A Dynamic Capabilities Approach to Sustainable Business Model Innovation

A Case Study of the Swedish Architecture Industry

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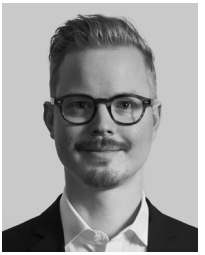

Firms today are facing changing conditions which they must respond to in order to maintain a sustained competitive advantage. To address this change, practitioners such as managers and executives of large firms look towards the concepts of Business Models and Business Model Innovation, as tools to devise and execute strategies to manage that change. This study will present an in-depth comparative case study of two large specialised Swedish architecture firms anonymised as Alpha and Beta, both experiencing significant strategic changes due to sustainability. However, sustainability is a concept that is often challenging to define, leading to difficulties for firms in implementing sustainability into their business models.

It is becoming widely accepted that dynamic capabilities, defined as an organisation's capacity to adapt and reconfigure both internal and external competencies to address changing environments swiftly, play a pivotal role in innovating a business model. Dynamic capabilities encompass the abilities to sense (identifying and assessing opportunities), seize (mobilising resources to exploit opportunities and derive value from them) and transform (continuously renewing the organisation). However, there has been limited research on exactly what these dynamic capabilities constitute in a Sustainable Business Model Innovation (SBMI) context and how they contribute to SBMI. To fill that gap, I propose a novel framework for SBMI based on dynamic capabilities. It includes a breakdown of capabilities into second-order capabilities ("learning-to-learn", meta-capabilities); first-order capabilities (affecting reconfiguration) and zero-order capabilities (operational).

Thus, this study proposes a capability-based conceptualisation of SBMI, identifies the different capabilities affecting SBMI and sheds light on how they contribute to SBMI. Furthermore, this study also identifies insights into the interactions of SBMI with external actors, the two separate SBMI processes (managerial-led and employee-led) and its determining factors. Empirically, this study contributes to the evolving theory on how firms can meet their increasing commitments to deliver societal value alongside financial gains.

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Markus Arnez-Wegelius

LUND UNIVERSITY

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Abstract

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To answer that question, I propose a novel framework for SBMI based on dynamic capabilities. It includes a breakdown of capabilities into second-order capabilities ("learning-to-learn", meta-capabilities); first-order capabilities (affecting reconfiguration) and zero-order capabilities (operational). My findings show that the sensing capability is composed of the lower capabilities of cross-disciplinary sensing, organisational sensing and stakeholder sensing. The seizing capability is composed of the lower capabilities of cross-disciplinary consensus building, reorganisation of BMI and stakeholder alignment. Finally, the transforming capability is composed of the lower capabilities of incorporation of cross-disciplinary knowledge, cultural and organisational change and stakeholder integration.

Thus, this study proposes a capability-based conceptualisation of SBMI, identifies the different capabilities affecting SBMI and sheds light on how they contribute to SBMI. Furthermore, this study also identifies insights into the interactions of SBMI with external actors, the two separate SBMI processes (managerial-led and employee-led) and its determining factors. Empirically, this study contributes to the evolving theory on how firms can meet their increasing commitments to deliver societal value alongside financial gains.

Key words

Dynamic Capabilities, Business Models, Business Model Innovation, Sustainable Business Models, Sustainable Business Model Innovation, Sustainability, Architecture

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To my wife Sofia, my parents Annika & Rainer and my parents-in-law Birgitta & Oscar who supported me during this long journey…

And to my children Léo, Gabriel, Alma and Théa, without whom this book would have been completed many years earlier :)

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Stockholm, March 2024

Markus

1 Introduction

The phenomenon of sustainability is gaining an unprecedented importance in our lives, as governments, businesses and societies alike put more and more effort into promoting sustainable development and exerting pressure on firms to contribute to the environmental, economic and social well-being of communities, leading to new trends in our values, attitudes and behaviours (Parida & Wincent, 2019). Indeed, sustainability as a phenomenon is being observed increasingly on a global level, albeit with varying degrees of success. The concept of sustainability seems to enshrine the principles of financial, environmental and social sustainability (Purvis et al., 2019). With the challenges of climate change, population growth and urbanisation ever present, the notion of sustainability has come to the forefront. In general, one can observe that society as a whole is becoming more concerned with environmental, social and economic challenges facing them (Barkemeyer et al., 2014). There is widespread agreement that the current living conditions are unsustainable, and could, in the long-term, lead to catastrophic consequences for future generations: global warming and severe weather phenomena observed in recent years will most likely worsen significantly in the near future (IPCC, 2023). Such impacts of climate change on human development will only worsen if significant action is not taken to reduce global carbon emissions. Thus, the consensus at the global level is exceedingly in favour of taking actions to ensure a sustainable future.[1]

The argumentation behind societal actors undertaking sustainable actions largely stems from the assertion by the United Nations (2023) that human beings are the most important actor in both causing environmental damage and achieving sustainable development. Numerous scholars have also pointed towards the role that organisations such as businesses have in reaching sustainability goals (Barkemeyer et al., 2014; Rudawska, Renko & Bilan, 2013; UN, 2023). Businesses, including, for example, the construction and architecture industry, although having played a part in creating environmental damage, still possess the ability to change the ground rules, and enable

[1] As demonstrated by the Paris Agreement, a global agreement on the reduction of climate change, negotiated during the 2015 United Nations Climate Change Conference ("COP21").

penetration of sustainability practices within their industries (Barkemeyer et al.,2014; Moon, 2007).

As this uncertainty regarding sustainability can impact a vast spectrum of a firm, firms predominantly use the concept of Business Models (BMs) to navigate through this. Indeed, BMs are very popular in research and in practice and can be described as the standard framework through which firms structure their business. This can be explained by the fact that the Business Model framework allows for a holistic, systematic, actor-oriented, and overarching model of the firm. As firms do not know which specific parts of their organisation, if not all, will be impacted by the environmental uncertainties, using a BM perspective allows them to have an overview of the whole firm and its workings. It is arguably precisely this point which gives BM an advantage over conventional strategy literature, with proponents arguing that business models are distinct from strategy due to their holistic, systems-oriented approach embedded in the concept (Amit & Zott, 2020; Hedman & Kalling, 2003; Zott et al., 2011; Zott, 2012). I argue that having a broader overview of the firm as a whole and adopting a micromanagement perspective, as opposed to focusing on specific aspects, will allow the firm to navigate this uncertainty better.

Business Models also present certain advantages for research: they have a strength in mapping out the different dimensions of the firm, both internal and external, allowing for a more clearly delineated object of study. Bigelow and Barney (2020) even argue that the BM approach, as opposed to the dominant strategy theories of the resource-based view (RBV) and transaction cost economics (TCE), which have strictly focused on inimitability and asset specificity respectively, has the capacity to look beyond those concepts and develop theories about the potential factors that drive the internal organisation of the business model in ways that could enlighten strategy research on value creation and capture. Business models are needed to formulate highly important aspects of any business, such as the value proposition to clients, as well as the manner in which the firm plans to implement the changes. They are boundary-spanning, networks of connection across firms and across industries, and serve as a reminder of the importance of considering multi-lateral arrangements which have indeed been difficult to build theory around, and research on such business models might be considered analogous to research on platforms, networks and ecosystems (Bigelow & Barney; 2020). Furthermore, business models are malleable and have a strong managerial-centric tone and managerial implications, benefits which explain why the framework is commonly used by managers and firms today. Indeed, perhaps it will be ultimately the business model approach, given its emphasis on interdependencies and multi-lateral connections, which may provide more insight to managers and entrepreneurs (than traditional strategy literature) who are grappling with the

complexity of an increasingly interdependent environment in which to compete. Furthermore, due to the increasing pressure on companies to address sustainability within their business models, the concept of a "Sustainable Business Model" (SBM) has arisen (Bocken et al., 2014). This concept has a number of definitions (Geissdoerfer et al., 2018); however, within this study, I will define a "Sustainable Business Model" as a business model that incorporates the concepts of environmental, social and economic sustainability to the highest degree possible. For avoidance of doubt, I am not referring to a business model which is sustainable in the sense of long-lasting and which does not incorporate elements of environmental and social sustainability. Operationally within the field of architecture, a SBM seeks to address four main areas: environmental sustainability (addressing the carbon footprint and life cycle of the architectural project), social sustainability (addressing psychological and social well-being, energy-reducing and beneficial behaviours), economic sustainability (addressing cost-efficiency and opportunities) and architectural design (addressing aesthetics).

However, it is clear from the literature that the concepts of BMs and SBMs remain theoretically underdeveloped and fragmented (Bigelow & Barney, 2020; Foss & Saebi, 2017; Teece, 2010; Zott et al., 2011). I argue that BMs are underdeveloped as a unit of study, specifically because they do not provide enough insight into how firms create or deal with change. Precisely as Chesbrough et al. (2018) argue, the Business Model framework is useful in numerous ways; however, certain significant barriers impede change: first, there is the conflict between the existing business model and the new business model (that seeks to exploit the emerging, disruptive technology). Second, the dominant logic (Prahalad & Bettis, 1986) inherent to a business model configuration is also a significant barrier. Indeed, it can be argued that BMs are typically geared towards offering and positioning but are less able to explain forces for change, such as capabilities and processes. This, I argue, is due to BMs having a much larger focus on the static picture and mapping of the firm, rather than on what businesses do and how they do it. By attempting to do both, I argue that the robustness of the BM as a unit of study diminishes.

