in Off-site Construction', *Journal of Architectural Engineering*, 18(2), pp. 107–113.
- Netzell, O. (2015) *Markpriser, markbrist och byggande*. Karlskrona. Available at: <https://www.boverket.se/sv/om-boverket/publicerat-av-boverket/publikationer/2015/marknadsrapport-mars-2015/>.
- Nord, T. (2005) *Structure and Developments in the Solid Wood Value Chain*. Luleå University of Technology.
- Nord, T. (2008) *Prefabrication Strategies in the Timber Housing Industry a Comparison of Swedish and Austrian Markets*. Luleå tekniska universitet.
- Nord, T. and Brege, S. (2014) *En framtida hållbar trävärdekedja: Struktur, utveckling och möjligheter*. Linköping.
- Nord, T. and E. Semnani, S. (2019) *Struktur, Konkurrenskraft och Utveckling i Snickerisegment*. Linköping. doi: LIU-IEI-RR--19/00309—SE.
- Nord, T. and Widmark, N. (2010) *Trämanufaktur i ett uthålligt samhällsbyggande - Åtgärder för ett samverkande innovationssystem*.
- Nordin, F. and Kowalkowski, C. (2010) 'Solutions Offerings: A Critical Review and Reconceptualisation', *Journal of Service Management*, 21(4), pp. 441–459.
- Nordin, F., Lindahl, I. and Brege, S. (2013) 'The Applicability of Integrated Solutions

- Offerings: Differential Effects of Product Complexity', *Journal of Relationship Marketing*, 12(1), pp. 59–78.
- NRA Sweden (2012) *Den nationella strategiska forskningsagendan för den skogsbaserade näringen i Sverige*. Gävle.
- NTT (2019) *Nyheter för sågverk, träindustri och trävaruhandel*, Woodnet. Available at: <https://www.woodnet.se>.
- Nybakk, E. *et al.* (2009) 'Antecedents to Forest Owner Innovativeness: An Investigation of the Non-timber Forest Products and Services Sector', *Forest Ecology and Management*, 257(2), pp. 608–618.
- OECD (2011) *ISIC REV. 3 Technology Intensity Definition*. doi: 10.1787/sti.
- OECD (2018) *OECD Data, Organization for Economic Co-operation and Development*. Available at: <https://data.oecd.org/>.
- Osiyevskyy, O. and Dewald, J. (2015) 'Explorative versus Exploitative Business Model Change: The Cognitive Antecedents of Firm-level Responses to Disruptive Innovation', *Strategic Entrepreneurship Journal*, 9, pp. 58–78.
- Osterwalder, A. and Pigneur, Y. (2010) *Business Model Generation*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Osterwalder, A., Pigneur, Y. and Tucci, C. L. (2005) 'Clarifying Business Models: Origins, Present, and Future of the Concept', *Communications of the Association for Information Systems*, 16(1), pp. 1–25.
- Palinkas, L. A. *et al.* (2015) 'Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research', *Administration and Policy in Mental Health and Mental Health Services Research*, 42(5), pp. 533–544.
- Parastuty, Z. *et al.* (2015) 'Organizational Change: a Review of Theoretical Conceptions that Explain How and Why Young Firms Change', *Review of Managerial Science*, 9(2), pp. 241–259.
- Parasuraman, A. (1997) 'Reflections on Gaining Competitive Advantage Through Customer Value', *Journal of the Academy of Marketing Science*, 25(2), pp. 154–161.
- Pateli, A. G. and Giaglis, G. M. (2005) 'Technology Innovation-Induced Business Model Change: A Contingency Approach', *Journal of Organizational Change Management*, 18(2), pp. 167–183.
- Patton, M. Q. (2002) *Qualitative Research & Evaluation Methods*. 3rd edn. Thousand Oaks, CA: Sage Publications.
- Peteraf, M. A. (1993) 'The Cornerstones of Competitive Advantage: A Resource-Based View', *Strategic Management Journal*, 14, pp. 179–191.
- Pettigrew, M. (1987) 'Context and Action in the Transformation of the Firm', *Journal of Management Studies*, 24(6), pp. 649–670.
- Porter, M. E. (1980) 'Industry Structure and Competitive Strategy: Keys to Profitability', *Financial Analysis Journal*, July-Augus, pp. 30–41.

