

THESIS FOR THE DEGREE OF LICENTIATE OF ENGINEERING

**Initial Business Models in New Technology-Based Firms:
Dimensions and Founders' Prioritisations**

HANNA RYDEHELL

Department of Technology Management and Economics

CHALMERS UNIVERSITY OF TECHNOLOGY

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HANNA RYDEHELL

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Department of Technology Management and Economics
CHALMERS UNIVERSITY OF TECHNOLOGY
SE-412 96 Gothenburg
Sweden
Telephone + 46 (0)31-772 1000

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HANNA RYDEHELL

Department of Technology Management and Economics
Chalmers University of Technology

Abstract

Business models have been emphasised in research as an important concept for studying and understanding firms' value creation and performance. The business model in literature is understood as how firms configure their businesses, including how they create and deliver value for their customers, and how they capture economic value from its offering. Recently, research has highlighted the founder's role in the firm's business model, pointing to a cognitive perspective in business models. Emphasising this perspective makes founders' perceptions and prioritisations essential in understanding the link between business models and firm performance. However, the relationship of these prioritisations to the business model dimensions in extant literature still requires clarification, and so far, such a connection has not been fully addressed.

The purpose of this thesis is to connect business model dimensions and founders' prioritisations. This is addressed through a systematic literature review of business models and through a multiple-case study, including interactive and retrospective parts, of eight new technology-based firms (NTBFs).

The results recognise three measurable dimensions of the business model in literature: innovation, change, and efficiency. Measurements are identified for each of these dimensions to facilitate the connection of each dimension with firm performance. Further, the case study's results demonstrate three distinct ways in which founders of NTBFs prioritise within their business model in the start-up phase. These prioritisations focus on customers, value chain partners, and finance. This thesis further recognises a connection between the customer-focused business model in NTBFs and innovation and change dimensions, and a connection between prioritising partners and the change and efficiency dimension. Additionally, the results indicate a connection between the financial focus and the business model's dimension of efficiency.

The thesis contributes to business model literature, and to the field of entrepreneurship, by addressing the connection between business model dimensions in literature and founders' prioritisations. Moreover, the thesis suggests future research with a focus on the interrelations among business model dimensions, and potential effect of these dimensions and founders' prioritisations on firm performance.

Keywords: business model, new technology-based firm, measurable dimensions, prioritisation, cognitive instrument

List of appended papers

Paper 1: Rydehell, H. and Buffart, M. (2015). 'Characterisations of Business Models: A Systematic Literature Review', submitted to an international journal.

An earlier version of the paper was presented at RENT XXIX – Research in Entrepreneurship and Small Business, November 2015, Zagreb, Croatia.

Paper 2: Rydehell, H. and Isaksson, A. (accepted, forthcoming). Initial configurations and business models in new technology-based firms, *Journal of Business Models*.

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1. Introduction

This thesis explores initial business models in new technology-based firms, and contributes to research on business models as well as in the field of entrepreneurship. This chapter will present a brief introduction to the thesis, starting with the background and research setting, and continuing with the problem discussion and purpose of the thesis.

1.1. Background

Research on business models has gained increased interest since the 1990s (Klang, Wallnöfer, and Hacklin, 2014), demonstrating a way of analysing firms' value creation process, such as capturing value through technological innovations (e.g. Amit and Zott, 2001; Chesbrough and Rosenbloom, 2002). Start-ups' value creation process, in contrast to mature, established firms', is characterised by the uncertainty in facing obstacles due to resource constraint, such as lack of capital and legitimacy from customers. Further, the entrepreneurial process characteristic of new firms is iterative, including experimentation and ongoing changes (Bhave, 1994; Andries, Debackere, and Looy, 2013), which also concerns the business model. Hence, the business model is an ongoing, changeable tool for start-ups to understand the business and its environment, as well as providing a visual structure of the firm's architecture. During the process, in which the new firm attempts to identify its value proposition and customer segment, the business model will change and adapt (Andries and Debackere, 2007; Andries *et al.*, 2013). Consequently, the business model will be influenced by how founders understand their business and the surrounding business environment and thus, how they make and prioritise their decisions. Accordingly, these prioritisations made within the business model would influence which type of business model the firm has, and how they, for example, allocate resources to compete in the market.

Extant research has highlighted, in addition to the adaptation and change of new firms' initial business models, the need for a successful business model to correspond to customer needs, and simultaneously match that need to available resources (Morris, Schindehutte, and Allen, 2005; Baden-Fuller and Haefliger, 2013; Demil, Lecocq, Ricart, and Zott, 2015). Thus, the business model is linked to firm performance, which would mean that the business model, and the prioritisations made within it based on the founders' understanding and perception, would ultimately be a factor that influences the firm's performance. However, emphasising the business model as a visual tool in the founder's mind requires further connections to extant business model literature. This especially pertains to ways of prioritisations within the initial business models, which link to the developed business model type.

Currently, business model literature has developed frameworks for practitioners' use, highlighting the business model as architecture of the firm. However, it is still unclear as to how the founders of new firms use these frameworks to perceive their business model. Researchers have recently begun to regard the business model as a model in the mind of the founder or manager (Baden-Fuller and Mangematin,

2013; Martins, Rindova, and Greenbaum, 2015), which requires further explanation. To recognise how a business model actually influences firm performance, further clarification must be conducted concerning the connection between business model dimensions, as explained in literature, and founders' prioritisations when developing their businesses. Otherwise, if the practitioner (or founder) perceives the business model other than as researchers do, the business model could have a different effect on firms and their performance than what is explained thus far. Thus, expounding upon such a connection would enhance the understanding of business models and clarify their effects.

1.2. Research setting

To connect the business model dimensions in literature, and founders' prioritisations in practice, it is of specific interest to study business models in a context that drives new business models, or changes in existing ones. This context exists for industries based on new technology, as this can facilitate the emergence of new business models (e.g. Baden-Fuller and Haefliger, 2013). Technology-based start-ups, or 'new technology-based firms' (NTBFs), are especially interesting because they are not only firms keen to develop new business models based on their technology, but are also in a phase in which they must change their business model to fit the market's needs (e.g. Andries and Debackere, 2007).

Regarding NTBFs, these firms have been given much attention by researchers and policy makers; they have demonstrated an important impact on an economy's long-term development (Storey and Tether, 1998), and can be seen as drivers of economic growth and innovation (Spencer and Kirchhoff, 2006). They especially contribute to an economy through exports, employment, taxes, research and development and innovation (e.g. Bollinger, Hope, and Utterback, 1983; Brinckmann, Salomo, and Gemuenden, 2011; Autio and Yli-Renko, 1998).

New technology-based firms can be defined as firms that are newly established, are not a subsidiary of another larger company and primarily aim to commercialise a technology, which should be the first time it is exploited (Bollinger *et al.*, 1983; Storey and Tether, 1998). Hence, NTBFs can be seen as agents of technology transfer (Autio and Yli-Renko, 1998; Kollmer and Dowling, 2004), and these firms are high-tech entrepreneurial firms operating in high-tech industries (Storey and Tether, 1998). Research has defined NTBFs as either firms focusing on new technology, or as technology-based new ventures (e.g. Storey and Tether, 1998; Aspelund, Berg-Utby, and Skjevdal, 2005; Maine, Shapiro, and Vining, 2010). The latter definition will be used for this thesis; therefore, the context will revolve around technology-based start-ups. Further, 'technology-based' refers to the product or service incorporating the firm's technology (Kollmer and Dowling, 2004) and the high-tech industry in which it operates.

1.3. Problem discussion and purpose

The primary issue for such technology-based start-ups as NTBFs is typically resource scarcity when struggling to survive during their first years (Yli-Renko, Autio, and Sapienza, 2001; Aspelund *et al.*, 2005; Maine *et al.*, 2010), such as financial capital. Although firms can use social capital to connect to networks that could facilitate a lack of other resources and legitimacy (e.g. Yli-Renko *et al.*, 2001; Stam, Arzlanian, and Elfring, 2014), they might prioritise and focus on different activities within the business model to develop a competitive market advantage. However, aspects regarding the NTBF's embedded technological knowledge, lack of legitimacy and financial resources, and dependency on industrial networks must be considered for the business model to be competitive. Consequently, when prioritising differently, other issues can arise that create problems for the firm, including the ability to recognise customers' needs (e.g. Klofsten, 1994), and establishing viable customer relationships with which to collaborate when defining the firm's value proposition.

Further, with technological advances and changes in customers' needs, NTBFs' business models require adjustments over time to ensure that the value proposition is satisfying (Andries and Debackere, 2007; Chesbrough, 2010; Trimi and Berbegal-Mirabent, 2012). Accordingly, the initial business model will evolve through a process of adjustments, which rely on the founders' perception and sensing of opportunities in the market (Sosna, Treviño-Rodríguez, and Velamuri, 2010; Martins *et al.*, 2015). The exploitation of these opportunities, and NTBFs' commercialisation of their technology, implies an understanding of the business environment and the stakeholders within it, as well as an adaptation to change (Morris *et al.*, 2005).