To address this shortcoming of explaining change, Business Model Innovation (BMI) has emerged as a method that attempts to explain change within the existing firm. BMI is even portrayed as a new source of innovation that complements the traditional subjects of process, product, and organisational innovation (Amit & Zott, 2020). Business models are argued not only to lead to technological innovation through their novel value creation channels but can also be a source of innovation in themselves (Chesbrough et al., 2018; Sako, 2012; Teece, 2007, 2010; Zott et al., 2011; Bashir and Verma, 2016). BMI has also been formulated to specifically allow for innovation within sustainability, referred to as Sustainable Business Model Innovation (SBMI), guiding

firms towards more sustainable BMs (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013; Boons et al., 2013; Geissdoerfer et al., 2018; Johnson & Suskewicz, 2009; Luedeke-Freund, 2010; Mokhlesian & Holmén, 2012; Stubbs & Cocklin, 2008). These concepts of BMI and SBMI, like BM, have gained an increasing amount of attention, especially among practitioners, as well as in management research. The BMI and SBMI literature are more recent and even vaguer and more scattered than the BM literature. However, BMI and SBMI are also becoming more popular in research and thus deserve to be scrutinised.

1.1 Empirical Problem

1.1.1 Need for Sustainable Architecture

There are multiple definitions of sustainability (or sustainable development), many of which do justice to the underlying idea, such as the popularly quoted *Brundtland definition* as provided by the United Nations (1987), which will be used in this study: 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.

One field that has shown to have a large environmental impact in the world is within buildings and construction, consuming approximately 40% of global energy consumption (Mokhlesian & Holmén, 2012). In response to this issue, one may observe initiatives such as s*ustainable buildings* (or *green buildings, green construction*). It is a concept that describes a construction that is environmentally responsible and resource efficient, encompassing both the structure itself, as well as the processes leading to its construction and its lifecycle (from design to maintenance and demolition) (United States Environmental Protection Agency, 2016). In a world threatened by global warming, political and business leaders are increasingly turning towards more sustainable urban planning and construction; consequently, the concept of *Sustainable Buildings* is gaining importance (Kibert, 2004). The field of *architecture* is of paramount importance in the development of sustainable buildings and urban planning. Not only do the architects design the building and thus play a key role in the planning of the level of sustainability to be achieved, but they also work closely with the construction companies in the actual construction of the building and implementation of the sustainability features. They often also play a decisive role in the follow-up and evaluation of sustainability of the building.

Alusi et al. (2011) identify two powerful trends affecting how urban areas are designed: 'One trend involves a growing awareness of a threat to the sustainability of the Earth's

natural environment; the second is the rapid rise in the number of people moving into and living in cities'. Over 50% of the world's population live in urban areas, and we notice the largest developments in urban growth in the developing world, due to rapid population and economic growth. Ninety per cent of urban growth worldwide occurs in developing countries and are projected to triple their base of urban areas between 2000 and 2030 (expected to reach 5 billion people by 2050) (Alusi et al., 2011). Urban areas are also the largest consumer of energy, consuming 60% to 80% of the world's energy production.

Given these factors, ideas on how to combine rapid urbanisation and sustainability are becoming of critical importance, and the solution seems to lie within sustainable construction.

Sustainability in the construction field is closely connected to the notion of sustainable construction or green buildings, which can be defined as 'healthy facilities designed and built in a resource-efficient manner, using ecologically based principles' (Kibert, 2008). They argue that these types of construction projects have the primary goal of being financially successful, where the investors are willing to invest, and revenues are generated, while inhabitants are willing to reside, work or spend time in the building for other reasons, promoting their health and well-being (Zhou & Lowe, 2003). The second sustainable goal is environmental, leading to features of the building that contribute to a healthier and less polluted environment (for example: a low Co2 emission rate, a high percentage of renewable energies). Lastly, a third goal is to create a positive social atmosphere, where inequalities of different kinds (economic, social, opportunity) are minimised, and varying social and ethnic groups interact equally in building a stimulating and fair community. The factors instrumental in the success of sustainable buildings are multiple, not only in the planning, design and construction phases but also in the analysis of the lifecycle of the building (Ortiz et al., 2009). Collaboration among multiple stakeholders (architects, construction companies, clients, industry organisations) is necessary in achieving these goals (Lam et al., 2010). However, it is often the case that there is a lack of cooperation between the parties in the building process (Gluch et al., 2006).

Sustainability has impacted the construction industry in numerous ways in terms of the planning of construction projects, the design of the buildings as well as the actual construction phase, but there is more and more focus on the lifecycle of buildings. In particular, there is a stronger emphasis on the energy and resource use in construction projects (Knudstrup et al., 2009). The construction industry differs in large part from other industries in terms of the long lifetime of buildings. Thus, if we are to secure stronger sustainability in the future, there is a greater need to build sustainably today (Kibert et al., 2000). Moreover, the sheer size of the construction industry globally

makes that industry of paramount importance, both in contributing to climate change and in leading the way towards sustainability. In effect, studies have shown that buildings account for approximately 40% of global energy consumption, approximately 40% of global material deployment and approximately 25% of global waste annually (Mokhlesian & Holmén, 2012; Zuo & Zhao, 2014).

Furthermore, scholars such as Mokhlesian and Holmén (2012), and Revell and Blackburn (2007) argue that the strongest driver of sustainability within the field of construction is the architects and the firms representing them. Driven by client demand and as they play a decisive role in the planning and designing of construction projects, they are able to have a significant impact on the final outcome. Altomonte et al. (2014) additionally argue that educating architects in sustainability can play a large role in improving sustainability in society. They claim that architects show a much stronger concern for sustainability as they determine so much of the building project.

For these reasons, and the fact that the construction industry impacts three of the UN's sustainable development goals (*Industry, Innovation and Infrastructure; Sustainable Cities* and *Communities; Responsible Consumption and Production*) (United Nations, 2018), the architecture industry is of particular interest to study, due to their decisive role in promoting and enabling sustainability in the construction industry, and the economy as a whole. The construction industry is the single largest carbon emitter, accounting for the largest use of materials and contributor of waste (Zuo & Zhao, 2014). Thus, architects can impact this industry strongly through their pivotal role in the planning and designing of construction projects (Mokhlesian & Holmén, 2012; Revell & Blackburn, 2007) and are considered key actors in promoting sustainability within the industry (Altomonte et al., 2014).

In summary, the architecture industry is a professional, artistic, well-established and change-averse branch whose BM has not changed substantially. However, it is now facing substantial changes, mostly due to the phenomenon of sustainability but also disruptions from larger firms. As sustainability is a highly discussed and huge factor for change, with demands coming from firms, customers and society at large, firms need to at least show that they consider sustainability and the implications for their business model, in order to survive and thrive. However, sustainability is ambiguous, idiosyncratic and thus difficult for a firm to implement. This creates a problem for BMI to deal with sustainability, especially as architecture firms are conservative and, I argue, have not had to deal with change of this magnitude before. Nonetheless, these firms need to respond to sustainability in order to survive and be successful, but they are currently at odds with how to do so in the best manner. Therefore, I argue that this is a relevant empirical object of study, as the changes that these firms need to pursue will be apparent and easy to isolate and study.

1.1.2 Business Impact of Sustainability

The increasing focus on sustainability has not only accentuated the need to minimise externalities, but has also led to a new stream of demand and market conditions, such that 'executives start waking up to the fact that a sizable number of consumers prefer eco-friendly offerings, and that their businesses can score over rivals by being the first to redesign existing products or develop new ones' (Nidumolu et al., 2009). Thus, sustainability not only represents a challenge and extra cost for firms (Ketata et al., 2015; Shrivastava, 1995), but can also represent great opportunities, such as potential new sources of revenue and a means to gain competitive advantage (Mysen, 2012; Porter & Kramer, 2006, 2011; Sommer, 2012; Unruh & Ettenson, 2010; Nidumolu et al., 2009). Despite the large opportunities that sustainability may imply, there is a certain inability of firms to recognise these opportunities; thus, the progress of sustainability work within companies has been slower than predicted (Baumgartner & Korhonen, 2010). In effect, companies that are at the forefront of sustainability are often small and limited (such as green start-ups), and more established firms tend to only make incremental changes in their business practices (Sommer, 2012).

In their quest for sustainability, companies can implement it in many ways, although one can identify two main directions, either in a *defensive* or in an *accommodative* approach (Schaltegger et al., 2012). A defensive approach focuses on the internal organisation of the firm, by changing the operations to enable a more sustainable way of doing business (Porter & Kramer, 2011; Stubbs & Cocklin, 2008). In order to achieve this, firms may, for example, change their logistical and transportation policies to reduce their carbon footprint by including more environmentally friendly methods of transportation, or minimising the distances needed for the transport of a product. They may also ensure that the energy needed to produce their products and services comes from renewable and sustainable sources, without, as such, changing the actual offering to clients. On the other hand, the second direction of implementing sustainability, the *accommodative* approach, focuses externally, by changing the firm's offerings towards more sustainable and environmentally-friendly products and services for their customers (Maxwell & van der Vorst, 2003; Porter & Kramer, 2011). Products themselves can be redesigned to include more environmentally-friendly materials, which are less polluting for the environment, as this can not only impact the firm's own operations but also benefit the lives of their customers (Sommer, 2012). Porter and Kramer describe the defensive approach as mainly being associated with cost minimisation, while the offensive approach is associated with revenue generation. As a whole, both of these directions are crucial for companies to achieve levels of sustainability that will bring about a fundamental change (UN, 2014). Moreover, if a firm focuses on redesigning its products and services to be more sustainable, it can also

unlock new avenues and opportunities to generate revenue and improve its overall competitive position in the market (Maxwell & van der Vorst, 2003; Porter & Kramer, 2011)

The construction industry strives to be an example of how businesses can successfully adapt their operations and offerings to sustainable solutions whilst increasing their profitability. Indeed, the construction industry has been shown to have much more environmental, social and economic impacts on society compared to many other industries, and there have already been a number of sustainability initiatives within the industry (Mokhlesian & Holmén, 2012; Zuo & Zhao, 2014). Nonetheless, even though the field of construction as a whole, and architecture in particular, has witnessed a number of incremental innovations in their ways of working (such as CAD/CAM and BIM[2]), the industry as a whole has not seen the same kind of disruptive technologies or innovations that have changed the business model in a radical manner. It is precisely for this reason that a study into the architecture industry is particularly interesting.[3]

1.1.3 Sustainability and Business Models

Thus, if architecture firms are to incorporate sustainability in a significant manner within their business models, this will demand changes in the way they organise internally, their cost and revenue streams, and undoubtedly change their client offerings (Mokhlesian & Holmén, 2012). Indeed, Barkemeyer et al. (2014) point out that the main difficulty does not lie in redesigning offerings to be more sustainable, but rather in recalibrating the rest of the firm's business model to match the sustainable offering. They argue that it is vital for companies to do so if they are to be truly sustainable.