- Porter, M. E. (1981) 'The Contributions of Industrial Organization To Strategic Management 1,2', *Academy of Management Review*, 6(4), pp. 609–620.
- Porter, M. E. (1989) 'How Competitive Forces Shape Strategy', in *Readings in Strategic Management*. London: Palgrave, pp. 137–145.
- Porter, M. E. (1995) 'The Competitive Advantage of the Inner City', *Harvard Business Review*, (May-June), pp. 55–71.
- Porter, M. E. (1996) 'What is Strategy?', *Harvard Business Review*, (November-December), pp. 61–78.
- Porter, M. E. (2001) 'Strategy and the Internet', *Harvard Business Review*, 79, pp. 62–79.
- Prahalad, C. K. and Hamel, G. (1990) 'The Core Competence of the Corporation', *Harvard Business Review*, (May-June), pp. 79–91.
- Probst, L. *et al.* (2013) *Advanced Manufacturing: Mass customisation*. Luxembourg. doi: Ref. Ares(2015)4645626 - 28/10/2015.
- Raisch, S. and Birkinshaw, J. (2004) 'Organizational Ambidexterity: Antecedents, Outcomes, and Moderators', *Journal of Management*, 34(3), pp. 375–409.
- Rajagopalan, N. and Spreitzer, G. M. (1997) 'Toward a Theory of Strategic Change: A Multi-lens Perspective', *Academy of Management Review*, 22(1), pp. 48–79.
- Ranson, S., Hinings, B. and Greenwood, R. (1980) 'The Structuring of Organizational Structures', *Administrative Science Quarterly*, 25(1), pp. 1–17.
- Romanelli, E. and Tushman, M. L. (1994) 'Organizational Transformation as Punctuated Equilibrium: An Empirical Test', *Academy of Management*, 37(5), pp. 1141–1166.
- Saebi, T. (2015) 'Business Model Evolution, Adaptation, or Innovation? A Contingency Framework on Business Model Dynamics', in Foss, N. J. and Saebi, T. (eds) *Business Model Innovation: The Organizational Dimension*. Oxford: Oxford University Press, pp. 145–168.
- Saebi, T. and Foss, N. J. (2015) 'Business Models for Open Innovation: Matching Heterogeneous Open Innovation Strategies with Business Model Dimensions', *European Management Journal*. Elsevier Ltd, 33(3), pp. 201–213.
- Sakin, M. and Kiroglu, Y. C. (2017) '3D Printing of Buildings: Construction of the Sustainable Houses of the Future by BIM', *Energy Procedia*. Elsevier B.V., 134, pp. 702–711.
- Sandberg, D. *et al.* (2014) 'The Role of the Wood Mechanical Industry in the Swedish Forest Industry Cluster', *Scandinavian Journal of Forest Research*. Taylor & Francis, 29(4), pp. 352–359.
- Sathre, R. and O'Connor, J. (2010) 'Meta-analysis of Greenhouse Gas Displacement Factors of Wood Product Substitution', *Environmental Science and Policy*. Elsevier Ltd, 13(2), pp. 104–114.

- SCB (2018) *Gainfully employed by region and sector, 2018, Statistics Sweden*. Available at: <https://www.scb.se/en/finding-statistics/statistics-by-subject-area/labour-market/employment-and-working-hours/labour-statistics-based-on-administrative-sources/pong/tables-and-graphs/gainfully-employed-by-region-and-sector-2018/>.
- SCB (2019) *Hitta statistik, Statistiska centralbyrån*. Available at: <https://www.scb.se/hitta-statistik/>.
- Schnieder, S. and Spieth, P. (2013) 'Business Model Innovation: Towards an Integrated Future Research Agenda', *International Journal of Innovation Management*, 17(01), pp. 1–34.
- Schumpeter, J. A. (1934) *The Theory of Economic Development*. Cambridge, Massachusetts: Harvard University Press.
- Seddon, P. B. *et al.* (2004) 'The Case for Viewing Business Models as Abstractions of Strategy', *Communications of the Association for Information Systems*, 13(1), pp. 427–442.
- Siggelkow, N. (2002) 'Evolution toward Fit', *Administrative Science Quarterly*, 47(1), pp. 125–159.
- Skatteverket (2017) *Skattesystemets utveckling 2006-2015: Kartläggning av könsuppdelad statistik*. doi: 200 265892-17/113.
- Smeds, R. (1997) 'Radical Change Through Incremental Innovations: Generic Principles and Cultural Differences in Evolution Management', *International Journal of Technology Management*, 14(1), pp. 146–162.
- Som, O. and Kriner, E. (2015) *Low-tech Innovation: Competitiveness of the German Manufacturing Sector*. Edited by O. Som and E. Kriner. Switzerland: Springer.
- Spanos, Y. E. and Lioukas, S. (2001) 'An Examination into the Casual Logic of Rent Generation: Contrasting Porter's Sompetitive Strategy Framework and the Resource-based Perspective', *Strategic Management Journal*, 22(10), pp. 907–934.
- Spieth, P., Schneckenberg, D. and Ricart, J. E. (2014) 'Business Model Innovation – State of the Art and Future Challenges for the Field', *R&D Management*, 44(3), pp. 237–247. doi: 10.1111/radm.12071.
- Spieth, P. and Schneider, S. (2016) 'Business Model Innovativeness: Designing a Formative Measure for Business Model Innovation', *Journal of Business Economics*. Springer Berlin Heidelberg, 86(6), pp. 671–696.
- Stake, R. (2000) 'Case studies', in Denzin, N. K. and Lincoln, Y. S. (eds) *Handbook of Qualitative Research*. Thousand Oaks, CA: Sage Publications, pp. 435–454.
- Statista (2018) *Sweden: Distribution of gross domestic product (GDP) across economic sectors from 2008 to 2018*. Available at: <https://www.statista.com/statistics/375611/sweden-gdp-distribution-across-economic-sectors/>.
- Statista (2019) *Smart Home: Sweden, Statista*. Available at: <https://www.statista.com/outlook/279/154/smart-home/sweden>.