Moreover, the changing process of implementing a business model is important for NTBFs to experiment and adapt their initial business models, and it has been demonstrated to be important for entrepreneurial ventures' success (e.g. Morris *et al.*, 2005; Andries and Debackere, 2007). Experimentation with initial business models is especially crucial for firms operating under highly uncertain conditions (Andries and Debackere, 2007; Andries *et al.*, 2013). During the experimentation with, and development of, the initial business model, the founders make many early decisions, and prioritisations may differ between activities in the business model. Early decisions made by founders influence their firms' future development and performance (e.g. Eisenhardt and Schoonhoven, 1990; Klofsten, 1994; Andries *et al.*, 2013); thus, prioritisations made when configuring the initial business models could affect firm performance. Therefore, founders' prioritisations would enhance the understanding of how business models influence firm performance. In that sense, understanding initial business models, in the mind of founders, could further explain such questions as, 'Are unique business model characteristics correlated with improved survival or performance?' (George and Bock, 2011, p.106). However, understanding such relationship requires further clarification between the founder's envisioned business model and business model characteristics as explained in literature. What are the similarities between the business model in literature and in practice?

Accordingly, business model literature still lacks a clear connection between the literature's description of business models and the business model as applied in practice. Hence, research is necessary to uncover possible relationships between prioritisations within the initial business model, made by founders, and the dimensions of business models outlined by previous research, and to connect these two sides. Thus, this thesis' purpose is *to connect business model dimensions and founders' prioritisations*.

1.4. Outline of thesis

This licentiate thesis is a compilation thesis, consisting of an extended summary and two appended papers. The thesis is structured starting with Chapter 1 (the introduction), which presents the thesis' background and the research setting, followed by the problem formulation and purpose. Chapter 2 then summarises existing research forming the frame of references, which ultimately develops two research questions. Chapter 3 presents the methodology and describes the research strategy used and how the studies in the thesis were planned and performed. A short summary of each of the appended papers is provided in Chapter 4, and Chapter 5 then discusses the research questions and the thesis' primary contribution. The thesis is finalised in Chapter 6 by discussing future research related to its contribution, as well as presenting a way forward.

2. Literature review and research questions

This chapter presents references from extant research regarding entrepreneurship, NTBFs' start-up process, and business models, providing an overview of research performed thus far and what still needs to be uncovered and explained.

2.1. Venture start-up phase and new technology-based firms

The start-up phase of new ventures, including NTBFs, can be divided into four phases: the idea, pre-start-up, start-up, and post-start-up phases (Clarysse and Moray, 2004). This thesis studies the start-up phase, and this is characterised as the firm after legislation, when technology development is still ongoing, and the board of directors includes the founder(s).

The start-up process involves opportunity recognition, discovery for exploitation in the market, and value creation (e.g. Shane and Venkataraman, 2000), involving the mobilisation of resources and identifying customers' segment and needs. Opportunity creation has also been argued as a value creation method for entrepreneurs (Sarasvathy, 2001). Regardless of the emergence of opportunity, a firm will have to simultaneously adapt and change their business to the business environment, and experiment with their business model (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010; Andries *et al.*, 2013). This is especially important in new ventures, and particularly NTBFs, as they face greater uncertainties and challenges in creating new business models due to new technology development. The resources of NTBFs are further constrained in the start-up phase (e.g. Yli-Renko *et al.*, 2001; Andries and Debackere, 2007) and thus, must utilise other means to survive in the market. Consequently, new ventures struggle to form competitive advantages that could be used to exploit opportunities (Ireland, Hitt, and Sirmon, 2003). Thus, the business model can be the basis for seeking opportunities and advantages to create and capture value and to survive in a competitive market.

Moreover, NTBFs have been characterised as entrepreneurial start-ups and spin-offs from technical universities and corporations (Autio and Yli-Renko, 1998; Löfsten and Lindelöf, 2002, 2005). Employees and founders of the start-ups are usually highly educated with technological knowledge, which has been demonstrated in studies focusing on small technology-based firms, located both on and off of science parks (Klofsten and Jones-Evans, 2000; Löfsten and Lindelöf, 2002, 2005). Highly educated employees are useful in developing and establishing production (Brinckmann *et al.*, 2011), and in capturing knowledge essential for the development of their technology. However, NTBFs lack other resources, such as financial resources (Kollmer and Dowling, 2004), which are important in market positioning when competing with large, established firms. Furthermore, these firms also experience difficulties because of a lack of legitimacy and problems attracting venture capital, few employees, and a lack of organisational assets and intellectual property (Clarysse, Bruneel, and Wright, 2011; Bollinger *et al.*, 1983; Brinckmann *et al.*, 2011; Eisenhardt and Schoonhoven, 1990). Hence, to reduce this shortage, NTBFs need to use the resources they have to access resources they do not have. Resources

that could be useful at this point are social and human capital, referring to both the entrepreneur's personal network and their knowledge and skills (e.g. Yli-Renko *et al.*, 2001; Stam *et al.*, 2014). These resources may become further valuable for firms when collaborating with others, and thus, NTBFs create new ways to interact. Networks and other collaborations, e.g. clusters, are important for NTBFs to access resources (Yli-Renko *et al.*, 2001; Ireland *et al.*, 2003; Maine *et al.*, 2010). Therefore, relationships with partners and customers may be essential business activities in NTBFs' business models during an early start-up phase. However, this implies that entrepreneurs can absorb and assimilate new knowledge and resources from external environments, and that they have the ability to exploit them (Cohen and Levinthal, 1990), such as utilising resources to recognise and exploit opportunities.

Furthermore, the start-up phase is quite uncertain for entrepreneurs, and with insufficient resources, they will need to either rely on their experiences and knowledge, or rely on beliefs regarding the future outcomes of their actions (Gavetti and Levinthal, 2000). Thus, from a cognitive perspective, how entrepreneurs (or founders) prioritise their business activities in forming the initial business model will depend on their understanding (or sensibility) of the business environment.

2.2. Business models

The business model as a concept gained attention during the dot-com era in the 1990s (DaSilva and Trkman, 2014; Klang *et al.*, 2014) in explaining firms' value creation and performance, resulting in the emergence of several frameworks, such as the Business Model Canvas (Osterwalder, Pigneur, and Tucci, 2005; Osterwalder and Pigneur, 2010) and the entrepreneur's business model (Morris *et al.*, 2005). Researchers have used these frameworks to study both established firms and new ventures, providing practitioners with useful visual tools. This especially concerns new ventures involved with incubators and business coaches, and have used such frameworks as the Business Model Canvas to facilitate founders' understanding of their businesses.

A firm's business model is generally referred to as the value-creating process of a firm's business, or how a firm creates value for its customer, how that value is delivered, and how the firm ultimately captures that value economically (e.g. Chesbrough and Rosenbloom, 2002; Teece, 2010; Zott, Amit, and Massa, 2011). However, researchers' consensus regarding the definition of a business model differs, which has created confusion regarding the concept's use (Klang *et al.*, 2014). Nevertheless, most definitions still comprise the similar elements and activities of a business model, including the value proposition (or the firm's offer to the customer) and the identification of ways to earn money from serving customers (e.g. Chesbrough and Rosenbloom, 2002; Dubosson-Torbay, Osterwalder, and Pigneur, 2002; Teece, 2010; George and Bock, 2011). Table 1 presents some business model elements from previous literature.

Table 1: Elements of a business model

Author (Year)	Business Model Elements
Amit and Zott (2001)	Content, structure, and governance of transactions, and value creation design
Chesbrough and Rosenbloom (2002)	Value proposition, market segment, value chain structure, cost structure and profit potential, value network, and competitive strategy
Dubosson-Torbay <i>et al.</i> (2002)	Product innovation, customer relationship, infrastructure and network of partners, and financial aspects
Magretta (2002)	Customer definition, value proposition (value to customer), cost, profit
Morris <i>et al.</i> (2005)	Offering (value proposition), market, internal capability, competitive strategy, economy (cost, profit), and growth/exit
Osterwalder <i>et al.</i> (2005)	Value proposition, target customer, distribution channel, relationship, value configuration, capability and core competences, partnership (partner network), cost structure, revenue model
Tikkanen <i>et al.</i> (2005)	Strategy and structure, network, operations, finance and accounting, reputational rankings, industry recipe, boundary beliefs, products
Teece (2010)	Value proposition, market segment, revenue streams, cost structure, strategic engagement, 'isolating mechanism,' resources/dynamic capabilities, value chain and value delivery
Baden-Fuller and Mangematin (2013)	Identifying the customer, customer engagement, monetisation, and value chain and linkage.

A majority of business model research has attempted to classify business models and identify their elements, or emphasising what a business model is and what it is composed of (Klang *et al.*, 2014). Business model research has evolved through the years by following different streams, of which the two most obvious are: 1) business model as architecture of the firm (e.g. Morris *et al.*, 2005; Osterwalder *et al.*, 2005), or 2) business model as a mental model and a cognitive instrument for founders and managers (e.g. Doz and Kosonen, 2010; Baden-Fuller and Mangematin, 2013). However, both streams recognise that the business models' elements are causally interrelated, and the business model must change over time to serve as a source of competitive advantage. The business model's composition has been argued as an activity system, including relationships, in which products or services offered are embedded, and through which value can be created and captured (Amit and Zott, 2001; Zott and Amit, 2007, 2008). An activity within the business model is regarded as engagement of resources (e.g. human, physical) of any party involved to exploit opportunities, hence, creating and capturing value (Zott and Amit, 2010). In this sense, activities can be performed outside the boundaries of the focal firm and facilitate the firm's reliance on external partners.