This is further complicated by the fact that, even though sustainability as a concept has been considered within the architecture industry for many years, there are still no clear directions on how to best implement it within the firm's business model, or even what the term really means (Mokhlesian & Holmén, 2012).

[2] CAD/CAM stands for Computer-Aided Design & Computer-Aided Manufacturing while BIM for Building Information Modelling. These are software tools, typically used together in the architectural field to create models and simulations of the built environment, thereby saving time and increasing accuracy for architects.

[3] Despite the developments within the architectural industry in Sweden, where large construction firms are taking on roles and responsibilities in construction projects traditionally held by architecture firms, I argue that this has not significantly impacted the underlying business models and logic of these firms, with the architectural projects still being carried out in a conventional manner, especially in the case of architectural firms.

Nonetheless, changes in a firm's business model are not something to be taken lightly. Misjudged opportunities or badly implemented changes have been shown to lead to the downfall of many successful companies. Sommer (2012) emphasises this difficulty by observing that a company can either be the first to change their business model within an industry, which leads to great challenges because even though they may have a first-mover advantage, they have no other company to look towards and learn from, which increases the risk of failure. The other alternative is that the company is not the first to implement such changes in their business model, and thus is following others, which has the added advantage of trying out tested policies but is at the same time confronted with challenges unique to their company. He also raises the additional difficulty of a company not correctly identifying exactly what is necessary to adapt its business model into a sustainable one, due to the general lack of consensus in the field. Thus, it is common for firms to concentrate mostly on offering a sustainable product but much less on adapting their business model, as this is seen to be of great difficulty and presents great risk, although it is essential. For example, it is commonly observed that firms over-communicate the sustainability offering or initiatives they may have, and they concentrate more effort on this form of *greenwashing*[4] than on actually delivering sustainable products in a sustainable manner (Bolis et al., 2014; Kahle & Gurel-Atay, 2013). This example emphasises the difficulty experienced within the industry, by both companies and clients, in adapting a business model to truly deliver sustainable solutions and contribute towards a more sustainable society.

Sustainability is a concept that is often difficult to define and is characterised by uncertainty regarding the actual meaning and implications of the term. As such, it can be broadly understood as a focus on minimising externalities from human activity in general and a firm's operations in particular (Brown et al., 1987). But beyond this, one can intuitively imagine that this increasing focus on sustainability in our societies would also alter the market conditions and translate, for example, into a new form of demand as awareness rises amongst consumers, public organisations and companies. Firms are able to capitalise on this by way of innovation, adapting or expanding their offerings and selling products and services with a focus on sustainability in mind.

The drive for sustainability is argued to be external as well as internal, with Sommer (2012) arguing that companies often cannot impact exogenous change themselves but rather have to adapt to such change. The rise of sustainability practices within firms seems to stem from both external pressures to change and a higher demand for environmentally produced or promoting products (Ketata et al., 2015; Danciu 2013). This external pressure to partake in sustainability business practices has come from the

[4] Defined by Kahle and Gurel-Atay (2013) as: 'exaggerated benefits or unsupported claims in support of the environment in advertising and other persuasive communications'.

public sector, such as governments, non-governmental organisations and other organisations (Danciu 2013), as well as the media, lobby groups and other stakeholders (Galpin & Whittington; 2012). A great number of firms nowadays, including within the field of architecture, understand that despite the fact that sustainability practices are being implemented on a voluntary basis in many countries, due to increasing external pressure and the changing nature of demand, implementing sustainability into their organisation in a meaningful way is of vital importance if they are to succeed in this new business era.

There have been a number of studies regarding the implementation of sustainability into business models (Bocken et al, 2014; Boons & Lüdeke-Freund, 2013; Boons et al., 2013; Geissdoerfer et al., 2018; Johnson & Suskewicz, 2009; Luedeke-Freund, 2010; Mokhlesian & Holmén, 2012; Stubbs & Cocklin, 2008). The key theoretical challenge is centred around how companies can implement such changes within their operations and provide innovative ways of sourcing, processing, manufacturing and delivering sustainable products and services. If the changes made are to have an impact, this often requires significant changes in their business model (Johnson et al., 2008; Sommer 2012; Bocken et al., 2014). Indeed, Bocken et al. (2014) develop a sustainable business model framework, and argue that in order to implement sustainability, a firm's business model requires a "fundamental shift" in the purpose of business and almost every aspect of how it is conducted. Business model innovation offers a 'potential approach to deliver the required change through re-conceptualising the purpose of the firm and the value creating logic, and rethinking perceptions of value'. Furthermore, Sommer (2012) argues that sustainability changes should be implemented with a business model perspective in mind as this can be used to 'distinguish real sustainability opportunities from thin air, and help seizing these opportunities while avoiding the usual pitfalls of business model innovations. In other words, it can guide companies to become more sustainable and more competitive'. In summary, the empirical focus of this study will concentrate on what architecture firms do to implement sustainability into their business practices. Firms at large are expected by society and consumers to transform their business practices to become more sustainable. In order to explore this question, the nature of the concept of sustainability needs to be studied, including its seemingly unclear theoretical definition and application.

1.2 Theoretical Problem

Despite sustainability becoming increasingly important for firms, there have been few studies on SBMs in architecture and, more importantly, which capabilities contribute to SBMI within architecture firms and enable them to innovate their existing business model. The question of which capabilities contribute to a firm innovating their existing

business model is of primary importance in ensuring sustained competitive advantage. This phenomenon of organisational change that the firm must complete is of a complex nature, which requires significant time and resources from firms, often without resulting in a clear, established answer.

Indeed, there seems to be a gap in the literature as to which capabilities contribute to SBMI. Firms, in general, often face a significant challenge in their ability to innovate for SBMI, as highlighted by previous research (Hart & Dowell, 2011; Inigo et al., 2017). It is becoming widely accepted that dynamic capabilities, defined as an organisation's capacity to adapt and reconfigure both internal and external competencies to address swiftly changing environments (Teece et al., 1997), play a pivotal role in BMI (Teece, 2018). At its fundamental level, ordinary capabilities, characterised by repeatable patterns of action, enable companies to maintain their current business models (Winter, 2003). On a more advanced level, dynamic capabilities encompass the abilities to sense (identifying and assessing opportunities), seize (mobilising resources to exploit opportunities and derive value from them) and transform (continuously renewing the organisation). These dynamic capabilities empower corporations to adapt, recombine, and create ordinary capabilities, as outlined by Teece (2018), and craft, refine and transform their business models, as emphasised by prior research (Harreld et al., 2007; Teece, 2007). However, there has been limited research on exactly what these dynamic capabilities are constituted of in a SBMI context, and how they contribute to SBMI.

To bridge this gap, we analyse the business models of the case companies engaged in SBMI. By examining the internal and external dimensions of the firms and identifying capabilities which facilitate sensing, seizing and transforming for SBMI, this study enhances our comprehension of dynamic capabilities in driving SBMI. Consequently, it advances theoretical perspectives on SBMI (Dentchev et al., 2018) and offers practical insights to corporate management on innovating business models for increased sustainability (Foss and Saebi, 2017). Additionally, this study contributes to the evolving theory on how firms can meet their increasing commitments to deliver societal value alongside financial gains.

This study seeks to address that gap in the literature and will analyse the empirical phenomenon through the theoretical lens of relevant concepts. Thus, it will attempt, through its findings, to identify the different capabilities affecting SBMI and shed light on how they contribute to SBMI. In doing so, the study also identifies findings on the interactions of SBMI with external actors, the process of SBMI, its factors and finally proposes a capability-based conceptualisation of SBMI.[5]

[5] Throughout this study, I will refer to a "Sustainable Business Model" as a business model that incorporates the concepts of environmental, social and economic sustainability to the highest degree possible. For avoidance of doubt, I am not referring to a business model that is sustainable in the sense of long-lasting and which does not incorporate elements of environmental and social sustainability.

The business model perspective will be adopted in this study for several reasons: first, it provides an elegant, holistic and overarching model of the firm, and one whose strength lies in mapping out the internal and external dimensions, especially the relations between external and internal factors relevant to analysing the phenomenon and enabling a more clearly delineated object of study. The concept of capabilities (Augier & Teece, 2008; Eisenhardt & Martin, 2000; Helfat & Peteraf, 2009; Teece, 2007; Teece & Pisano, 1994; Teece et al., 1997) is not new to Business Models, and a number of BM scholars already refer to it (Afuah & Tucci, 2001; Applegate, 2001; Osterwalder, 2004; Teece, 2010), with Seelos and Mair (2007) even going so far as describing a business model as a 'set of capabilities that is configured to enable value creation consistent with either economic or social strategic objectives'. I go even further and argue that capabilities are essentially resources (and activities leading from the use of those resources), and thus something that firms can control. Consequently, I argue that the business model framework intuitively includes capabilities. Thus, as resources and activities, they are an already existing and necessary component of BMs, and both the BM and the capabilities literature have a common understanding of capabilities. Therefore, I argue that capabilities are a natural part of BMI, and that the phenomenon of business model innovation can, in one way, be seen as a form of capability development. After careful analysis of the literature on business model innovation (Chesbrough, 2010; Zott et al., 2011) and on capability development (Teece et al., 1997; Teece, 2007; Winter, 2000, 2003; Zollo & Winter, 2002), this author argues that combining the BMI framework with a capability perspective provides a framework with further explanatory power in explaining the phenomenon than either of those perspectives applied individually. Therefore, a combined BMI and capabilities framework will be used in this study to analyse the empirical material, namely the SBMI framework.