- Sterman, J. D. (2000) *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Boston, MA: McGraw-Hill.
- Storbacka, K. *et al.* (2013) 'Solution Business Models: Transformation along Four Continua', *Industrial Marketing Management*. Elsevier Inc., 42(5), pp. 705–716.
- Swedish Forest Industries Federation (2019) *Skogs Industrierna*. Available at: <https://www.forestindustries.se/forest-industry/facts-and-figures/>.
- Teece, D. J. (2010) 'Business Models, Business Strategy and Innovation', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 172–194.
- The Swedish Central Bank (2019) *Reporänta, Sveriges Riksbank*. Available at: <https://www.riksbank.se/>.
- The Swedish Construction Federation (2019) *Bostadsinvesteringar, Sveriges Byggindustrier*. Available at: https://www.sverigesbyggindustrier.se/bygginvesteringar/bostadsinvesteringar__6908.
- Thompson, James, D. (1967) *Organization in Action*. New York: McGraw-Hill.
- Tian, X., Martin, B. and Deng, H. (2008) 'The Impact of Digitization on Business Models for Publishing', *Journal of Systems and Information Technology*, 10(3), pp. 232–250.
- Timmers, P. (1998) 'Business Models for Electronic Markets', *Electronic Markets*, 8(2), pp. 3–8.
- Tirole, J. (1988) *The Theory of Industrial Organization*. Cambridge, Massachusetts: The MIT Press.
- TMF (2019a) *Fönster, The Swedish Federation of Wood and Furniture Industry*. Available at: <https://www.tmf.se/statistik/branschstatistik/fonster/>.
- TMF (2019b) *TMF i Siffror, The Swedish Federation of Wood and Furniture Industry*. Stockholm. Available at: <https://www.tmf.se/>.
- Tosey, P. and Robinson, G. (2002) 'When Change is no Longer Enough: What Do We Mean by "Transformation" in Organizational Change Work?', *TQM Magazine*, 14(2), pp. 100–109.
- Trading Economics (2019) *Sweden Manufacturing Production, Trading Economics*. Available at: <https://tradingeconomics.com/sweden/manufacturing-production>.
- von Tunzelmann, N. and Acha, V. (2006) 'Innovation in "Low-Tech" Industries', in Fagerberg, J. and Mowery, D. C. (eds) *The Oxford Handbook of Innovation*. Oxford University Press.
- Tushman, M. L. and O'Reilly III, C. A. (1996) 'Ambidextrous Organizations: Managing Evolutionary and Revolutionary Change', *California Management Review*, 38(4), pp. 7–30.
- Tushman, M. and Nadler, D. (1980) 'A Model for Diagnosing Organizational Behavior', *Organizational Dynamics*, 9(2), pp. 35–51.

UNIDO (2019) *INDSTAT 2 2019, ISIC Revision 3, United Nations Industrial Development Organization*. Available at: [https://stat.unido.org/database/INDSTAT 2 2019, ISIC Revision 3#](https://stat.unido.org/database/INDSTAT%202019,%20ISIC%20Revision%203#).

UNIDO (2020) *Classification of manufacturing sectors by technological intensity (ISIC Revision 4), United Nations Industrial Development Organization*. Available at: <https://stat.unido.org/content/focus/classification-of-manufacturing-sectors-by-technological-intensity-%2528isic-revision-4%2529;jsessionid=4DB1A3A5812144CACC956F4B8137C1CF>.

Utterback, J. M. (1974) 'Innovation in Industry and the Diffusion of Technology', *American Association for the Advancement of Science*, 183(4125), pp. 620–626.

Utterback, J. M. and Abernathy, W. J. (1975) 'A Dynamic Model of Process and Product Innovation', *The International Journal of Management Science*, 3(6), pp. 639–656.

Utterback, J. M. and Suárez, F. F. (1993) 'Innovation, Competition, and Industry Structure', *Research Policy*, 22(1), pp. 1–21.

Vargo, S. L. and Lusch, R. F. (2004) 'Evolving to a New Dominant Logic for Marketing', *Journal of Marketing*, 68(1), pp. 1–17.

Van de Ven, A. H. (2007) *Engaged Scholarship: A Guide for Organizational and Social Research*. New York: Oxford University Press.

Van de Ven, A. H. and Poole, M. S. (1990) 'Methods for Studying Innovation Development in the Minnesota Innovation Research Program', *Organization Science*, 1(3), pp. 313–335.

Van de Ven, A. H. and Poole, M. S. (1994) 'Explaining Development and Change in Organizations', *Academy of Management Review*, 20(3), pp. 510–540.

Vendrell-Herrero, F. and Wilson, J. . (2017) 'Servitization for Territorial Competitiveness: Taxonomy and Research Agenda', *Competitiveness Review: An International Business Journal*, 27(1), pp. 2–11.

Verkstadsforum (2019) *Deromegrupper storsatsar på nytt affärssystem från IFS, PLM&ERP NEWS*. Available at: <http://plm-erpnews.se/deromegruppen-storsatsar-pa-nytt-affarsystem-fran-ifs/>.

Visnjic, I., Wiengarten, F. and Neely, A. (2016) 'Only the Brave: Product Innovation, Service Business Model Innovation, and Their Impact on Performance', *Journal of Product Innovation Management*, 33(1), pp. 36–52.

Voelpel, S. *et al.* (2005) 'Escaping the Red Queen Effect in Competitive Strategy: Sense-testing Business Bodels', *European Management Journal*, 23(1), pp. 37–49.

Voelpel, S. C., Leibold, M. and Tekie, E. B. (2004) 'The Wheel of Business Model Reinvention: How to Reshape Your Business Model to Leapfrog Competitors', *Journal of Change Management*, 4(3), pp. 259–276.

Wahlfeldt (2018) *E-handel med byggvaror går som tåget, Dagens industri*. Available at: <https://www.di.se/nyheter/e-handel-med-byggvaror-gar-som-taget/>.