The stream that recognises the business model as architecture of the firm provides insights and visualisations of how firm-level business activities can be structured to create and capture value. However, to emphasise the link between the business model, exploitation of opportunities, and

competitive advantage, the individual’s role in the structuring of business activities, and specifically in developing and adjusting the business model, must be considered. Extant research has demonstrated how founders’ and managers’ heuristics hinder their ability to adopt new business models (Chesbrough and Rosenbloom, 2002; Chesbrough, 2010; Osiyevskyy and Dewald, 2015a, 2015b). Hence, without regarding the business model as a cognitive structure and a representation of the founder or manager’s perception of reality, the individuals accountable for the business model are neglected. A need still exists to clarify how the concepts used in both literature and research relate to the business model in practice, and thus the business model, to the founders of new ventures.

Figure 1 illustrates the changes in the business model concept, but highlights the relationship between the streams.

The business model in this thesis will refer to how firms create, deliver, and capture value from the offer they serve to the customers, perceiving the business model as architecture of the firm that forms and changes with the founder’s sensibility.

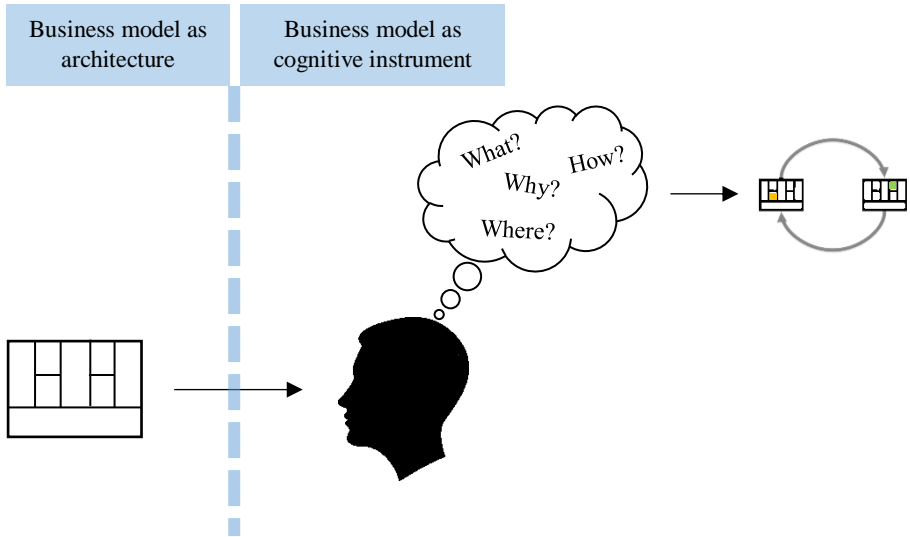


Figure 1: Changes in the business model concept – from architecture to cognitive instrument

The business model as architecture is posited to enhance communication between the entrepreneur and, for example, venture capitalists and investors (Doganova and Eyquem-Renault, 2009; Trimi and Berbegal-Mirabent, 2012). Further, this helps entrepreneurs to visualise how their entire business works, building on narratives and sensibility (Magretta, 2002; Tikkanen *et al.*, 2005). Thus, the business model contains intangible resources linked to cognitive aspects (Tikkanen *et al.*, 2005), and in this sense, a business model’s development and renewal are influenced by the cognitive activities of the founder or manager (Tikkanen *et al.*, 2005; Doz and Kosonen, 2010; Martins *et al.*, 2015). The business model is

further noted as a facilitator of opportunity creation (George and Bock, 2011), which implies not only the opportunity-centric nature of business models, but also that this changes with new discoveries.

Moreover, as the business model visualises how different elements and business activities act together to create and capture value (Magretta, 2002; DaSilva and Trkman, 2014), such as capture value from innovation (Chesbrough and Rosenbloom, 2002), it is critical for firms to gain and ensure competitive advantage (Doz and Kosonen, 2010; McGrath, 2010; Klang *et al.*, 2014). The business model is further linked to technological innovation through decisions made within the business model, and by influencing the firm's performance (Baden-Fuller and Haefliger, 2013).

From a cognitive perspective, decisions made within the business model are made based on founders' and managers' perception of opportunities and an assessment of the environment (Baden-Fuller and Mangematin, 2013; Osiyevskyy and Dewald, 2015a, 2015b). The business environment is rapidly changing for technology-based firms; hence, the business model must be adapted to changes in the business environment to ensure that competitive advantage remains over time (Chesbrough, 2010; Zott *et al.*, 2011; Trimi and Berbegal-Mirabent, 2012). The importance placed on innovation and the renewal of business models has emphasised the problems established organisations experience, and how organisations may overcome these obstacles (Chesbrough, 2007, 2010). For new ventures, the business model is changing as the firm attempts to identify its customer segment and value proposition. Nevertheless, the changing process of adapting the initial business model is essential for new ventures' success (Morris *et al.*, 2005; Andries and Debackere, 2007), and can result in experimenting with several business models (Markides and Charitou, 2004; Clausen and Rasmussen, 2013). During this change in the business model, firms experiment, using trial-and-error learning (McGrath, 2010; Sosna *et al.*, 2010; Andries *et al.*, 2013), which is essential for new ventures to cope with uncertainty (Andries and Debackere, 2007). Hence, the business model will develop and change simultaneously with the entrepreneur's knowledge (George and Bock, 2011; Osiyevskyy and Dewald, 2015a, 2015b).

Furthermore, entrepreneurs' knowledge and resource base are heuristically influencing the development and changing process of business models (George and Bock, 2011), and because of this, other ways must be found to balance the limited resource base of new ventures, e.g. NTBFs. This will ultimately influence prioritisations in the business model, and the decisions made in its development. Involving other stakeholders in the process facilitates new ventures' competing in the business environment by providing access to external resources, and can reduce the ever present uncertainty in the new ventures' environment (Reymen *et al.*, 2015; Maine *et al.*, 2010), and especially for such technical start-ups as NTBFs. However, involving such stakeholders as venture capitalists may pressure entrepreneurs (e.g. Reymen *et al.*, 2015), ultimately influencing how entrepreneurs make sense of and perceive their environment, and what they prioritise in their initial business model. Nevertheless, firms must involve and interact with their customers to provide offers consistent with their needs (Trimis and Berbegal-

Mirabent, 2012; Osterwalder, Pigneur, Bernarda, and Smith, 2014). Engaging customers as co-creators will be important for firms' technology development (Baden-Fuller and Haefliger, 2013; Demil *et al.*, 2015), and thus, the business model must be flexible to react to customers' changing needs (Trimi and Berbegal-Mirabent, 2012). This indicates that activities centred on customers are important to prioritise in the business model.

2.3. Research questions

Following the purpose, the thesis aims to connect business model dimensions and founders' prioritisations. However, to connect any relationships between existing literature and practice, both sides must be clarified. First, as clarified by extant business model research, the proposed number of elements in a business model widely varies, which is evident in observing Table 1. For example, Magretta (2002) and Baden-Fuller and Mangematin (2013) present four elements, whereas Osterwalder *et al.* (2005) present nine elements. Furthermore, as demonstrated by Klang *et al.* (2014), the various numbers of elements illustrate previous research's attempt to clarify what a business model is, and what it consists of, and hence, how to classify the concept. Resulting extant business model literature has provided several business model characterisations, and has related the concept to firm performance. However, thus far, the extant literature has not proposed any actual measurements of these characteristics. Further investigation is needed to obtain measurable dimensions of business model characteristics, so researchers can assess the effects of a firm's business model on its performance. Such dimensions would not only enhance our understanding of the relationship between the business model and performance, but also facilitate a connection to applied business models for founders, and hence, provide input as to how business models can affect firm performance. Accordingly, the first research question is as follows.

RQ1: What measurable dimensions of business models can be identified in literature?

Second, focus has recently shifted to the cognitive perspective of business models, arguing how the role of individuals (e.g. founders) might influence a firm's business model and its performance (Demil *et al.*, 2015; Martins *et al.*, 2015). Accordingly, business model literature intersects with research on the entrepreneurial mind. For example, as argued by Baden-Fuller and Mangematin (2013) and Osiyevskyy and Dewald (2015a, 2015b), founders' perceptions and ability to adapt to business environmental changes influence their decisions regarding their business model. For NTBFs, which operate in a rapidly changing environment, adaption will be critical in the start-up phase, and how founders prioritise might be influenced by stakeholders, involved as a way of securing resources. However, a lack of understanding still exists concerning prioritisations and decisions that NTBFs' founders make during the start-up phase when configuring their businesses, and developing and adapting their initial business model. Accordingly, the second research questions can be formulated:

RQ2: How do founders of NTBFs prioritise when developing their initial business models?