Thus, the theoretical focus of this study will concentrate on identifying the different capabilities affecting SBMI and shedding light on how they do so. To best capture the change that the firms have experienced, the SBMI approach has been adopted in this study. A preliminary framework will be constructed based on concepts borrowed from the business model innovation literature and adapted to incorporate the factors that are believed to be significant in explaining which capabilities contribute to SBMI.

1.3 Research Question & Purpose

The purpose of this study is to build upon SBMI research, increase understanding of the capabilities behind SBMI within architecture firms and strengthen the concept of SBMI overall.

Thus, the research question can be formulated as follows: 'Which capabilities contribute to sustainable business model innovation, and how?' This study will identify the different capabilities affecting SBMI and shed light on how they contribute to it. Although this study is not primarily focused on the process, being rather a case study, it will incorporate process elements to answer the research question.

The theoretical purpose of this study is thus to address some of the theoretical underpinnings of SBMI as set out earlier, focusing on which capabilities contribute to SBMI. Analysis of these capabilities is expected to enhance our theoretical understanding of SBMI. The choice of theoretical study is due to the limited research on the constituent capabilities of SBMIs and the need to strengthen its theoretical robustness. The empirical purpose of this research project is to concentrate on what architecture firms do to implement sustainability into their business practices, with the goal of contributing to firms' ability to fulfil their increasing commitments to deliver societal value alongside financial gains.

After careful analysis of the SBMI literature, despite its shortcomings, the author argues that it provides a sound framework for explaining the empirical phenomenon. Furthermore, the empirical findings can contribute, in turn, to strengthening this preliminary framework. The SBMI perspective will be applied in the analysis for several reasons. First, the business model perspective provides an elegant, holistic and overarching model of the firm. The strength lies in its ability to map out both the internal and external dimensions, relevant to analysing the phenomenon and enable a more clearly delineated object of study. Second, through theoretical and empirical research, it was observed that the business model concept is often referred to, both in the sustainability and architecture literature, but also appears often in the empirical interviews conducted with architects, clients and other relevant persons within the field.

In summary, this study will identify the various capabilities affecting SBMI and shed light on how they contribute to SBMI. In doing so, the study will also identify insights into the interactions of SBMI with external actors, the SBMI process, its influencing factors and finally propose a capability-based conceptualisation of SBMI.

1.4 Empirical Design and Setting

Firms today are facing changing conditions regarding sustainability, which they must address to maintain competitiveness. To do so, practitioners such as managers and executives of large firms look towards BM and BMI, and use them as tools to devise and execute strategies to manage this change. However, problems arise due to these

concepts being both theoretically underdeveloped and fragmented, especially regarding SBMI.

In this study, I have chosen to study large strategic changes in an incumbent and path-dependent sector. One such industry of considerable strategic importance and facing change is architecture, with sustainability being a big focus. This particular study will focus on two case studies relating to the case companies anonymised as Alpha ("Alpha") and Beta ("Beta"). These are the two large, specialised architecture firms in Sweden and are actively implementing changes within their organisations, namely within sustainability.

To understand why sustainability is bringing about such as a large change, we need to understand the background of the movement. Sustainability as a phenomenon is increasingly observed on a global level, with varying degrees of success. Nonetheless, sustainability is a concept which is often difficult to define and is characterised by uncertainty as to its actual meaning and implications. Thus, this uncertainity leads to difficulties for firms in implementing sustainability into their business practices.

As mentioned previously, the phenomenon of sustainability is taking an unprecedented importance in our lives, and as it is of such large empirical relevance, thus warrants scrutiny and study.

However, even though sustainability as a concept has been considered within the architecture industry for some years, there is still no agreement on how to best implement it within firms (Mokhlesian & Holmén, 2012). This is why studying the capabilities behind SBMI has empirical relevance. Therefore, I argue that SBMI is a relevant empirical object of study, as the changes that these firms are facing are real and challenging.

2 Theoretical Foundations

The theoretical foundations underpinning this study are explained in this chapter, namely business models (including SBMs) and business model innovation (including SBMI). The elements which are relevant to the study from the field of organisational capabilities will also be touched upon. I finish off the chapter with the summary of the relevant theoretical concepts.

2.1 Introduction to Business Models & Business Model Innovation

> The definition of a business model is murky at best. Most often, it seems to refer to a loose conception of how a company does business and generates revenue. Yet simply having a business model is an exceedingly low bar to set for building a company. Generating revenue is a far cry from creating economic value … (Porter 2001)

The term 'Business Model' is one that has risen in popularity tremendously: since 1995, there have been 1,177 articles published in peer-reviewed academic journals, in which the notion of business model is touched upon (Zott et al., 2011), as well as an explosion of conferences and panels centred around this theme. All of this, despite the fact that the term business model, in itself, is one that has been notoriously difficult to define and thus has taken on a multitude of definitions, mostly in connection with the actual circumstances in which the term is used. For example, Lewis (2000) defined it in perhaps the simplest of manners: 'All it really meant was how you planned to make money', describing that the term was so popular and seemed to justify all kinds of poorly prepared business plans in Silicon Valley in the 1990s, but lacking any real substance. Due to this, it is currently very difficult to assess the progress in the academic research on business models, as the field has failed to develop a common language and accepted theoretical assumptions and framework, to analyse the concept. Zott et al. (2011) identify a common set of emerging themes that could provide a basis for a more unified study of business models: 1) 'there is widespread acknowledgement—implicit and explicit—that the business model is a new unit of analysis in addition to the product, firm, industry, or network levels; it is centred on a focal organisation, but its

boundaries are wider than those of the organisation; 2) business models emphasise a system-level, holistic approach towards explaining how firms do business; 3) organisational activities play an important role in the various conceptualisations of business models that have been proposed; and 4) business models seek to explain both value creation and value capture'. The authors also draw our attention to different literature, while not explicitly referring to the study of business models, is very much connected to the same questions and issues. These include discussions on new organisational forms, ecosystems, activity systems, value chains and value networks.

Within the field of academia, there are many different theoretical perspectives on the concept of business models. Drucker (1994) discusses the paradox that companies may implement new, sophisticated tools and technologies but experience negligible or even negative gains in efficiency or performance. He further notes that firms whose strategy has been hugely successful can suddenly find itself failing, even if it is highly efficient. To explain these types of phenomena, Drucker advocates for a *theory of the business*. He argues that for companies to flourish and achieve sustainable growth, they need to continuously re-evaluate their theory of the business to adapt to the changing conditions of the business world. He describes it as three sets of key assumptions: about the organisation's environment (society, market, customers and technology), the organisation's mission and the core competencies needed to fulfil that mission. He argues that these three sets of assumptions must not only fit the reality of the business environmental at any given time, but they must also fit each other, be correctly understood throughout the organisation and tested constantly. Organisations are argued to need to implement processes for preventative care. First, there is the idea of *abandonment*, suggesting that companies should consistently challenge every one of their products and services, as well as their policies and routines, to assess whether they are relevant for the current business environment, or whether they should be abandoned. Second is the preventative measure of studying "noncustomers", which allows companies to adapt and expand their operations into new markets. What is particularly interesting about Drucker's (1994) article is that, despite the fact that he never mentions the term business model, he clearly is referring to the same concept, questions and dynamics, but rather defines them as assumptions: 'these assumptions are about markets. They are about identifying customers and competitors, their values and behaviour. They are about technology and its dynamics, about a company's strengths and weaknesses'. Despite these previous conceptualisations of the business model, there still is not a clear agreement on what is a business model.

2.1.1 Business Models

BM, as a perspective, I argue, is a young but promising field. Most of the BM frameworks have a generic and map-type character. The advantages of the BM perspective, I content, is the systematic element, in that it combines a number of frameworks which, in large part, follow the same general methodology and are broadly applicable across a vast number of fields and industries, despite possible large differences between those industries (Bigelow & Barney, 2020). Another advantage is that BM provides a holistic approach, which, despite several differences between the different frameworks, incorporates the same dimensions of the firm, namely the internal dimension (activities and resources), the external dimension (relationships with suppliers, customers, sales channels) and value proposition. BM also often encourages a focus on the specific components, rather than the combination of components. For firms to benefit, there needs to be a deeper understanding of both the systematic element and the relations between the components. Indeed, even though each of the specific elements of the BM can be isolated and perhaps better and formally studied using existing concepts from strategy, as Hedman and Kalling (2003) point out, I argue that the BM approach still provides a better overview of the firm and sheds light on the multilateral nature of the firm and its value creation. One last benefit of BM is that they are situational, can be continuously updated and guide strategy. Indeed, one of the most common uses of the business model framework is by practitioners to aid them in management and strategy decisions. This malleability, which can be described as a lack of boundary conditions inherent in the concept, explains in large part the appeal to practitioners.

Despite the strong divergence within the literature on business models (see Figure 1), one can still identify certain defining features of the concept.

In simple terms, business models can be described as adhering to two general schools of thought: the first, more predominant school, provides a general description of the way in which a firm does business, such as the design or architecture of the value creation, delivery and capture mechanism (Teece, 2010). The second school describes business models as a cognitive frame and a mental representation of the firm's managers and employees (Baden-Fuller & Haefliger, 2010; Doganova & Eyquem-Renault, 2009).

For the sake of clarity, this study considers the business model as a description of how the firm conducts its business, meaning how it creates value and delivers that value to its customers and stakeholders. To be more precise, this study will adopt the definition of Massa et al. (2017), who define a business model as 'a description of an organisation and how that organisation functions in achieving its goals'.