- Waldner, F., Poetz, M. K. and Grimpe, C. (2015) 'Antecedents and Consequences of Business Model Innovation: The Role of Industry Structure', *Business Models and Modelling*, 33, pp. 347–386.
- Watzlawick, P., Weakland, J. H. and Fisch, R. (1974) *Change: Principles of Problem Formulation and Problem Resolution*. New York: Norton.
- Weick, K. E. and Quinn, R. E. (1999) 'Organizational Change and Development', *Annual review of psychology*, 50, pp. 361–386.
- Weiss, K. D. (1997) 'Paint and Coatings: A Mature Transition Industry', *Progress in Polymer Science*, 22(96), pp. 203–245.
- Wernerfelt, B. (1984) 'A Resource-based View of the Firm', *Journal of Strategic Management*, 5(1984), pp. 171–180.
- Wezel, F. C. and Saka-Helmhout, A. (2005) 'Antecedents and Consequences of Organizational Change: "Institutionalizing" the Behavioral Theory of the Firm', *Organization Studies*, 27(2), pp. 265–286.
- Williams, F. P. *et al.* (1995) 'Manufacturing Strategy, Business Strategy and Firm Performance in a Mature Industry', *Journal of Operations Management*, 13, pp. 19–33.
- Williamson, O. E. (1975) *Markets and Hierarchies*. New York: Free Press.
- Wirtz, B. W. *et al.* (2016) 'Business Models: Origin, Development and Future Research Perspectives', *Long Range Planning*, 49(1), pp. 36–54.
- Wirtz, B. W., Schilke, O. and Ullrich, S. (2010) 'Strategic Development of Business Models: Implications of the Web 2.0 for Creating Value on the Internet', *Long Range Planning*, 43(2–3), pp. 272–290.
- Yin, R. K. (1989) *Case Study Research: Design and Methods*. 2nd edn. Newbury Park, CA: Sage.
- Yin, R. K. (1993) *Applications of Case Study Research*. Newbury Park, CA: Sage.
- Yin, R. K. (2010) 'Analytic Generalization', in Mills, A. J., Durepos, G., and Weibe, E. (eds) *Encyclopedia of Case Study Research*. Thousand Oaks, CA: Sage Publications, pp. 21–23.
- Yip, G. S. (2004) 'Using Strategy to Change your Business Model', *Business Strategy Review*, 15(2), pp. 17–24.
- Yunus, M., Moingeon, B. and Lehmann-Ortega, L. (2010) 'Building Social Business Models: Lessons from the Grameen Experience', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 308–325.
- Zeithaml, V. A. (1988) 'Consumer Perceptions of Price, Quality, and Value: a Means-End Model and Synthesis of Evidence', *Journal of Marketing*, 52(3), pp. 2–22.
- Zott, C. and Amit, R. (2007) 'Business Model Design and the Performance of Entrepreneurial Firms', *Organization Science*, 18(2), pp. 181–199.
- Zott, C. and Amit, R. (2008) 'The Fit Between Product Market Strategy and Business

Model: Implications for Firm Performance', *Strategic Management Journal*, 29(1), pp. 1–26.

Zott, C. and Amit, R. (2010) 'Business Model Design: An Activity System Perspective', *Long Range Planning*. Elsevier Ltd, 43(2–3), pp. 216–226.

Zott, C., Amit, R. and Massa, L. (2011) 'The Business Model: Recent Developments and Future Research', *Journal of Management*, 37(4), pp. 1019–1042.

Appendix

A. The Interview Guide

- Introduce ourselves
- Say the purpose of interview
- Assure them that they do not need to answer any questions they do not want, and their anonymity will be ensured.

Background Information of the Interviewee

- What is your position in the company?
- How many years have you been working here?
- Can you briefly describe your responsibilities?

Changes at the Company/Division

- Can you briefly describe the main changes that the company went through while you were working here? What do you think triggered these changes? Explanation: Is it initially from within the organization? From your industry? Or from new players or other industries?
- What were the changes that took place in your division?
- What were the challenges that you went through when undergoing changes?
- Can you think of examples of innovations that you believe took place in your division?

Outcome of Changes

- Did your division achieve the change objectives that they had?
- Is there anything that you think you might have done better?
- What are the areas that are still undergoing change?

Supplier Relationships

- What are the communication channels used to contact/reach your suppliers? Has there been changes in the past years?
- How would you describe the nature of relationships with your suppliers? (i.e. long-term, short-term) Has there been changes in the past years?
- Who are your main suppliers? How often do you change your suppliers?
- What role do they play in internal operations of the company? Has there been changes in this regard over the past years?

Customer Relationships

- Through which communication/marketing channels do you currently reach your customers? Have these channels been different five years ago?
- How do the customers normally find you?

- How would you describe the relationships you have with your customers? How were these relationships five years ago?
- How did the changes in your company influence the relationships with your customers?
- Can you describe your customers' role throughout the whole process from production to final delivery? How was their role five years ago?
- Are there any differences in customer's role depending on the offering?
- What share of your customers are returning customers?
- If you lose one of your customers, will it significantly affect your revenue?

Third-party (external actors) Relationships

- Who are the main external partners that you collaborate with? Who were they five years ago?
- How would you describe the nature of relationships you have with your external partners? Were these relationships different five years ago?
- How does the relationship with these partners benefit company's operations?

Companies' current BM vs. the BM five years ago

- How would you describe the competition in your industry?
- Do you see any changes in the basis of competition in the industry?
- How does your company differentiate itself from competitors? Was it different five years ago?
- Can you describe in your own words the value that you believe your company delivers to the customers? Was it different five years ago?
- Has there been changes in your main customer segments over the past years?
- What services does your company offer to its customers? What were those offerings five years ago?
- Can you describe what your total offerings are?
- What problems do they solve for the customer?
- Is there any core part in your offerings that plays a key role?

(In this interview, by total offering we mean a bundle of product and service offered to customers)

- How much would you say is the share in turnover of product and service in each total offering? Please tell us an approximate percentage. How much was this percentage five years ago?
- What is their approximate share in profit? And five years ago?
- Does this share of product-service vary a lot between your different offerings?
- What are the key internal company resources (tangible) that enable the delivery of total offering to customers? What were they five years ago?
- What are the key company competences (intangible) that enable the delivery of total offering to customers? What were they five years ago?
- What is your cost structure? i.e. what are the main contributors to the costs associated with your total offering? Can you tell us an approximate share of each? Have these costs been different five years ago? (i.e. from an abstract level, for e.g. Production, R&D, Design, Marketing, Sales, Procurement, Purchasing, etc.)
- Can you explain about your pricing strategy/structure?
- Can you explain about your revenue streams?