Identifying how NTBFs' founders prioritise when developing their initial business models would further provide insight to not only how founders initially perceive their businesses, but also to what elements of the business model are recognised as comparatively important. Furthermore, cognitive aspects might differently influence the type of business model developed, as well as who would be involved in that process. This indicates that an understanding of founders' perceptions and prioritisations would facilitate further research to assess influences on the business model, including how quantitative research could possibly assess the concept. Thus, such an identification would provide a basis for connecting the practical concept with that in literature, providing insight to the initial business model's possible effects on firm progress during the start-up phase.

3. Research methodology

The chapter presents the process of the research conducted to answer the purpose of this thesis, and further describes the methods used, including a discussion of research quality.

3.1. Research design

The choice of methodology should relate to the research project's purpose and research questions (Maxwell, 2013). This thesis aims to connect business model dimensions and founders' prioritisations. The research intends to answer two aforementioned research questions to accomplish this purpose.

In considering the first research question, the focus is on what is already discussed in extant business model literature, but could be collected and utilised in new ways. Thus, literature review is the research design of choice. A systematic approach to the literature review is appropriate for the review to be comprehensive and structured, and simultaneously transparent and reproducible (Schneider and Spieth, 2013). A systematic approach further provides a consistent knowledge base from different research fields (Tranfield, Denyer, and Smart, 2003).

Furthermore, the second research question aims to explore what is still not clearly understood in extant literature. Hence, an inductive approach to the research design provides the possibility to gain a deeper understanding (Flick, 2009; Bryman and Bell, 2011), and is appropriate when the topic and context are complex, as with both business models (Baden-Fuller and Morgan, 2010) and NTBFs. To address this complexity, the choice of research design for this thesis' first research question involves a multiple case study (Eisenhardt, 1989), including retrospective parts to capture founders' perceptions about their business, business model, and the changes made during the first years in the start-up phase.

3.2. The research process

The research project started in September 2014, with the author receiving an overview of literature in the field, and recognising gaps that required further explanation. From this stage, case studies were planned and an interview guide was developed, including questions related to existing business model literature. Interviews were conducted with NTBFs' founders to study business models and founders' perceptions and prioritisations. Simultaneously, a literature review was conducted to identify characteristics of business models and their measurable dimensions in literature, providing a deeper understanding of the business model in academia. This second study specifically aimed to identify measures to support future quantitative business model research.

The case studies resulted in a conference paper presented in August 2015, at which it was invited for submission to a peer-reviewed journal. The conference paper was therefore rewritten into the current paper appended in this thesis (see Paper 2), which has been accepted for journal publication.

The literature review further resulted in a conference paper, which was presented at a conference in November 2015. It was then revised during the spring of 2016 and submitted to an international journal. Figure 2 presents the research process that resulted in this thesis.

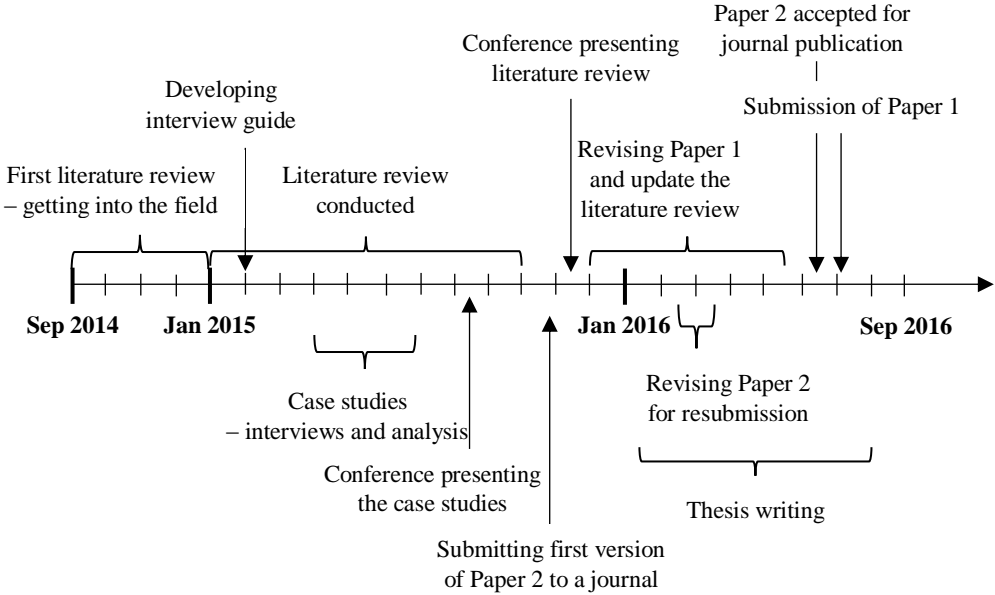


Figure 2: The research process

3.3. Systematic literature review

Paper 1 is based on a review of business model literature, aiming to examine the knowledge that already exists in the field, and to use it to explain both how business models have been characterised, and how these characteristics could be measured to create a consensus for future business model research. Thus, business model characteristics and their measurable dimensions in the literature were to be identified. The literature review was performed systematically to enable a transparent, reliable, and replicable process (Tranfield *et al.*, 2003; Schneider and Spieth, 2013). The systematic literature review followed a process adapted from steps in a systematic review methodology (Tranfield *et al.*, 2003). However, not all conventional elements, which are mainly used for a positivistic approach involving only quantitative methods, were used since the emphasis was on clarifying the business model concept and identifying its measurements, which is an area that still lacks both knowledge and consensus.

The overall systematic literature review process can be summarised in Figure 3.

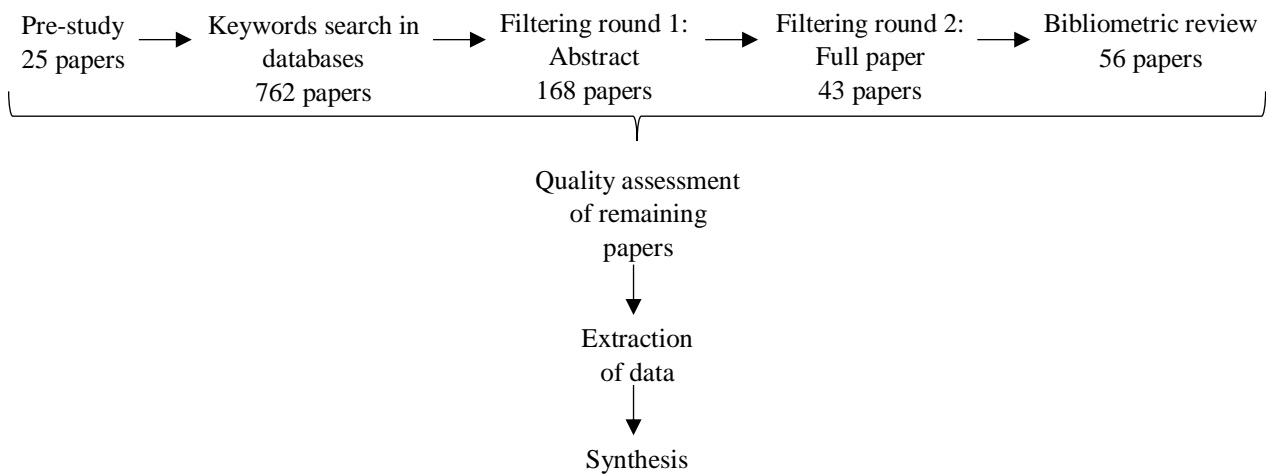


Figure 3: Summary of the review process

The literature review was performed in five steps. First, a pre-study was conducted to provide a preliminary understanding of the concept, and to develop a list of keywords used for identifying relevant papers in three databases: EBSCO, ScienceDirect, and ProQuest. Second, two filtering rounds were performed to select papers that met the criteria set for the study's purpose. The first round focused on the papers' abstracts, and the second round reviewed the full content of the remaining papers. Those used for the pre-study, but that did not appear in the keyword search, were controlled for relevance through a bibliometric review.

Third, the papers that remained after the filtering rounds were organised and classified by their purpose, methods, and contribution. Classifying the papers helped structure them, and provided an understanding of the research fields and theoretical arguments used to position business model research. During the process of organising and classifying the papers, their quality was assessed based on the quality assessment criteria of Pittaway *et al.* (2004).

Fourth, the papers' data was extracted by coding in steps, starting with broad coding to highlight the conceptualising of business models, or different ways the papers 'measured' business models. Further coding was then used to sort the papers into themes, depending on the business model measurements or classifications that the papers provided. A final coding was conducted due to word(s) that appeared around the discussing of measurements in the papers, thus providing definitions and aspects linked to business model measurements. This coding resulted in 56 first-order themes, which could be reorganised into nine broader themes. The overall coding facilitated the operationalisation of business model.

Finally, data was grouped in tables summarising the papers' research findings, and they were classified into different themes, comparing and interpreting the themes to operationalise them into measurable dimensions (i.e. constructs). This synthesising offered the possibility to create some constructs that were

limited to a context, and thus, were more general. Ultimately, synthesising the data resulted in three primary constructs, and one theme for the categorisation of business models.

3.4. How to study business models in an entrepreneurial setting?

The business model concept lacks a clear consensus from a literature perspective, and practitioners mean different things when discussing their business models (George and Bock, 2011). Thus, how do we study business models in an entrepreneurial setting?