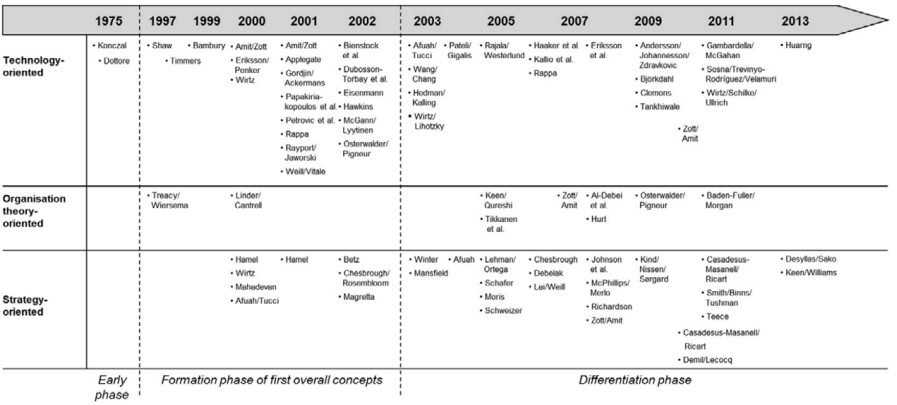

Figure 1: Literature overview of the business model research field (Wirtz et al., 2016)

Purpose and Characteristics

The purpose of the business model was initially interested in understanding and describing novel ways of doing business that were enabled by the internet and major advances in communication and information technologies, and the ever-changing roles that the firms played in the new ecosystems (Zott et al., 2011). This, of course, also implied a strategic dimension, focusing largely on questions of value creation, value capture, performance and competitive advantage[6] (Massa et al., 2018). Furthermore, the concept was seen as a means for a company to commercialise innovative ideas and technologies and that the business model itself can be an entirely new form of innovation, in the form of business model innovation ("BMI") (Foss & Saebi, 2018).

The question remains of how the concept of the business model can actually impact the way a firm carries out its business. The following themes have been identified: value creation, as well as its role in innovation.

One of the big contributions of the business model literature is the new conceptualisation of how value is created. Previously, value was theorised to primarily originate very much within the boundaries of the firm (Barney, 1991); however, due to the rise of the digital economy, value is increasingly being created in collaboration with multiple other business partners (here, value is referred to in economics terms,

[6] I define value creation as the internal processes that a firm partakes in to create profits, such as innovating, producing and delivering new products to the market, without a strong focus on defending their existing market shares. I define value appropriation, or value capture, as the external activity of the firm of extracting profits from the marketplace by defending their competitive position in the market against competition by erecting barriers to imitation, for example.

although value creation mechanisms have also been addressed in terms of social value (Seelos and Mair 2007)). Thus, these novel ways of conceptualising value creation go beyond the traditional views such as Schumpeterian innovation, the reconfiguration of the value chain according to Porter (1985), strategic networks and alliances between firms, or the development of firm-specific core competencies. Emphasis is also placed on the necessity of firms developing radically new forms of business models to succeed in the 'age of revolution' (Hamel 2000). To do so, it is argued that companies must adopt radical and new innovation agendas, as value creation and capture occur within a value network that extends the company's resources (which can include business partners, suppliers, distribution channels, and coalitions).

Moreover, business models have been shown to strongly impact the performance of the firm. The nature of the market is of paramount importance in how firms implement their business models, as firms do not operate in an environment devoid of competition (Hamel, 2000). Firms can increasingly compete solely based on their business model and how they apply it (Casadesus-Masanell & Ricart, 2010); thus, the business model itself can become a source of competitive advantage, resulting in superior value creation (Morris et al., 2005) or even change the entire dynamics of an industry (Magretta, 2002).

Indeed, Mitchell and Coles (2003) discuss the need for companies to create processes for innovation and improvement, whereas Chesbrough (2003, 2006, 2010) advocates for the concept of open innovation (OI) to achieve business model innovation. He describes it as: 'Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and to expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology' (Chesbrough, 2006). Saebi and Foss (2015) even distinguish between four OI strategies: Market-based; Crowd-based; Collaborative and Network-based. In a "market-based innovation strategy", knowledge input to the innovation process is acquired through the market. This type of knowledge acquisition strategy includes, for example, inward-licensing of IP, R&D outsourcing or the acquisitions of innovative small start-ups (Chesbrough, 2003; Dahlander & Gann, 2010; Ebersberger, Bloch, Herstadt, & van de Velde, 2012). This open innovation strategy is characterised by low diversity and low integration of external sources. In a "crowd-based innovation strategy", knowledge input is sourced from a larger number of actors, such as innovation contests or user communities (Howe, 2008). Enabled by "digitization" (Baldwin & Clark, 2000) and low communication costs, companies can access the distributed knowledge of external individuals or communities without resorting to traditional means of backwards or forwards integration (Lakhani et al., 2012). In a "collaborative innovation strategy", a company enters into collaborative agreements with a few knowledge-intensive partners, such as lead-users (Simard &

West, 2006; von Hippel, 2005), universities and research institutes (Perkmann & Walsh, 2007) or other companies (Emden et al., 2006; van de Vrande et al., 2006). In a "network-based innovation strategy", companies in this category deeply integrate external partners to ensure the effective joint development of knowledge by engaging and maintaining a network of relationships with various external partners (Keinz et al., 2012).

However, firms must first continue the arduous process of converting research and development into products and services that meet customers' needs, so-called *internal innovation*, and then integrate their results, ideas and expertise with persons and organisations outside the firm, in order to commercialise the product or service in question, leveraging on internal as well as external sources of ideas. As for how to actually organise such as a network of innovators, Boudreau and Lakhani (2009) shed light on different modes of organisation: as a collaborative community or a competitive market. Collaborative communities can be seen as groups of people, who often work for free, loosely governed by soft rules and social norms that promote open access to information, transparency, joint development, and sharing of intellectual property. Competitive markets, on the other hand, see external innovators developing multiple competing varieties of complementary goods, components or services in a fiercely competitive environment, with little to no cooperation. Miles, Miles, and Snow (2006) express a similar idea of *collaborative entrepreneurship*, which they define as the 'creation of something of economic value based on new jointly generated ideas that emerge from the sharing of information and knowledge'. The authors refer to this form of entrepreneurship as an organisational process and external collaboration efforts that enable this type of network interaction. Thus, although they do not directly define the business model, Zott et al. (2011) argue that it is a form of business model innovation. Chesbrough (2007b) builds upon his previous work and introduces the concept of *open business models.* These models are types of networks in which the different players collaborate in the co-creation of the business model. He explains how, within this type of organisation, 'companies must open their business models by actively searching for and exploiting outside ideas and by allowing unused internal technologies to flow to the outside, where other firms can unlock their latent economic potential' (Chesbrough, 2007b). This occurs, as the author explains, because companies may not always be able to value or utilise in-house technologies, whilst other external firms may be much better at doing so. Moreover, Zott et al. (2011) state that open business models, which are designed for sharing and licensing technologies, not only can be a source of innovation themselves but may also lead to additional business model innovation in complementary markets as a consequence of the reconfiguration of downstream industry structure, as well as the reconfiguration of capabilities (Gambardella & McGahan, 2010). Business model innovation can even become intellectual property (Rivette & Kline, 2000; Rappa, 2001).

Business Model Components

Despite the vast number of conceptualisations and frameworks of business models (see Figure 2), the majority of them actually share the same characteristics (Wirtz et al., 2016). Nonetheless, rather than being seen as a strength, the multitude of approaches in identifying different components and the semantics used to justify them can be viewed as a challenge or obstacle for knowledge-generation in the field (Pateli & Giaglis, 2003). Therefore, outlining in detail such differences and similarities in business model components would offer little academic benefit to this study (for a discussion of the development of business model frameworks, see Baden-Fuller & Morgan (2010), Hedman and Kalling (2003), Lambert (2006), Normann (1977), Sommer (2012), Teece (2010), Zott et al. (2011)). The author believes that a more parsimonious approach would be most useful in interpreting and elucidating the observed empirical phenomena of this study. A large number of theoretical components, rather than increasing the explanatory power of the approach, would instead be counterproductive, as it would reduce the inductive ability of business models. Thus, the author has identified a select number of components from the literature, which are considered to be highly relevant to the empirical field of research and can provide greater explanatory power. Nonetheless, it could be of great interest to refer to several of the most influential business model frameworks, namely those of Chesbrough and Rosembloom (2002), Osterwalder (2004) and Johnson et al. (2008).