B. Companies' Change Series

The tables in this section have been produced based on the case studies' empirical findings. These tables demonstrate a set of change series that each company has gone through during the ten-year period. These change series are divided into the two time periods that are the focus of this study. Each change series starts with the initial internal and external triggers to a family of changes. These triggers lead to specific changes in the companies, which may be associated with certain internal or external challenges. Lastly, each change series is grouped based on the BM components that were affected as a result of these changes.

As can be seen, two arrows are also shown at the sides of these tables, one pointing downwards and the other pointing horizontally towards the right-hand side of the table. The vertical arrow represents the chronological order of the triggers to changes, while the horizontal arrow represents the chronological order of events within each change series. In other words, each change series will start with change triggers, which will lead to changes, with challenges appearing along the way. However, it should be pointed out that the changes in different series of change may have taken place simultaneously during each time period.

The sources of the tables' contents are companies' annual reports, official websites and interviews. In the case of information collected through interviews, the source is mentioned in brackets after each statement. The rest of the information included in the tables comes from companies' annual reports and official websites.

T0 to T1					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
	Increase in the demand of customers (both resellers and end-users) in having variety in offered models (2 interviewees)	Expansions in the factory floor to enable some level of automation Wider variety in products offerings (2 interviewees) Limited offering of installation services (1 interviewee)	Difficulty in changing the existing machineries, knowledge and routines in production (2 interviewees) Difficulty in finding the good mix in production of standard vs. customized models (2 interviewees)	Cyclical demand of stairs around the year, makes having an even flow in production difficult (1 interviewee)	Resources Activities Products & Services
More time-consuming/complicated process of quotation & price calculation because of increased variety of stairs models (1 interviewee) Org. size & high no. of white collars make the operations more costly (1 interviewee)		Started journey towards digital systems (2 interviewees)	More difficult to change, due to the big size of organization (2 interviewees)		
Cease of membership in wood manufacturing group		Change in the brand name Investments in own sales department	Record high negative profit margin of -13% due to MSEK 4 investment in sales department		Resources Activities Channels Actors & Relationships

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
New ownership's (Annual Report, 2013) strategic direction towards increase in profitability & reduced focus on turnover (1 interviewee)	Tighter funding after recession (2 interviewees)	Restructuring of organization's activities for efficiency & waste minimization through:	Improving the production flow, with digital systems has so far, led to increase in the lead times (1 interviewee).		Resources Activities Value Proposition Revenue Model Actors & Relationships
		Implementation & integration of digital systems such as ERP, MPS & configurator (4 interviewees)	Digitalization of internal processes brings inflexibility in certain decision makings (2 interviewees)	Being in a conservative manufacturing industry, where new technologies are adopted much later than other manufacturing industries (2 interviewees)	
		Stock control improvements (2 interviewees)	The nature of products & possibility to have many diff. combinations in stairs models, make the implementation of digital systems challenging (2 interviewees)	Uncertain about the reaction of bigger customers on using the company's configurator system for placing orders (2 interviewees)	
		Increased collaboration with sister companies in Sweden & Norway	Difficulty in estimating the optimal amount of raw material to purchase & stock (2 interviewees)		
		Action- & time-based pricing (3 interviewees)		High dependent on economic cycles & large/price-sensitive construction companies (1 interviewee)	

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
	Market trend towards decrease in the need of intermediary (resellers) level (1 interviewee)	Developing the website into a more interactive platform (2 interviewees)		End-users do not have a clear understanding of the value of stairs (1 interviewee)	Activities Products & Service Value Proposition Customer Segments Channels
	End-users demand more involvement in the production process & education on stairs' manufacturing & installation (2 interviewee)	Opened own sales offices in Stockholm & Gothenburg (2 interviewees)			
Importance of mounting services to overall quality of stairs (1 interviewee)	Increased demand/desire for mounting services from private customers (1 interviewee)	Wider offering of mounting services (2 interviewees)	Increased level of responsibility and time consumed, by providing their own mounting services (2 interviewees)		Products & Services Value Proposition
The end of T2					

Windows A

T0 to T1					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
Holding company's large-scale acquisition strategy		Increase in the no. of production units at Windows A after acquisitions	Company's production not at its desired capacity		Resources Activities
Restructuring, cost reduction & capacity adjustments after acquisitions		Decrease in the no. of employees			
	Changes in the cycles of construction industry. Changes in ROT benefits Higher demand from industrial customers than private ones.	Company forced into offering low profit margin windows (1 interviewee)		Powerful industrial customers imposing high price-pressures (2 interviewees)	Customer Segments
Group-wide brand strategy introduced, agenda for more innovation and development		Recruitments & changes to key positions New consumer-friendly website launched. TV campaigns introduced Started collaborations with a science park in Sweden for innovative products The start of working on digital consumer solutions			Resources Activities Products & Services Actors & Relationships Channels
Introducing guidelines on group-level for benefiting from economies of scale		Started the lean management & waste minimization journey Having fewer, but larger factories (production units merging & shutting down)	Not being able to financially benefit from economies of scale (2 interviewees)		Resources Activities

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
Continued efforts in economies of scale and centralization within daughter companies		Production units continuing to merge & shut down More centralised and group-level sales operations	Centralization leading to diseconomies of scale (2 interviewees)		Resources Activities Actors & Relationships
			No structured control over profit & loss of the daughter companies (2 interviewees)		
			Lack of structure, inefficiencies, overlaps in responsibilities on group-level and daughter companies (3 interviewees)		
Having no majority shareholder owner	The holding co. became a listed company on Stockholm Nasdaq	Several recruitments to key positions Changes in work process of R&D and sales dept. (1 interviewee) Several new window designs launched Launch of new brand and TV campaigns for Windows A		The complex nature of window production does not allow the product development efforts to be easily observed/appreciated by the customers. (2 interviewees)	Resources Activities Products & Services Value Proposition Channels
Group-level guidelines on product development & innovation			Only 15% of R&D's resources goes to NPD & innovation. The rest goes to fine-tuning the existing machines and platforms. (1 interviewee)		
Goal to establish a market leader position					