Case studies allow us to further investigate how NTBFs' founders perceive their business models, and we can further understand their experiences, including their prioritisations. Thus, input is provided as to how the founders prioritised within their initial business models. Based on the business model as architecture of the firm and dependent on the founder's sensibility, the study's unit of analysis was the business model. Specifically, the study focused on the prioritisations made within the business model by founders of NTBFs, and the founders' perceptions of their business model. Moreover, as cases are context dependent (Flyvbjerg, 2006; Yin, 2014), the cases were studied within the context of technology-based start-ups.

Further, using semi-structured interviews provided an opportunity to interact with founders, and allowed the respondents to explore the research area in detail (Bryman and Bell, 2011). Adding interactive and retrospective activities to the interview guide provided several ways to allocate founders' perceptions and prioritisations of the initial business models, as well as to detect changes made during the first years in the start-up phase.

3.4.1. Selection of cases

Cases were selected based on two criteria: (1) the firm being new, and (2) the firm being technology-intensive (Almus and Nerlinger, 1999; Yli-Renko *et al.*, 2001). For the first criterion, firms were considered new based on the years from registration (year of founding), and based on previous research on technology-based start-ups, firms younger than five years were perceived as still experimenting with their business model (e.g. Clarysse and Moray, 2004; Andries and Debackere, 2007).

Classifications of technology-intensiveness degrees were used for the second criterion, i.e. high-tech, medium-tech, and low-tech manufacturing industries (e.g. Almus and Nerlinger, 1999). Classifications of *high-tech* and *medium high-tech manufacturing*, and *high-tech knowledge intensive services* were used to study NTBFs, based on codes from the Statistical Classification of Economic Activities in the European Community (NACE) (Eurostat, 2016)¹, which has previously been used by researchers

¹ Eurostat is the European Union's statistical office and provider of comparable information at a European level (Eurostat, n.d.). The NACE codes are the classifications of industries provided by Organisation for Economic Co-operation and Development (OECD). The high-tech industry and knowledge-intensive services are based on a technological intensity that can be identified using sectoral or product approaches. The first is based on a collection of manufacturing industries and their R&D expenditures, whereas the second is a complement that includes high-tech trade data (Eurostat, 2016).

studying NTBFs (e.g. Clarysse *et al.*, 2011; Xiao, 2015). The NACE codes can be found in the translation of Sweden’s Standard Industrial Classification codes, which enabled the use of the Retriever Business database to obtain information for Swedish technology-based start-ups (NTBFs).

Firms that meet the two criteria could be identified using Retriever Business. The final sample was then chosen based on access to the specific cases (Eisenhardt and Graebner, 2007). Thus, cases were ultimately selected based on convenience sampling, that is, firms that agreed to participate in the study were chosen. The final sample included eight cases, which are displayed in Table 2.

Table 2. Description of selected cases

Cases	Description of NACE Code	# Founders Interviewed	Year of Founding	Business Idea
A	Engineering, Technical Testing and Analysis	1	2012	Dental disposable product for saliva absorption under the tongue
B	Computer Programming	2	2013	Developed software to streamline production; software can manage production planning
C	Information Services	1	2010	Software for companies to take advantage of online products, in the area of ‘Internet of things’
D	Video and Television Program Production	1	2011	Films and broadcasts live performances and concerts in theatres
E	Computer Programming	1	2012	IT service to facilitate photography improvements
F	Video and Television Program Production	1	2012	Providing services and technology for post-production, including film
G	Engineering, Technical Testing and Analysis	1	2011	Data-based simulator for the training and maintenance of intubation skills
H	Advertising and Market Research	1	2013	Terminal to easily collect customer feedback; assists service industry to provide better customer satisfaction and customer service

3.4.2. Data construction and analysis

A semi-structured interview guide was developed to study business models within an entrepreneurial setting, including interactive activities that allow respondents to explore their business models and its changes from start-up (registration) to the present. The semi-structured interview focused on the founder describing their business and their product or service in their own words, including who was involved during start-up (such as investors or other stakeholders), what the founders had prioritised, and changes they would have made in hindsight. The interactive section was integrated with the semi-structured interview, and consisted of a timeline and activity cards based on the Business Model Canvas (Osterwalder and Pigneur, 2010) and the entrepreneur’s business model (Morris *et al.*, 2005). This provided an opportunity to ask the same questions in several ways to ensure that misunderstandings were reduced. The interview guide’s interactive section streamlined founders’ expressing of their thoughts and perceptions about their business and the business model and indicated in several ways how and what they prioritised during the start-up phase.

The interviews were conducted in person with the NTBFs' founder(s). In one case, the interview was conducted with two people, and the founders' shared perception was regarded as the firm's business model. The interviews lasted approximately one hour and were recorded, activity cards were positioned and photographed, and timelines were collected. Interviews were transcribed as soon as possible after each ended to ensure that their interactive (and retrospective) parts were not later misunderstood or forgotten, such as parts in which the interviewees were writing down decisions, but not clearly mentioning them orally or discussing a specific activity card.

To analyse the data, each transcript was first analysed individually based on thematic coding (Braun and Clarke, 2006; Flick, 2009), which was used to distinguish themes from the data. The coding was driven by the research question (Braun and Clarke, 2006) for Paper 2; thematic coding is useful for specific comparisons of people's experiences and perceptions (Flick, 2009), and was thus helpful for the purpose of the study noted in Paper 2. However, throughout the data analysis, more seemingly important themes occurred; thus, these were included for the case analysis. This process was further influenced by returning to literature when new themes occurred.

3.5. Research quality

The thesis is based on qualitative research and a literature review of business models; in that sense, quality could be evaluated from the concept of trustworthiness, instead of validity and reliability (Bryman and Bell, 2011). The concept of trustworthiness includes four criteria, which parallel the criteria for quantitative research discussed in the following sections.

3.5.1. Credibility

Credibility parallels internal validity, and refers to the findings' believability (Halldorsson and Aastrup, 2003; Bryman and Bell, 2011). Researchers should obtain credibility by ensuring that the research has been conducted in good practice and controlled by respondents to reduce misinterpretation (Bryman and Bell, 2011).

For the thesis, credibility was checked for Paper 2 using respondent validation (Bryman and Bell, 2011), confirming the results from transcribed interviews. The interactive sections of the interviews further provided an opportunity to ensure that founders' perceptions of business models were correctly understood, using several ways for the interviewees to express themselves. Furthermore, if there was any indication of the respondent not fully understanding a question, it was rephrased and discussed to arrive at a consensus. Finally, as Paper 1 is a literature review, it cannot be judged based on credibility.

3.5.2. Transferability

The transferability criterion parallels external validity, which concerns the findings' generalizability, i.e. if the findings apply to other contexts (Halldorsson and Aastrup, 2003; Bryman and Bell, 2011). Findings in qualitative research can be applied to contexts similar to those studied (Flyvbjerg, 2006),

but knowledge acquired can still be applicable in other contexts (Halldorsson and Aastrup, 2003). The aspect of transferability for the studies in the thesis is constrained due to a limited number of firms in Paper 2; however, transferability can be enhanced by a detailed, thorough description of the context, and assumptions central to the research (Bryman and Bell, 2011). Hence, a detailed description of the case context and interview proceedings from Paper 2 should contribute to transferability.

3.5.3. Dependability

The criterion of dependability concerns how likely the findings can apply at other times (Bryman and Bell, 2011). Related to reliability, dependability concerns the degree to which the study can be replicable (Halldorsson and Aastrup, 2003). Records, notes from interviews and observations, interview transcriptions, and documentations during the data analysis should be accessible and easy to follow to ensure dependability (Halldorsson and Aastrup, 2003; Bryman and Bell, 2011). Dependability was ensured for the studies in the thesis by recorded and transcribed interviews (Paper 2), and by detailed documentation of the systematic literature review (Paper 1), including keywords, search strings, databases, and decisions made during data analysis.

3.5.4. Confirmability

Confirmability concerns the issue of objectivity (Bryman and Bell, 2011); hence, the criterion ensures that the research findings are not impacted by researcher bias (Halldorsson and Aastrup, 2003; Bryman and Bell, 2011). Paper 2 in the thesis is based on semi-structured interviews, and thus, complete objectivity would be impossible, as interaction with the interviewees would result in some influence. However, the confirmability criterion was achieved through an ongoing discussion with interviewees, allowing them to examine the transcriptions for any misunderstandings, and to confirm that the research's interpretations were correct. Credibility in Paper 1 was achieved through repeated readings of the selected papers. Furthermore, credibility could be ensured for the systematic literature review through two researchers reading all the papers and discussing the findings.

4. Summary of appended papers

The chapter briefly summarises the papers included in the thesis, and provides an overview of how the purpose has been addressed within the different papers.

Regarding the author's contribution to the appended papers, both authors of Paper 1 contributed equally by systematically reviewing extant literature and writing the paper. However, the thesis' author was the leading author, and was responsible for the paper's coherency.

Both authors of Paper 2 contributed to its conceptualisation, and the development of the interview guide. Major data collection was conducted by the thesis' author, who also analysed the data and assumed a leading role in writing the paper.