Component / Author	Strategy	Resources	Network	Customers	Market offering (value proposition)	Revenues	Service provision	Procurement	Finances	Spectrum of the Components
Hamel (2000)	Core Strategy, Strategic Resources		Value Network	Customer Interface						◔
Mahadevan (2000)			Logistic Stream		Value Stream	Revenue Stream				◔
Wirtz (2000)	Combination of production factors for strategy implementation	Core competencies & Core assets		Market & customer segmentation	Service offer & Value proposition	Systematization of revenue forms	Combination & transformation of goods & services	Production factors & Suppliers	Financing & Refinancing	◕
Hedman/Kalling (2002)	Managerial and organizational, longitudinal process component	Resources		Customers	Competitors, Offering		Activities & Organization	Factor & Production Input Suppliers		◕
Bouwman (2003)		Technical architecture		Customer Value of Service					Financial arrangements	◔
Afuah (2004)	Positions	Resources			Industry Factors		Activities		Costs	◑
Mahadevan (2004)				Target Customers	Value Proposition	Revenue Model	Value Delivery			◔
Voelpel/Leibold/ Tekie (2004)		Leadership capabilities	Value Network (Re)Configuration for the Value Creation		Customer Value Proposition					◔
Yip (2004)	Scope, Differentiation	Organization		Nature of Customers, Channels	Value Proposition, Nature of Outputs		How to transform inputs (including technology)	Nature of inputs		◕
Lehmann-Ortega/Schoettl (2005)					Value Proposition, Value Architecture	Revenue Model				◔
Osterwalder/ Pigneur/Tucci (2005)		Core Competency	Partner Network	Target Customer, Distribution Channel, Relationship	Value Proposition	Revenue Model	Value Configuration		Cost Structure	◕
Tikkanen et al. (2005)	Strategy & Structure		Network				Operations		Finance & Accounting	◑
Al-Debei/El-Haddadeh/Avison (2008a)			Value Network		Value Proposition, Value Architecture				Value Finance	◔
Demil/Lecocq (2010)		Resources & Competences, Organization			Value Proposition	Volume & Structure of Revenue Streams			Volume & Structure of Revenue costs	◑
Johnson (2010)		Key Resources			Customer Value Proposition	Profit Formula	Key Processes			◑
Osterwalder/ Pigneur (2010)		Key Resources	Key Partners	Customer Relationships, Channels, Customers Segments	Value Proposition	Revenue Streams	Key Activities		Cost Structure	◕
Intensity of use	◑	◕	◑	◑	◕	◑	◑	◔	◑	

○ Very low ◔ Low ◑ Moderate ◕ High ● Very high

Figure 2: Overview of selected business model components (Wirtz et al., 2016)

Perhaps the most popularised representation of a business model is that of Osterwalder (2004). He finds the empirical setting to build his business model framework from the e-business industry, and largely views the concept of a business model as a form of architecture. He strives to develop a business model ontology ("*BMO*"), which can be described as a 'conceptualisation and formalisation of the essential components of a business model into elements, relationships, vocabulary, and semantics' (Zott el al. 2011), and it is structured into different levels according to depth and complexity.

Johnson et al. (2008) have also developed a business model framework that is widely cited in the field. They conceptualise the business model as four interlocking elements, which, in combination, create value: customer value proposition (CVP); profit formula; key resources and key processes. They state that the most important element by far is the CVP, as it is a 'way to create value for customers—that is, a way to help customers get an important job done', with "job" referring to a fundamental problem in a given situation that requires a solution. One main difference from Osterwalder's (2004)

framework is the emphasis on whether a company can change its business model, and how it could do so, rather than merely playing a more descriptive and prescriptive role.

However, one key criticism of the presented theoretical approaches is, as mentioned before, their apparent failure to address the most established paradigms and theoretical traditions within the field of strategic management.

Another successful application of formal strategic management theory into the business model framework is that of Hedman and Kalling (2003), who were loosely inspired by Normann's (1975) business model ideas and Porter's (1991) causality chain model. The resulting framework included factors from the industrial organisation and value chain perspective (Porter, 1980; 1985), the resource-based view (Barney, 1991), as well as the strategic process perspective (Mintzberg, 1978; 1994; Whittington, 2000). The model's components included customers, competition, offerings, activities and organisation, resources, suppliers and the firm's scope of management, whilst incorporating a longitudinal dimension.

Relevant Business Model Components in this Study

The business model components for this study are as follows. The framework is characterised by its holistic and wide-spanning qualities. By categorising the factors behind a firm's business model into three broad categories, it allows for a more exploratory and inductive approach to include the relevant factors identified in literature and from empirical observations. The choice for this specific business model framework is explained by its simple, uncluttered and yet effective manner of mapping the business model, as opposed to other, often more complex, frameworks. Of course, the number of categories within a business model framework can be considered a matter of semantics or conceptual granularity, but nonetheless permits, in my opinion, a more intuitive and less restrictive theoretical framework, with which one may have a greater facility to identify the different components of the business model of architecture firms that are affected in a significant way by SBMI. A framework with much more restrictive categories would have entailed greater effort and theoretical uncertainty in categorising the different concepts, and led to more difficulty in visualising the holistic nature of the components, and perhaps even restricted creativity in creating new theory.

Therefore, I base the components of this study on three broad categories of the market, the products and the internal situation of the organisation, which I rename: the *Internal Dimension*, the *Offering* and the *External Dimension*. Components have been identified from the literature and are found below (see Table 1), including a brief description of each component.

Business Model Component	Description
Internal Dimension	
1. Tangible Resources	Tangible resources present in the firm, such as people, tools, equipment and technology
2. Information Resources	Information resources present in the firm, such as know-how, relevant knowledge, competencies and capabilities
3. Organisational Resources	Organisational resources present in the firm, such as structure, processes and culture
The Offering & Value Proposition	
4. Arrangement of Value-Creating Activities and Resources	The configuration of activities and resources that the company employs to create value for the customer
5. Offering	The products and services offered to satisfy the client's needs
6. Value Proposition	The extra value that the company's offering proposes to its customers
7. Revenue Model	The streams of income present in the company
External Dimension	
6. Relationship with Customer	The channels of communication and type of interaction that the company engages in with the customer, including branding
7. Relationship with Partner	The channels of communication and type of interaction that the company engages in with the partner, including alliances and cooperation
8. Relationship with Competitor	The channels of communication and type of interaction that the company engages in with the competitor, including positioning within the market and the nature of competition

Table 1: Business Model Components used in this study

2.1.2 Sustainable Business Models

There have been a number of studies regarding the SBMs (Bocken et al., 2014; Boons & Lüdeke-Freund, 2013; Boons et al., 2013; Geissdoerfer et al., 2018; Johnson & Suskewicz, 2009; Luedeke-Freund, 2010; Mokhlesian & Holmén, 2012; Stubbs & Cocklin, 2008). The key theoretical challenge is centred around how companies implement changes leading to higher sustainability within their operations and provide innovative ways of sourcing, processing, manufacturing and delivering sustainable products and services. If the changes made are to have an impact, this often requires significant changes in their business model (Johnson et al., 2008; Sommer, 2012; Bocken et al., 2014). Indeed, Bocken et al. (2014) developed a sustainable business model framework and argued that in order to implement sustainability, a firm's business model requires a 'fundamental shift' in the purpose of business and almost every aspect of how it is conducted. They suggested that business model innovation offers a 'potential approach to deliver the required change through re-conceptualising the purpose of the firm and the value creating logic, and rethinking perceptions of value'. Furthermore, Sommer (2012) argues that sustainability changes should be implemented with a business model perspective in mind, as this can be used to 'distinguish real sustainability opportunities from thin air, and help seizing these opportunities while avoiding the usual pitfalls of business model innovations. In other words, it can guide companies to become more sustainable *and* more competitive'.

The application of sustainability thinking into business models can be categorised as a *reformist environmentalist* approach (Egri & Pinfield, 1999), where corporate interest is merged with environmental concerns. Incorporating economically relevant sustainability features into business models preoccupied with corporate business success has shown to be a highly complex task with many different and fragmented approaches (Evans et al., 2017; Geissdoerfer et al., 2018; Hansen et al., 2009; Joyce & Paquin, 2016; Stead and Stead, 2008; Schaltegger and Wagner, 2011; Wagner, 2007).

One influential study on business models that enable sustainable innovation is that of Boons and Lüdeke-Freund (2013), in which they apply the business model lens to the innovation process. They start by pointing out that the existing research in the field, both within business models and within sustainable innovation, has failed to successfully bridge the gap between those two concepts and provide a holistic framework for how a firm can recalibrate its business model to be able to create and market sustainable innovations. Boons and Lüdeke-Freund (2013) seem to agree somewhat with Porter and Kramer (2011) insofar as sustainable innovations must be anchored in a financial value-creation logic, that the level of business potential must be sufficient to motivate the development of any novel sustainable offering. They argue that charitable or philanthropic aspirations will not suffice in justifying such an effort. Moreover, they assert that simply developing a sustainable solution, offering or product is often not enough to generate extra revenue. Other measures have to be taken, such as adapting the market positioning of the company (and the product) to match the message of the offering, as well as adapting the internal operations of the firm, its processes, competences and culture.

However, other scholars, such as Schaltegger et al. (2012), argue that a *sustainable business model* must be innovative insofar as it supports the management of voluntary social and environmental activities in addressing the business case drivers in a systematic manner. In doing so, such a business model can strategically create *business cases for sustainability* on a continuous basis. They differentiate between the concept of a business case *for* sustainability and a business case *of* sustainability (in this case, a conventional business case), and argue that the former aims to achieve such a goal of realising economic success through an 'intelligent design of voluntary environmental and social activities'. They advocate that such a business case is characterised by three requirements: the firm must realise a voluntary activity with the intention of contributing to a solution to a societal or environmental problem; the activity must create a positive business effect, such as cost-savings or increased sales or profits; and last, an argumentation and justification that a specific management activity has clearly met both previous requirements, that is, a positive societal or environmental solution, as well as having generated some kind of economic benefit for the firm. They identify

core business drivers for sustainable business cases: c*osts and cost reduction, risk and risk reduction, sales and profit margin, reputation and brand value, attractiveness as an employer* and *innovative capabilities*.

Other strategies for combing sustainability and corporate business performance have also been identified in the literature: Schaltegger et al. (2012) demonstrate three separate strategies: *defensive (limited integration), accommodative (integration)* and *proactive (full integration).* The first strategy refers to a very minimal effort in sustainability, where it is perceived as a cost-constraint and a need to comply with legislation. This strategy can be seen as a means of protecting the existing business and revenue-generating rationale of *business logic* (Prahalad & Bettis, 1995). The second strategy relates to a cautious modification of internal processes and a modest application of sustainability goals. Sustainability management systems and tools are introduced to have limited control, and some organisational change is required, such as training of employees. This leads to sustainability objectives being introduced into many business processes but not impacting the core business as such and can be compared to Roome's (1992) '*compliance-plus strategy*'. The last strategy is one where environmental or societal objectives are fully integrated into the core business logic of the firm, where the business processes, products and revenue logic are directed towards sustainability. Schaltegger et al. (2012) even go so far as arguing that the definitions of costs and risks are modified to include social costs and risks (i.e. negative externalities). Pursuing such a strategy entails that business and sustainability goals are completely aligned, and business leadership is one of outstanding sustainability performance. Roome (1992) describes this outcome as 'commercial and environmental excellence'. From these strategies, Schaltegger et al. (2012) deduce sustainability business model pillars (see Table 2).