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
As a market leader and as per communicated values, offering a wide range of window from standard to highly customized	New niche-focused & strong competitors entering the market (1 interviewee) Higher demand received from price-pressed industrial buyers (1 interviewee)	Major investments targeted at improving production efficiency & automation Some automated machineries purchased Developing digital systems such as ERP, BIM & configurators	Difficulty in finding the right balance in production of standard and customized products (2 interviewees) Due to the complex nature of production, high investments are required for the automated machineries (1 interviewee) High variety in versions of produced windows, imposing difficulty in updating the windows configurator system (1 interviewee)	The high investments in the automated machineries, only add little value to the end-products. (1 interviewee)	Resources Activities
Strategies of market-shaping as the market leader (2 interviewees) The benefits of producing/providing digital solutions compared with the traditional hardware, in terms of having easier/quicker updates (1 interviewee)	Increasing trend in the whole ecosystem of Smart Housing solutions	Opened an office in science park Set digital vision 2020 Launched first connected windows series and related apps A new app for carpenters launched	Difficulty in completely deviating from the core business and the manual settings, by producing smart windows (2 interviewees) Lack of competence and knowledge of sales force for selling smart/connected windows (1 interviewee)	Being part of a conservative industry (2 interviewees) Not receiving the desired response from consumers on digital solutions until now (2 interviewees) High investments in automated machineries, when the product made from them does not sell much (1 interviewee) Having traditional industrial customers, who are not open to consuming new technologies (3 interviewees)	

T1 to T2					
Change Triggers		Change		Change Challenges	
Internal	External			Internal	External
Not achieving economies of scale through centralization (3 interviewees)	Need to get close to the end-user (3 interviewees)	Start of a major restructuring & decentralization project on the group level. Leaving more accountability for each daughter company (all interviewees)			
Unstructured/insufficient business and accounting control over operational figures and incorrect pricing (1 interviewee)		Improving business controlling & accounting procedures (1 interviewee)		High reliance of older staff on tacit knowledge (1 interviewee)	
The need to improve the mix of sales to consumer market	Changes in consumers' buying habits, the tendency to educate themselves on the Internet before placing the orders (2 interviewees)	Introduced online education plans for consumers			
	The general market trend of retail death (1 interviewee)	Opened first online shop for spare parts			Becoming the competitor of their customers (2 interviewees)
	The inability of smaller carpenters to manufacture and install the more complex windows that the company produce (1 interviewee)	New service concept for consumers, offering installation services			
Low-quality mounting services, leaves a negative impression on the quality of the market leader's brand (1 interviewee)	Urban living, people living in smaller apartments, the need for mounting services that carpenters don't provide due to low order quantity (1 interviewee)				Industrial customers imposing restrictions on the company and their installation service offering (2 interviewees)
The end of T2					
				Activities	
				Products & Services	
				Value Proposition	
				Customer Segments	
				Channels	

Windows B →

T0 to T1					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
Fully owned by the new holding company		Sale & purchase collaborations with new sister companies			Resources Actors & Relationships
Withdrawal from the wood manufacturing group responsible for sale		Started its own sales & marketing dept.			Resources Activities
		Marketing & Sales manager employed		Competing with their own customers (1 interviewee)	Products & Services Actors & Relationships Channels
		Offering montage & assembly services			
		Started having some presence in the press/media, advertising the energy efficiency of their windows			

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
	Competing with their own customers	No longer offering montage services			Activities Product & Services
New ownership's guidelines and factory improvement plans		Investments of around MSEK 4 in the factory Ongoing work on production improvements (1 interviewees) Lean Coordinator employed			Resources Activities
	A new generation of industrial customers are entering the market, who do not have the same expertise as the previous ones. They need more support and education (2 interviewees)	More educative content on the website	The lack of expertise by new industrial customers, makes the ordering process more time-consuming & challenging. (2 interviewees)	Lack of expertise in industrial customers can also risk the quality of window installation during building construction (2 interviewees)	Resources Activities Channels
More systematic reporting requirements by the Holding Co. (3 interviewees)		Employing around 20 new white collars	Not having enough resources & expertise in systematic reporting and accounting (2 interviewees)		

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Component
Internal	External		Internal	External	
Their Swedish holding co. started a more independent operation from its mother company in Denmark		Increased collaboration between Windows B and its Swedish sister companies both for the purchase of raw materials and sales	The imposed restrictions by the Holding Co. on available suppliers for purchasing raw materials (1 interviewee)		Actors & Relationships
Holding co.'s guidelines on increasing production volume (2 interviewees)		Around MSEK 20 investment in a multi-operational machine & factory reconstruction	The difficulty in integrating the data in the internal systems that work parallel together (2 interviewees)		
		Hired a production manager (a new position), undergoing staff education & competence development (2 interviewees)	The need for educating the staff for a more automated and large-scale production (2 interviewees)		Resources Activities
The end of T2					