It should be noted before presenting a summary of the appended papers that in Paper 1, 'characteristic' is used throughout, including in a description of measurable dimensions. However, including categorisations as characteristics is not of interest for the thesis' research question and overall purpose, but rather, how these characteristics can be measured. Thus, the word 'dimension' is instead used in this thesis to highlight ways to measure business models' characteristics, and to explicitly indicate what is measurable.

4.1. Paper 1: Characterisations of business models: A systematic literature review

The paper systematically reviews literature to identify ways of not only characterising business models, but also how to measure those characteristics, explaining what would facilitate the further development of linking business architecture to performance. The paper uses a systematic review method to further investigate the measurements of business model characteristics, using existing research from both quantitative and qualitative perspectives.

The paper identifies two types of business model characterisations from existing literature. The first, used by a majority of the reviewed papers, is a classification of business models. However, this approach is based on predefined values of business model elements, and becomes complex when attempting to measure this characteristic of a general business model.

The second type of characteristic involves the specific business model dimensions, which are independent of the business model itself. Three main dimensions could be recognised from this second type: innovation, change, and efficiency. The innovation dimension of the business model is explained as the degree of innovativeness and the business model being novel, which also refers to a change in the way of doing business, not only for the firms themselves, but also for the industry in which the firm operates.

The change dimension is similar to the innovation dimension, also referring to a change in the way of doing business. However, this dimension only explains ongoing changes, and adapts to cope with

changes in the business environment. The change dimension, in this sense, involves adaptation and changes that are 'new' to the firm itself.

In contrast to these two overlapping dimensions (innovation and change), the efficiency dimension involves the business model's effectiveness and efficiency, including its degree of simplicity in transactions, cost reduction, and capability to respond to customers' needs.

Furthermore, the measurements identified for each of the three dimensions were those that were the most obvious in the reviewed papers. However, all three dimensions had some overlapping measures, and not only between innovation and change, which future research should address.

Overall, the paper's key contribution is that it clarifies that a generalised measurement of the business model would not measure the business model concept per se, but rather, a combination of different measurable dimensions of specific business model characteristics.

4.2. Paper 2: Initial configuration and business models in new technology-based firms

The paper explores and analyses founders' perceptions of initial configurations and business models in NTBFs. It explores how NTBFs' founders discuss their business models, and what they emphasise within the business model when configuring and structuring their businesses, assuming a stream of business models research as models in the minds of founders. The paper includes eight cases, and describes how to study business models in an entrepreneurial setting without using 'business model' as a starting point. Business model definitions and perceptions were clarified by integrating activities within a semi-structured interview guide, i.e. activity cards and timeline mapping. It was also evident that business models' configurations and adjustments are influenced by the founders' cognition. The paper reveals that external organisations, such as science parks and venture capitalists, played a role in the founders' definition and perceptions of a business model. Moreover, it was concluded that business model elements, and different activities within these, were differently perceived and focused on by founders, with an exception for identifying and developing customer relationships, which was expressed as a main focus by a majority of founders. For example, concerning these differences, a majority of partners were referred to as 'investors', and were seen as resources to access financial capital. This was further mentioned as important for survival, but not the focus during the first years of a start-up. Most founders expressed 'partners' in the sense that this was unimportant to attend to, although a majority of the founders interviewed mentioned distributors and customers as important for the creation and delivering of value, thus, referring to them being partners within a value chain context.

The use of a timeline and the activity cards helped to outline changes in the business and the business model during the start-up phase, providing insight into NTBFs, and that founders are engaged in several businesses within the same firm to conduct its primary business, and develop and sell their main product or service. Hence, parallel business models existed to ensure the firm's survival during start-up.

The paper concludes that dividing the business models' elements and internal activities into different areas would allow respondents to more clearly express their focus, reducing misunderstandings. Such elements and activities include identifying key resources and partners in the value chain. Both were expressed differently depending on the interview situation, for example, if referring to financial resources and investors, or human resources and distributors, suppliers and/or customers. Hence, in accordance with research arguing that the business model is a model in the minds of the founders, the paper demonstrates that NTBFs' initial business models are configured based on founders' perceptions.

5. Discussion

This thesis aims to connect literature and practice concerning NTBFs' initial business models, which is accomplished through a study of both literature on business models and business models applied, hence answering two research questions. This chapter will discuss these research questions, leading to a conclusion regarding NTBFs' initial business models, by connecting literature's dimensions of business models and how these are configured through founders' prioritisations.

5.1. Dimensions of business models

The first research question concerns what business model dimensions exist in literature, and how to measure these dimensions. Paper 1 provides input to answer this question by arguing that three measurable dimensions could be identified in existing literature to measure business structure: innovation, change, and efficiency. These three dimensions emphasise a focus evident in business model literature, and highlight that the business model, as a concept of business architecture, can be measured based on these dimensions. Hence, as business model literature is still fragmented, with various categorisations and characterisations (Klang *et al.*, 2014), these dimensions provide a possible way to measure business models that does not indicate measuring each element in the business model individually. Furthermore, emphasising the business model as constituting firms' value-creating process, these dimensions could also be used to measure firms' value creation, delivery, and capture as, for example, either innovative or efficient. Accordingly, these dimensions do not intend to state that a firm's entire business model is innovative, for example, but that parts of the business may be considered as such.

In addition to the dimensions and their measurements, as highlighted in Paper 1, a systematic literature review further revealed other such dimensions as flexibility and effectiveness. However, these dimensions were not widely used in the literature, and measures of these overlapped with the three primary dimensions. Thus, flexibility is represented with both innovation and change, and effectiveness is represented in efficiency.

From a business model literature perspective, the business model's dimensions and their measurements would thus relate to how innovative (or novel) or effective the firm's value-creating process is, or how adaptable it is (or easy to change and adjust) to the surrounding business environment. The difference between business model innovation and business model change requires some clarification. As discussed in Paper 1, change is an adjustment, but not necessarily novel and innovative for anyone other than the firm itself, whereas innovation is a change that is novel for others as well as the firm. Change does not always mean innovation, but innovation always includes change.

Moreover, all three dimensions overlap to some extent. The innovation and change dimensions especially overlap in several measurements, but the innovation and efficiency dimensions have similar measurements, and some measurements overlap among all three dimensions.

In relation to extant literature, which argues the business model's effect on firm performance (e.g. Zott and Amit, 2007, 2008), these dimensions may facilitate a measurement of how parts of the value-creating process influence firm performance. Although the study in Paper 1 is based on characteristics of the business model as architecture, these characteristics' measureable dimensions could be based on how founders say they prioritise them.

The business model for NTBFs striving to compete in the market is considered a helpful tool for founders and managers to structure their business' architecture to create and capture value for both innovation and the transfer of technology (Chesbrough and Rosenbloom, 2002; Doz and Kosonen, 2010; Tikkanen *et al.*, 2005; Baden-Fuller and Haefliger, 2013). However, it is still the founder's decision to configure the business, and to adjust it to the market and its ongoing changes. The business model, in this sense, is a cognitive instrument (Baden-Fuller and Mangematin, 2013; Baden-Fuller and Haefliger, 2013), and its dimensions would be comparatively evident depending on decisions and prioritisations made within the business model.

5.2. Prioritisations within the business models

The second research question can be discussed by drawing from the study of business models in an entrepreneurial setting, and posits how NTBFs' founders prioritise when developing their initial business models. Prioritisations within the business model differ among the firms in the eight cases, but some elements and activities are prioritised more than others, such as the value proposition, customer segments, and customer relationships, as well as the business model activities related to these elements. Paper 2 indicates that these elements and activities recur in all the firms interviewed, even though some founders expressed changes in their first prioritisation compared to present prioritisations one to two years after founding. For example, customers are prioritised differently, starting with involving them in the evaluation of products or services, to involving them more closely in the product development.

The prioritisation of customers for collaboration has been recently highlighted by Trimi and Berbegal-Mirabent (2012), Baden-Fuller and Haefliger (2013) and Osterwalder *et al.* (2014), who argue in favour of involving the customer in value proposition development. It has further been emphasised in extant research that customers have a central role in value creation (e.g. co-creation) within a firm's business model (Demil *et al.*, 2015). Involving the people for whom your firm creates value can provide a push in the market, and facilitate payments for the product or services (Trimis and Berbegal-Mirabent, 2012).

Further, with a lack of resources in the early start-up phase, NTBFs must usually collaborate to gain access to resources (Yli-Renko *et al.*, 2001; Maine *et al.*, 2010), and involving customers could create

legitimacy for firms when trying to compete in the market. This resource scarcity was further mentioned in the study for Paper 2 as a reason to involve stakeholders early in the start-up phase. Using value chain partners (e.g. distributors and suppliers) offered one way to access resources, but financial partners were especially a prioritisation for some firms. Partners involved in the start-up phase in a high-tech industry with high uncertainty could compel the founders to perceive more control over their situation, and this may influence prioritisations. Alternatively, financial partners provide resources, such as financial capital, which reduces the pressure on founders to focus on costs; this may change prioritisations to customers, for example. On the other hand, involving such financial partners as investors and venture capitalists might position founders to perceive a need to perform (Reymen *et al.*, 2015), and they will prefer to begin receiving payments to generate a return on the investment.