Table 2: Sustainability Business Model Pillars (Schaltegger et al., 2012)

	Generic business model pillars			
Core drivers of business cases for sustainability	**Value Proposition (VP)**	**Customer Relationships (CR)**	**Business Infrastructure (BI)**	**Financial Aspects (FA)**
Costs and cost reduction	Products and services with lower energy or maintenance costs for customers	Cost-efficient contracting relationships, closed-loop service systems	Costs of new products and services can be lowered through partnerships	Balancing cost reductions for customers and cost structures of new products and services to increase profitability
Risk and risk reduction	Lowering societal through products and services can create value to certain customer segments	Service-relationships reducing sustainability risks for customers result in higher customer loyalty	Resources, activities, and partnerships set-up in order to minimise internal and external risks	Improved risk and credit rating resulting from lowered sustainability risks
Sales and profit margin	Environmentally and socially superior products and services require modified or new VPs to turn into sales and profits	Higher customer retention and customer value as a result of sustainability-oriented, service-intensive relationships	New products and services may require strategic partnerships (e.g., coopetition) to overcome market barriers	New products and services and/or new customer relationships contribute to diversified revenue streams
Reputation and brand value	Sustainability as distinctive element of good corporate reputation	Sustainability as marketing feature of the brand increasing customer loyalty	Strategic partnerships with sustainability leaders can increase reputation and brand value	Sustainability performance leading to a good rating and the consideration in sustainability indices and funds
Attractiveness as employer	A company's offerings and VPs allowing for personal identification to attract employees	Better customer service as a result of higher employee motivation	Attractiveness as principal can enhance the quality of activities, resources, and partnerships	Reduced costs for HR acquisition, less fluctuation costs and lower compensation costs
Innovative capabilities	Unfolding the full sustainability-potential of innovations enables modified or new VPs	Innovative products and services creating solutions to sustainability problems, improving customer retention	To allow for innovations to unfold may require new activities, resources, and partnerships	Higher innovation potential and expectations for profitable innovations leading to an increase of shareholder value

I will divide the following discussion, as per Normann's (1975) three-part business model framework. Normann's (1975, 1997) influential work paved the way for future scholars and was particularly well-received due to its encompassing and comprehensive nature in conceptualising the different factors that impact a firm's business model into three parts: the internal dimension, the offering and the external dimension. First, I shall investigate how sustainability can impact the internal dimension of a company, composed of the processes and organisational arrangements, but also the company's resources such as the physical assets, competences, culture and other factors of production that determine the cost and price of the offering. The second aspect refers to the offering, which is partly composed of the functionality and the tangible and intangible properties, and partly price, volume and cost properties. The third aspect relates to the external dimension of the business model, which includes the relationships with the customer, partner and competitors, as well as market factors, such as the nature and preferences of the firm's customers, their patterns of consumption, the competition and the focal firm's positioning in the marketplace.

The Internal Dimension

This internal dimension is composed of the internal factors that determine a firm's business model, that is, the matters that the firm has legal control over, and which are not affected by the market mechanism. These factors include value-chain configuration, processes and organisational control and structure, as well as resources such as assets, people, technology, products, equipment, information, brand, norms, values and company culture.

In terms of internal implications of sustainability, there is a strong focus within the field on the priority of firms seeking to implement sustainability. This priority should be to recalibrate their business models, more specifically their value chains and processes, to minimise the level of negative externalities created by their operations. These types of externalities are, of course, environmental, such as carbon dioxide emissions, but also so-called social externalities. These revolve around providing a working environment that ensures a minimum level of well-being for the employees, and even business partners, suppliers and other stakeholders up- and down-stream in the value chain (Freeman 1984, Porter & Kramer 2006, 2011).

Moreover, emphasis is placed on interacting and collaborating with external stakeholders as being of paramount importance in achieving higher levels of sustainability. For example, Boons and Lüdeke-Freund (2013) show the importance of managing and structuring upstream relationships with suppliers in a sustainable manner and including those partners in sustainable initiatives. They argue that, to achieve higher levels of sustainability, the focal firm needs to take responsibility for the

entire value chain. This is to ensure that processes are not delegated or outsourced to other firms or stakeholders who do not follow the same sustainability requirements. Other scholars also clearly accentuate the importance of partnerships and relationships with external stakeholders, such as Bocken et al. (2014) who argue that much higher potential in sustainable solutions can be achieved through partnering with other organisations. In a similar vein, Stubbs and Cocklin (2008) emphasise the importance of the firm's ability to lobby with stakeholders such as policy makers, opinion makers and authorities, with a focus on the environment and society as a whole. Moreover, Porter and Kramer (2006, 2011) stress the benefits of local clusters, where the firm can collaborate with customers, suppliers, NGOs, competitors and other relevant parties, to create further sustainable value.

Sustainability in business models places, of course, great importance on the resources of the firm in question. Scholars such as Bocken et al. (2014) claim that a crucial aspect of achieving a sustainable business model is maximising material productivity and energy efficiency, whilst reducing waste. In practice, this can be achieved through product and manufacturing process innovation, or through wider changes such as new partnerships and value network configurations to improve efficiencies and reduce supply chain emissions. Another important resource in pushing for sustainability is the firm's reputation and establishing an image in society as a sustainable actor. This enables communication between parties offering sustainable goods and services and also clients who are searching for sustainable products. However, if the firm communicates their sustainability efforts too excessively, there is a risk that clients may interpret their efforts as image boosting or marketing management instead of genuine sustainability (Schalltegger et al., 2012).

The internal contextual conditions of the firm are also considered fundamental in implementing sustainability. Initiatives to incorporate sustainability into a firm's operations can be facilitated vastly by employees sharing social and cultural values that promote sustainability. In implementing sustainability, it is of central importance to consider the political and cultural aspects of the firm, especially to ensure that all layers of management and employees affected by the changes are convinced and believe in them (Lewin, 1951; Alvesson & Sveningsson, 2012; Sommer, 2012). Moreover, other relevant stakeholders should also be considered, particularly those who may have the power, legitimacy and urgency to assert their interests (Mitchell et al., 1997).

An absolutely central feature of implementing sustainability into a business model revolves around the phenomenon of innovation and creating innovative processes within the firm, going even so far as to potentially create an entirely new and innovative business model. One common obstacle to achieving innovation within an organisation is the difficulty for employees to learn new routines and processes, as well as adjusting

their tasks to new technology and solutions. Boons and Lüdeke-Freund (2013) point out both internal and external challenges, such as business rules, behavioural norms and success metrics. They also refer to this process as the ability to implement 'organisational innovation', which is largely dependent on the motivation and belief in sustainability of the staff to implement such changes, as well as the ability of the staff, and their expertise and knowledge of technical solutions, particularly related to energy and ICT. Bocken et al. (2014) emphasise that innovation will be particularly effective in bringing about sustainability if applied to fields such as low carbon manufacturing, low carbon solutions, lean and resource-effective manufacturing, the dematerialisation of products and packaging, use of excess capacity, extended producer responsibility, zero emissions initiatives, solar and wind-power based energy innovations and, in general, a shift from dirty, non-renewable energy sources to clean, green, renewable sources.

Offering

The components of a firm's offering are of great importance in determining the sustainability level of a firm. Questions such as how products and services should be designed and priced to meet the customer's demand are pivotal. A sustainable offering should contribute to reduced energy usage while increasing the share of renewable energy required for its production. Stubbs and Cocklin (2008) even go so far as to argue for a systemic shift from a supply-driven to a demand-driven perspective, in which offerings are designed to meet the customers' *real needs* as opposed to driving the demand and consumption of unnecessary products and services.

In terms of exemplifying sustainable offerings, Bocken et al. (2014) offer an extensive description of how an offering can be transformed to become sustainable. They categorise sustainable business models into three main categories of archetypes: Technological, Social and Organisational (see Figure 3). The archetypes with the most significant implications for the firm's offering are the technological and social archetypes. The technological aspects focus on maximising material and energy efficiency, with innovative practices such as low-carbon, lean and additive manufacturing; creating value from waste, with ideas such as cradle-to-cradle and circular economic thinking, using excess capacity; and substituting with renewables and natural processes, which can be achieved through consistent initiatives to strive towards zero emissions by focusing on phasing out dirty energy sources in favour of solar and wind, and by encouraging energy innovations. According to Bocken et al. (2014), a sustainable offering must also adhere to certain social priorities. This includes delivering functionality rather than ownership, such as offering a product-oriented Product Service System (PSS) (Goedkoop et al., 1999; Tukker, 2004), with an emphasis on maintenance, extended warranty or, for example, a use-oriented PSS, where the product

is sold as a rental, lease or shared. Moreover, the firm should adopt a stewardship role in its offering, through measures such as providing extensive customer-care that promotes consumer health and well-being, and taking serious engagement towards ethical trade. Finally, the firm should encourage sufficiency through consumer education, managing demand, and so forth.