T0 to T1						
Change Triggers			Change	Change Challenges		Affected BM Components
Internal	External			Internal	External	
The standardized buildings become cheaper and quicker to produce, the more frequent it is done (1 interviewee)	Increased competition from lower-wage countries (1 interviewee)		Fixed-price catalogue buildings introduced	Not able to shape the market due to small size and lack of resources. Can only be a quick follower of the trends (1 interviewee)	Not very easy to convince the buyers to buy the fully standard options in company's offering (2 interviewees) The high reliance on public tenders, puts a high pressure on price (3 interviewees)	Activities Products & Services Value Proposition
	Unpredictability in contractors' performance (1 interviewee)					
	Higher rate of customer satisfaction on the highly standardized constructs, since all the expectations are met (1 interviewee)					
	The customers in this market, would like to immediately get the answer to how much will it exactly cost and when will it be over (1 interviewee)					
	The customers nowadays, demand more available information online before starting the process of ordering. They want clear and quick information on all aspects (1 interviewees).		Improved website content			Channels
	Economic recession & cycles in construction		38% drop in workforce			Resources
Increase in the complexity of projects makes the handling of all the data without digital systems difficult (2 interviewees)	Current availability of cheaper and more user-friendly software for internal operations (2 interviewees)		BIM system introduced New system implemented for 3D planning	Causing some operational interruptions in the factory		Resources Activities
In need of more systematic and structured decision-making process in production (1 interviewee)	New generation of workforce are more technology-savvy (1 interviewee)					

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Components
Internal	External		Internal	External	
Increase in the complexity of projects makes the handling of all the data without digital systems difficult (2 interviewees)	Current availability of cheaper and more user-friendly software for internal operations (2 interviewees)	Digital costing tools and automatic invoice scanning began	Difficulty in integrating all the existing systems into a unified one (3 interviewees)		Resources Activities
In need of more systematic and structured decision-making process in production (1 interviewee)	New generation of workforce are more technology-savvy (1 interviewee)	New Technical Manager employed	The digital systems are not shortening the internal processes, but increase the level of their accuracy (2 interviewees)		
Change in the ownership of the holding company Directions towards automation & digitalization for achieving efficiency (1 interviewees)	Changes in building regulations & increase in admin. workload The high reliance on public tenders, puts a high pressure on prices (3 interviewees)	Lean management process began	Difficulty in integration of all the existing systems into a unified one (3 interviewees)		Resources Activities Channels
		Digitalization of several internal operations continues/completed			
		Biggest investment in manufacturing automation machinery: €1 million	Due to the small scale of company's operation, high levels of automation are very costly and not always justified by the returns		
		Increase in white-collar workforce in design & sales (1 interviewee)			
		Organization restructurings of white-collar workforce (2 interviewees)			
		More comprehensive website			
The end of T2					

Housing Co.

T0 to T1					
Change Triggers		Change	Change Challenges		Affected BM Components
Internal	External		Internal	External	
Growth strategies	Changes in the market and types of customers The economic recession	Budget housing concept introduced			Resources Activities Products & Services Value Proposition Customer Segments
		Some restructuring & automation in production			
		Off-site pre-fabrication of walls			
		Entered Norway's market			

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Components
Internal	External		Internal	External	
Growth strategies Partly for increasing production capacity, partly for brand development	Increase in the demand of houses	Acquired another premium brand of housing company		The market of premium housing not doing well	Resources Activities Products & Services Customer Segments Actors & Relationships
	Offering highly customized single-family housings has not been a profitable business	Decision made to discontinue the premium manufacturer brand and continue operating under own brand			Resources Activities Products & Services Customer Segments Actors & Relationships
		Transfer of operations from the acquired premium manufacturer to own existing factory Rented out the premium brand's premises			

T1 to T2						Affected BM Components
Change Triggers		Change	Change Challenges		Resources Activities Value Proposition Customer Segments Channels	
Internal	External		Internal	External		
CEO change Continued growth & increase in production capacity strategies Continued operation modernization efforts	Changes in the market and types of customers	Investments made in modernization and increase of production rate in the factory	They believe the company is weak in communicating the values they offer to customers, even though their offerings are the same as the top actors in their segment (1 interviewee)	Municipalities not providing enough buildable lands for single-family housings, despite the existing demand. (2 interviewees)		
		Introduced 8 more types of budget series housings		Shortage of competent building contractors (2 interviewees)		
		Sold company's property in Germany Having sales offices in Sweden only				
	The contractors working closely with the company, pushed the idea of having a more digital internal operation	Began using digital tablets in the production floor (2 interviewees) Introducing a new ERP system (1 interviewee)		There are not many ready-to-order digital systems that meet all the requirements for internal processes in this industry. There is a need to order a tailor-made system (1 interviewee)		

T1 to T2					
Change Triggers		Change	Change Challenges		Affected BM Components
Internal	External		Internal	External	
On-site construction requires consideration into many aspects and is a longer process (2 interviewees)	Municipalities not providing enough buildable lands for single-family housings, despite the existing demand (2 interviewees)	Providing services and offerings on purchase of buildable lands to customers			Activities Products & Services Value Proposition Actors & Relationships Channels A New Parallel BM
	Municipalities demand a mix of single- & multi-family housings in the neighbourhoods. It is beneficial for the company to be able to do both. (1 interviewee)	Starting the modular construction as a sister company by over SEK 100 million investment	Module houses are only multi-family housings. To avoid competition inside the company between company's separate sales department of single and multi-family housings (1 interviewee)		
	Boom in the construction of multi-family housings	Module construction company inaugurated and received its first order			
	Shortage of competent building contractors (2 interviewees)	Acquiring 51% ownership in a new subsidiary for modular housing sales			
	General trends in smart housing and connected products	Low-scale collaborations for smart home solutions		The trend in smart housing is still shaky. There is no unified platform, no proper support system & the customers' reaction on it is still uncertain (1 interviewee)	Products & Services Actors & Relationships
The end of T2					

C. Measuring Cases' Scope of Change

This section represents the identification of the scope of change in companies' BMs at two points in time, T1 and T2, based on the proposed indicators discussed in the Analysis chapter. According to the proposed scope indicators, the scope of changes in companies' BMs can be identified as first, second or third order when the below conditions are met:

Scope of Change in BMs	Indicators
<i>First-order change</i>	One or more BM components are changed, as independent events.
<i>Second-order change</i>	More than one BM components are changed as a consequence of an initial change. Either within a single BM dimension or across different BM dimensions.
<i>Third-order change</i>	The majority of BM components in all three BM dimensions are changed. (<i>i.e. at least two changed BM components in each BM dimension.</i>) As a result of more than one first- or second-order change.