Business models' communicating of firms' value-creating process relates to founders' cognitive perceptions of their business environment (Tikkanen *et al.*, 2005; Baden-Fuller and Mangematin, 2013; Osiyevskyy and Dewald, 2015a, 2015b). Thus, how founders perceive their business environment and their business model would explain their prioritisations. However, these perceptions and prioritisations are demonstrated as influenced by perceived uncertainty and available resources, or those perceived as available (e.g. Reymen *et al.*, 2015). Hence, NTBFs' stakeholders could influence the perception of the business environment as less uncertain by e.g. offering resources, and therefore, might influence the prioritisations made within the business models. The study in Paper 2 demonstrated that founders' of NTBFs perception of both their business model and their business was influenced by stakeholders' involvement. This indicates that stakeholders involved play a role in founders' perceptions and in prioritising elements and activities in business models.

5.3. Summarising the discussion on the research questions

The two research questions in the thesis indicate two different directions: on the one hand, questioning characteristics in business model literature (measurable dimensions), and on the other, about characteristics about business models in NTBFs (prioritisations). The first research question concerns dimensions of business models used to measure and clarify the link between the business model and firm performance. The dimensions identified for such a relationship are innovation, change, and efficiency.

The second research question concerns founders' prioritisations, which are influenced by founders' perceptions regarding the business model as a cognitive instrument. This concerns how founders prioritise within their initial business models, which is important in understanding how the practical concept relates to that of literature. The prioritisations identified in NTBFs' start-up phase focus on customer involvement, and the involvement of such stakeholders as external organisations in the value chain (distributors and suppliers), or financial partners. In considering these prioritisations, and in comparing them with the business model dimensions identified in Paper 1, indications exist for a

relationship between prioritising customers and firms' increasing flexibility to understand customers' needs, which facilitates adaptation and change. Customer involvement further relates to measures within the innovation dimension, as this may simplify founders' search for new ideas, and compel them to experiment more with their business models. In contrast, a focus on the involvement of financial partners or other stakeholders is more related to the efficiency dimension, emphasising the ease of transactions to receive payments for a product or service.

5.4. Connecting business model dimensions and founders' prioritisations

The business model is used by both researchers and practitioners; thus, the connection between characteristics of business models existing in extant literature and in practice will be important to understand how the business model influences firm performance. Otherwise, we do not know how the dimensions used in literature to assess firm performance may relate to the existing business model in new ventures. In studying both literature and practice, the thesis reveals connections that have not been clearly described. Hence, the thesis provides insights to connecting the business model dimensions of innovation, change, and efficiency, and the prioritisations made by NTBFs' founders within their initial business models, including the role of perception.

Following the discussion on the prioritisations that founders of NTBFs make within their business models, the relationships between prioritisations and literature dimensions can be further analysed. Regarding the prioritisation of customer relationships and involvement in the process of developing the value proposition, founders focus on close relationships with customers by having them as partners. Yli-Renko *et al.* (2001) demonstrate that a relationship exists between acquired knowledge from customers and developing new, innovative products. Trimi and Berbegal-Mirabent (2012) and Baden-Fuller and Haefliger (2013) have also highlighted the importance of customer engagement in technological innovation. Similarly, the empirical study connects the literature review by indicating a connection between founders' prioritisation of customer relationships and business models' innovation dimension. As stated by one of the founders, discussing customer involvement in a very conservative industry: '*The customer is the most important, to have something to offer a customer, and that there is a problem to solve. [...] Our business has emerged in conversations with customers [...] I meet customers who say "we have been looking for this (product) for many years".*' Such expressions from case studies demonstrate a connection between prioritising customer relationships and a degree of innovativeness by providing the firm with more innovative technology. This could, in turn, create novel changes in the business environment. More specifically, prioritising customers connects to such measures of the innovation dimension as the *level of understanding customers* and *degree of improving customer benefits* (see Paper 1). Further, it also relates to the measure of *degree of open business model patterns* by expanding for customers to take part in the business model development. The *level of understanding customers* and *degree of improving customer benefits* are further evident for the change dimension, indicating an adjustment of the value creation part of the business model. Regarding the change

dimension, *new roles in the business network* for value delivery in the business model (Paper 1) further connects the prioritisation of close involvement (or co-creation). Thus, involving others in technology development to find new ways to capture value adapts the business to ongoing environmental changes. Accordingly, indications exist of connections between a customer-focused business model (i.e. prioritising customer relationships, close involvement, and customers as partners) and the innovation dimension, as well as the change dimension.

Furthermore, the empirical study in Paper 2 reveals that founders prioritise not only customers, but also ongoing collaboration with other partners in the value chain, such as distributors and suppliers. Some prioritisations still include, in that sense, close involvement and adjusting the new business to the demands and needs expressed within the business network. This indicates a connection to the change dimension of adapting the business model to its business environment. However, collaboration with partners in the value chain other than customers does not necessarily facilitate an understanding of real customer needs, as technology is not specifically tested or evaluated with end customers. As expressed by a founder in the case studies: *'We have made all the entrepreneurial mistakes you can make, and furthermore, we started really wide without checking what actually triggers the users. [...] You are often very wrong in your intuition'*. This provides an impression of how customers contribute to the founder's understanding of their needs. Nevertheless, collaboration with value chain partners may facilitate an understanding of the surrounding business environment, and especially with close collaboration, or for example, clusters (Maine *et al.*, 2010).

Additionally, prioritising collaboration with value chain partners can facilitate founders' allocation of resources (Yli-Renko *et al.*, 2001) and could thus be connected to founders' perception that the partnership will accelerate transactions. Hence, prioritising partners can connect to the efficiency dimension by making parts of the business model more effective for the firm and its founder. Accordingly, another dual connection seems to exist between literature and practice regarding prioritising partners in the value chain (or business network) instead of customers, and the change or efficiency dimension.

Furthermore, Paper 2 made it apparent that some founders of NTBFs had been involved with financial partners, referring to investors and venture capitalists. Financial support facilitated founders' focus on other business activities than identifying and allocating resources (financially), and in some cases, financial partners may provide important input and knowledge for how the firms should prioritise during the start-up phase. However, as argued by Reymen *et al.* (2015), financial partners tend to pressure founders to perform and deliver returns on investments. This might be why founders prioritise technology development to accelerate commercialisation and transactions. Hence, this also prioritises the firm's revenue streams and costs, instead of customers' close involvement. In that sense, there are

indications of a connection between a financially focused business model (i.e. one that prioritises the involvement of investors and venture capital firms) and business models' efficiency dimension.

The discussion, in summary, presents ways in which the business model dimensions connect to founders' prioritisations, referring to possible relationships between the identified business model dimensions and the prioritisations made by NTBFs' founders. This further provides input for future research, to assess and examine if such relationships truly exist. Figure 4 illustrates the connections between business model dimensions in literature, and the prioritisations in NTBFs' business models in practice. Furthermore, the business model dimensions identified overlap to some extent, as discussed in Section 5.1, which is illustrated in the figure using the arrows between the dimensions.

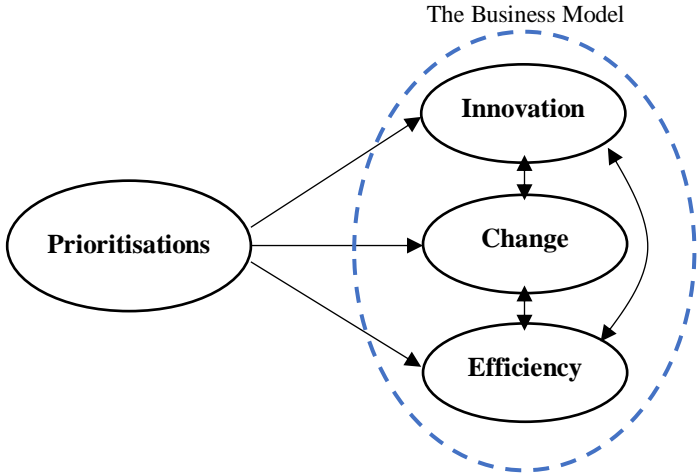


Figure 4: Connecting business model dimensions and founders' prioritisations

5.5. Conclusions

The thesis' objective was to connect business model dimensions and founders' prioritisations. Hence, how do founders of NTBFs perceive and prioritise within their business model, and what are the possible relationships between the 'theoretical concept' outlined in extant business model literature and the business models developed in practice? The research, which aims to connect business model literature and practice, reveals that similarities exist between the aspects prioritised within the business model by founders of NTBFs (practice) and business models' measureable dimensions identified in extant research (literature). These similarities connect business model dimensions and founders' prioritisations in three ways: (1) connecting customer focus with the innovation and change dimensions, (2) connecting the prioritisation of partners in the value chain with the change and efficiency dimensions, and (3) connecting financial focus with the efficiency dimension.

Moreover, according to the discussion regarding business models in the mind of founders, it can be concluded that NTBF founders' prioritisations made within the initial business model depend on the founders' understanding (or sensibility) of their business environment, which can be influenced by stakeholders' involvement. These prioritisations are further connected to different business model dimensions in literature, which could have possible consequences for firm performance.