To make the scope decision, the information about the affected BM components from the *series of change* tables included in Appendix section B is used. As can be seen below, the companies' BM components are colour-coded in accordance with the BM dimension to which they belong. This has the aim of facilitating an easier understanding of the affected BM dimensions during each series of change. In the upcoming tables, the BM components of the Operational Platform dimension are shown in green, the Offering dimension in orange and the Market dimension in blue.

Stairs Co.

From T0 to T1		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform Offering	Second
Key Activities		
Products & Services		
Key Resources	Operational Platform	Second
Key Activities		
Key Resources	Operational Platform Market	Second
Key Activities		
Actors & Relationships		
Channels		
Total No. Of affected BM components (out of 9)		5
Scope Decision		Second

From T1 to T2		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Value Proposition		
Revenue Model		
Actors & Relationships		
Key Activities	Operational Platform Offering Market	Second
Products & Services		
Value Proposition		
Customer Segments		
Channels	Offering	Second
Products & Services		
Value Proposition		
Total No. Of affected BM components (out of 9)		8
Scope Decision		Third

Windows A

From T0 to T1		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform	Second
Key Activities		
Customer Segments	Market	First
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Products & Services		
Actors & Relationships		
Channels		
Key Resources	Operational Platform	Second
Key Activities		
Total No. Of affected BM components (out of 9)		5
Scope Decision		Second

From T1 to T2		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platforms Market	Second
Key Activities		
Actors & Relationships		
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Products & Services		
Value Proposition		
Channels	Operational Platform	Second
Key Resources		
Key Activities		
Key Resources	Operational Platform Offering	Second
Key Activities		
Products & Services		
Value Proposition		
Key Activities	Operational Platform Market	Second
Actors & Relationships		
Key Activities	Operational Platform Offering Market	Second
Products & Services		
Value Proposition		
Customer Segments		

Channels		
Total No. Of affected BM components (out of 9)		7
Scope Decision		Third

Windows B

From T0 to T1		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform Market	Second
Actors & Relationship		
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Products & Services		
Actors & Relationship		
Channels		
Total No. Of affected BM components (out of 9)		5
Scope Decision		Second

From T1 to T2		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Activities	Operational Platform Offerings	Second
Products & Services		
Key Resources	Operational Platform	Second
Key Activities		
Key Resources	Operational Platform Market	Second
Key Activities		
Channels		
Actors & Relationships	Market	First
Key Resources	Operational Platform	Second
Key Activities		
Total No. Of affected BM components (out of 9)		5
Scope Decision		Second

Prefab Co.

From T0 to T1		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Activities	Operational Platform Offering	Second
Products & Services		
Value Proposition		
Channels	Market	First
Key Resources	Operational Platform	First
Key Resources	Operational Platform	Second
Key Activities		
Total No. Of affected BM components (out of 9)		4
Scope Decision		Second

From T1 to T2		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform	Second
Key Activities		
Key Resources	Operational Platform Market	Second
Key Activities		
Channels		
Total No. Of affected BM components (out of 9)		3
Scope Decision		Second

Housing Co.

From T0 to T1		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Products & Services		
Value Proposition		
Customer Segments		
Total No. Of affected BM components (out of 9)		5
Scope Decision		Second

From T1 to T2		
Affected BM Components after each change series	Affected BM Dimensions	Order
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Products & Services		
Customer Segments		
Actors & Relationships		
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Products & Services		
Customer Segments		
Actors & Relationships		
Key Resources	Operational Platform Offering Market	Second
Key Activities		
Value Proposition		
Customer Segments		
Channels		
Key Activities	Operational Platform Offering Market	Second
Products & Services		
Value Proposition		
Actors & Relationships		
Channels		
Products & Services	Offering Market	Second
Actors & Relationships		
Total No. Of affected BM components (out of 9)		7
Scope Decision		Third

D. Measuring Cases' Degree of Change

The upcoming sections represent the results of measuring degree of change in each company's BM components, based on the indicators discussed in the Analysis chapter. The measures are carried out by comparing companies' BM components from 2007 (Time 0) to the end of 2012/2013 (Time 1) and from 2013/2014 (Time 1) to the end of 2018 (Time 2).

Stairs Co.

From T0 to T1

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	-	-

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

From T1 to T2

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		x
Have changes improved existing functions?		x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Value Proposition

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Revenue Model

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Windows A

From T0 to T1

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Value Proposition

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	-	-

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	-	-

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

From T1 to T2

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Value Proposition

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Windows B

From T0 to T1

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	-	-

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

From T1 to T2

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Prefab Co.

From T0 to T1

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Value Proposition

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	-	-

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	-	-

From T1 to T2

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	-	-

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	-	-

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Housing Co.

From T0 to T1

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	Refined	

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Value Proposition

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?		
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?		
Have changes improved existing functions?	x	
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		
Decision	-	-

From T1 to T2

Key Resources

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Key Activities

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Products & Services

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?	x	x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Value Proposition

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Customer Segments

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

Key Actors & Relationships

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		x
Have changes led to changes in other BM components?		x
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		x
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision		Renewed

Channels

Indicators	Refined	Renewed
Have changes affected the standard repeated processes in the organization?	x	x
Have changes improved existing functions?	x	x
Have changes recreated or introduced new functions?		
Have changes led to changes in other BM components?		
Has a considerable amount of the company's resources (financial, tangible, human) been dedicated to changes?		
Is the change formally communicated? (Through annual report, press release, etc.)		x
Decision	Refined	

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