The thesis addresses the underexplored area of business models as a cognitive instrument, as well as connections between the concept in both literature and in practice concerning NTBFs' initial business model. Thus, the thesis provides value to business model research by explaining the dimensions of business models and founders' prioritisations, and how the concepts are perceived in an entrepreneurial context. Furthermore, the thesis provides valuable input and support to future quantitative business model research, explaining possible connections between the business model and founders' prioritisations (Figure 4). Consequently, the thesis adds value to the field of entrepreneurship by highlighting business models' cognitive perspective and its possible impact on the business configurations and enhanced competitive advantages of NTBFs.

6. Future research

The chapter provides suggestions for future research, continuing the discussion of the relationship between business model and firm performance, and builds on the findings discussed in Chapter 5. The chapter additionally provides an overview of the future of the doctoral project.

6.1. Business model and firm performance

The business model in existing literature has been emphasised as important for firm performance, and especially in linking the technology developed (e.g. Chesbrough and Rosenbloom, 2002; Baden-Fuller and Haefliger, 2013). Therefore, connecting the business model dimensions in both literature and application could provide important input to enhance understanding of the business model’s influence on firm performance. Figure 5 illustrates possible relationships between the business model dimensions and firm performance, as well as the interrelations (or overlaps) between the dimensions. Connections between business model dimensions and founders’ prioritisations, by building on the discussion in Chapter 5, are further included in the forthcoming discussion, which will outline and verify suggestions for future research concerning the influence on firm performance.

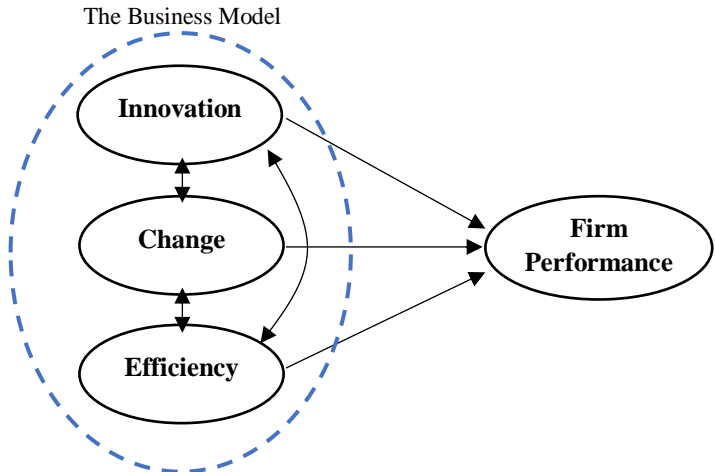


Figure 5: Business model dimensions and possible influence on firm performance

Extant business model research highlights the importance of experimenting with the initial business model for firms’ long-term success (Morris *et al.*, 2005; Andries and Debackere, 2007; Andries *et al.*, 2013). Experimenting with several business models before settling on one (Markides and Charitou, 2004; Clausen and Rasmussen, 2013), or iterating and changing the initial business model, are both processes indicating an adaptation to customer needs, and to changes occurring in the business environment. This indicates that a flexible business model (Trimi and Berbegal-Mirabent, 2012) would make the firm more successful, and hence, would positively relate to enhanced performance. Further, customers’ involvement increases an understanding of these customers’ needs, and for technology-based

firms, customer involvement is posited as important for technology development (Baden-Fuller and Haefliger, 2013), and would ultimately influence firm's performance. Additionally, a customer-focused business model related to the change dimension would positively affect NTBFs' performance. Thus, the change dimension and prioritising customer involvement is positively related to firm performance.

Furthermore, as argued in the previous section, a customer-focused business model may also be connected to the innovation dimension. The business model's innovation is further related to a novel change in the business model (e.g. Chesbrough, 2007, 2010), which would be novel for others than the firm itself. The ability to produce novel products and services in a highly competitive environment is important for firms (McGrath, 2010), and for NTBFs that compete with established firms, innovation in the business model would positively impact performance. As argued by Zott and Amit (2007), firms that focus on designing novel business models perform better in uncertain environments and even during changes over time.

The innovation dimensions further include experimentation and trial-and-error learning (Sosna *et al.*, 2010; McGrath, 2010; Andries *et al.*, 2013) with the intention to change the business model and produce new products and services for improved customer benefits. Experimentation and learning are also part of founders' changing perceptions that facilitate an understanding of the rapidly changing business environment, which is connected to both the innovation and change dimensions. However, regarding the change dimension, a connection also exists to prioritising partners in the value chain, other than the customers, as discussed previously in Section 5.4. Relationships with those in the value chain would provide the firm with resources and knowledge of the business environment (Yli-Renko *et al.*, 2001; Maine *et al.*, 2010), which could ultimately help founders identify their competitive advantage within the business network and facilitate performance in the start-up phase, and especially over time when the network expands. According to the discussion, the connection between the innovation dimension and customer prioritisation would positively affect firm performance, and the same may apply to the connection between the change dimension and prioritising partners in the value chain.

Although a positive relationship to firm performance may exist for the connection between the change dimension and prioritising partners in the value chain, these partners may not be able to help founders understand customers' real needs (i.e. what value is created, and for whom). Hence, it will be more difficult to capture value from technology development, especially if customers do not want or understand it. Such expressions as *'[...] if they (customers) do not understand it (the product) then they may blame themselves, which is definitely not the right way to treat your customers'* (from case studies) demonstrates some founders' initial thoughts that they minimally prioritised their customers, but then realised this was a mistake, thus indicating problems in their performance when not sufficiently prioritising customers. Further, others stated that *'as soon as the product is developed and launched, we will start to make money'*, which focuses on accelerating transactions, related to the business model's

efficiency dimension. Accordingly, a substantial risk exists in developing a product or service with no expressed market need, and thus, relates negatively to the firm's performance in a long-term perspective. Consequently, the efficiency dimension and prioritising value chain partners may negatively relate to firm performance.

Furthermore, an emphasis on developing technology, and decreasing the prioritising of customer involvement, could be due to pressure from stakeholders, and especially in instances of founders focusing on financial partners' early involvement. According to extant research and previous discussion, stakeholders tend to pressure founders to follow a more causal logic, to commercialise technology and receive payments (Reymen *et al.*, 2015). In that sense, they lean toward the efficiency dimension. However, these partners usually have start-up knowledge and experience, and provide founders with access to resources that could facilitate the founders' focus on customers and the product or service they provide, instead of being concerned with attracting financial capital. In that sense, a connection between a financially focused business model and the efficiency dimension could be positively related to firm performance. However, this positive effect may not be durable over time for NTBFs that operate in highly uncertain, rapidly changing environments, for which extant research argues necessary emphasis on experimentation (e.g. Chesbrough, 2010; Sosna *et al.*, 2010; Andries *et al.*, 2013), flexibility in the business model (Trimi and Berbegal-Mirabent, 2012), and involving customers to ensure that the technology addresses their needs, as well as transferring this so that it reaches the customers (Baden-Fuller and Haefliger, 2013).

6.2. The way forward

The thesis identifies future research as illustrated in Figures 4 and 5, and discussed in Sections 5.4 and 6.1. Thus, the thesis provides a basis for future quantitative research on business models in NTBFs. The suggestions offered in Section 6.1 would be of particular interest to business model literature as well as in the field of entrepreneurship, to understand the effects of business models and NTBFs' performance in the start-up phase. Additionally, future research should examine how, and to what extent, stakeholders influence the business model in practice and hence, firms' performance. A research project is already in progress to meet this need by developing a survey regarding initial business models, and collecting data from NTBFs in Sweden, Finland, and France. Among other topics regarding business models and NTBFs, this survey study is believed to generate data to test hypotheses about how different elements and prioritisations within the business model affect firm performance, and specifically perceived performance. The survey also collects data regarding stakeholders' involvement in the process, and to what extent, providing possibilities to understand how these people influence the business model in the minds of founders.

Moreover, the connection between founders' prioritisations and the dimensions in extant literature might differently influence firm performance depending on how far the firms have progressed in the start-up

phase, for example, if they move toward the post-start-up phase. For example, the effect of efficiency dimensions on firm performance and possible changes to this effect over time that was discussed in Section 6.1. Future research should examine how the different business model dimensions, and their connections to practice, influence firm performance over time. Thus, a longitudinal research design is proposed, for example, by following up on the aforementioned survey study after a year or two.

Furthermore, connections need to be clarified between the business model dimensions and prioritisations within the business model. The systematic literature review suggests how to measure business model characteristics, identifying three measurable business model dimensions, but the measurements require further validation. Are there actually three dimensions? Further, do both innovation and change, for example, relate to a customer-focused business model? Several questions could be posited to clarify and examine the connections between business model literature and the concept in practice, and how this affects NTBFs' performance. These answers would provide insights and value to business model literature, and clarify such unanswered questions in the field of (strategic) entrepreneurship as 'What are the relevant performance outcomes of business models?', 'Are some business models more prone to generate and/or appropriate value?' (Demil *et al.*, 2015, p.9). However, these are topics for future studies, and the proceedings of my doctoral thesis research.

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