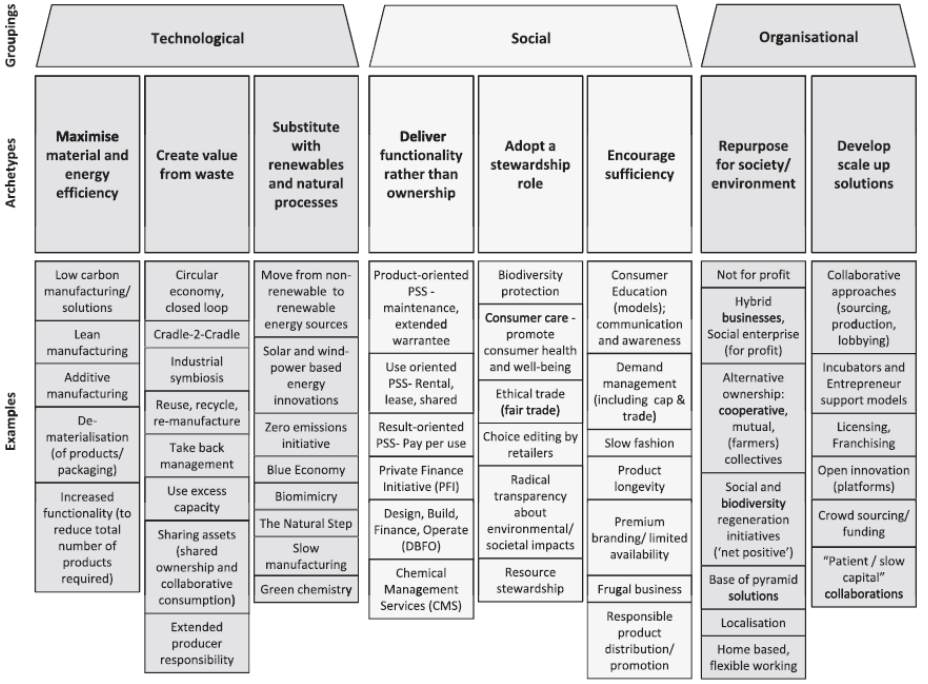

Figure 3: Sustainable Business Model Archetypes (Bocken et al., 2014)

Furthermore, Williams and Dair's (2007) framework of environmental, economic and social sustainability objectives is useful as an introduction to how sustainability may translate into practical objectives and an offering (see Table 3).

Sustainability objectives	Examples of how these objectives can be met in new developments
Environmental sustainability objectives	
1. To minimise the use of resources	Use renewable and recycled materials Use renewable energy sources Design developments for minimum waste during construction, life and after-life Use materials with low energy inputs
2. To minimise pollution	Remediate contaminated land Reduce air pollution Provide infrastructure for public transport, walking, cycling Raise densities on sites within 800 m of existing centres, services and transport corridors Design buildings for minimum energy consumption in use
3. To protect biodiversity and the natural environment	Conserve flora, wildlife and habitats on site Provide wildlife refuges Use sustainable urban drainage systems to protect rivers and water courses from pollution and flooding
Economic sustainability objectives	
1. To enable businesses to be efficient and competitive	Reduce energy consumption in construction Reduce waste in construction Provide infrastructure and buildings that enable businesses to keep energy and water consumption to a minimum Provide high quality buildings that are flexible and can be adapted with minimum costs
2. To support local economic diversity	Provide higher densities to enhance commercial viability Provide a mix of uses to increase viability and vitality of commercial areas Use locally produced goods and materials in construction
3. To provide employment opportunities	Provide a mix of uses to give choice of employment Develop high quality buildings for manufacturing and commercial activities Provide a mix of uses to give choice of employment
Social sustainability objectives	
1. To adhere to ethical standards during the development process	Ensure ethical trading throughout the supply chain of a development Provide a safe and healthy work environment
2. To provide adequate local services and facilities to serve the development	Provide space for training Develop good quality energy efficient buildings for community activities Offer a mix of retail spaces
3. To provide housing to meet needs	Develop a mix of housing tenure and type Provide affordable housing Provide high quality and flexible buildings that minimise the use of resources Provide secure dwellings
4. To integrate the development within the locality	Provide multiple links to adjacent neighbourhoods Reject or discourage gated developments Create a mix of transport provision with a variety of modal links to services, work, leisure and homes Provide good access for all
5. To provide high quality, liveable developments	Ensure sensitive, high quality architecture, civic design and master planning Design to reduce crime Design for road
6. To conserve local culture and heritage, if appropriate	Reuse locally valued buildings Design developments to reflect local heritage and use local materials

Table 3: Sustainability objectives framework (Williams & Dair, 2007)

Concerns about the price and cost of a sustainable offering are addressed in a limited manner in the literature. However, certain academics advocate for a different pricing strategy for sustainable offerings by actively bundling services and products, as well as combing them with solutions provided by external stakeholders (Bocken et al., 2014).

The External Dimension

The market in which the firm operates is of crucial importance when it comes to adopting a sustainable business model. Factors that the firm cannot directly control, such as the relationship with customers, partners and competitors, all play a large role in striving for sustainability.

Regarding customers, a central aspect is their preference for sustainability, that is, for sustainable products over non-sustainable ones, and their corresponding higher willingness-to-pay for the price premium of sustainable products. Interestingly, scholars such as Stubbs and Cocklin (2008) argue that a drive towards sustainability will make customers consume less, as the products and services they consume will address their needs for a longer time. Moreover, the firm itself should play a large role in determining customer demand (Boons & Lüdeke-Freund, 2013) by educating its customers on sustainability matters.

Within the literature of sustainable business models, the role of competitors is often emphasised. Sustainability has been shown to be a means of differentiating offerings from competitors, leading to value-creating opportunities for pioneering firms. Investing in sustainability can lead to a competitive advantage, particularly through a first-mover advantage. Schaltegger et al. (2012) demonstrate that competitive advantages gained through sustainability are subject to time compression diseconomies. Certain firms may rapidly invest heavily in public relations efforts in sustainability with the hope of obtaining a green image, but this can often amount to *greenwashing*.

Partnerships are also a key feature in adopting a more sustainable business model. Academics in the field seem to agree that partnering with customers, suppliers, or even competitors or other industry organisations is essential for becoming more sustainable. Stubbs and Cocklin (2008) argue that for firms pursuing sustainable business models to obtain a competitive advantage, they need to take a holistic and systematic approach to their business and environment, especially whilst handling different stakeholders.

Definition and Typology

Thus, a sustainable business model can be described from various perspectives. There are many definitions and typologies for SBMs (see Table 4), each presenting slightly different perspectives but still, I argue, sharing the same common characteristics. These characteristics are that SBMs build upon the conventional business model concept while incorporating sustainability concepts, principles and goals and/or integrating sustainability into their value proposition, creation and capture activities. One noteworthy point to consider regarding concept clarity is the difference between a business model *for* sustainability (Schaltegger et al., 2012) and a sustainable business model (Bocken et al., 2014). Although less frequently referenced in the field, a business model for sustainability is more akin to a conventional business model that has been adapted and strives to have a certain sustainability impact, whereas a sustainable business model is one in which sustainability is a core dimension of the business model already at the point of creation of the business model. For avoidance of doubt, this study will use the term sustainable business model (SBM) to refer to a sustainable business model, according to Bocken et al.'s (2014) definition.

Source	Definition
Stubbs and Cocklin, 2008	A sustainable business model is "a model where sustainability concepts shape the driving force of the firm and its decision making [so that] the dominant neoclassical model of the firm is transformed, rather than supplemented, by social and environmental priorities." (p. 103)
Garetti and Taisch, 2012	Sustainable business models "have a global market perspective, taking into account the development of new industrialised countries as well as the need for more sustainable products and services." (p. 88)
Schaltegger et al., 2012	Sustainable business models "create customer and social value by integrating social, environmental, and business activities" (p. 112)
Bocken et al., 2013	"Sustainable business models seek to go beyond delivering economic value and include a consideration of other forms of value for a broader range of stakeholders." (p. 484)
Boons and Lüdeke-Freund, 2013	A sustainable business model is different from a conventional one through four propositions, "1. The value proposition provides measurable ecological and/or social value in concert with economic value […] 2. The supply chain involves suppliers who take responsibility towards their own as well as the focal company's stakeholders […] 3. The customer interface motivates customers to take responsibility for their consumption as well as for the focal company's stakeholders. […] 4. The financial model reflects an appropriate distribution of economic costs and benefits among actors involved in the business model and accounts for the company's ecological and social impacts" (p. 13)
Wells, 2013	A business model for sustainability "would assists in the achievement of sustainability [by] following major principles […] for sustainability", which Wells defines as 1) resource efficiency, 2) social relevance, 3) localisation and engagement, 4) longevity, 5) ethical sourcing, and 6) work enrichment. (p. 65)
Upward and Jones, 2015	A (strongly) sustainable business model "is the definition by which an enterprise determines the appropriate inputs, resource flows, and value decisions and its role in ecosystems, [in a way that] sustainability measures [which] are those indicators that assess the outputs and effects of business model decisions […] might be claimed as successfully sustainable." (p. 98)
Abdelkafi and Tauscher, 2016)	Sustainable business models, "incorporate sustainability as an integral part of the company's value proposition and value creation logic. As such, [Business models for Sustainability] provide value to the customer and to the natural environment and/or society." (p. 75)
Geissdoerfer et al., 2016)	"we define a sustainable business model as a simplified representation of the elements, the interrelation between these elements, and the interactions with its stakeholders that an organisational unit uses to create, deliver, capture, and exchange sustainable value for, and in collaboration with, a broad range of stakeholders." (p. 1219)
Evans et al., 2017	Sustainable business models are described with five propositions, "1. Sustainable value incorporates economic, social and environmental benefits conceptualised as value forms. 2. Sustainable business models require a system of sustainable value flows among multiple stakeholders including the natural environment and society as primary stakeholders. 3. Sustainable business models require a value network with a new purpose, design and governance. 4. Sustainable business models require a systemic consideration of stakeholder interests and responsibilities for mutual value creation. 5.Internalizing externalities through product-service systems enables innovation towards sustainable business models." (p. 5ff)

Table 4: Selected sustainable business model definitions (Geissdoerfer et al., 2018)

This study will adopt the definition of SBM as: 'business models that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders, and hold a long-term perspective' (Geissdoerfer et al., 2018), and is represented in Figure 4.

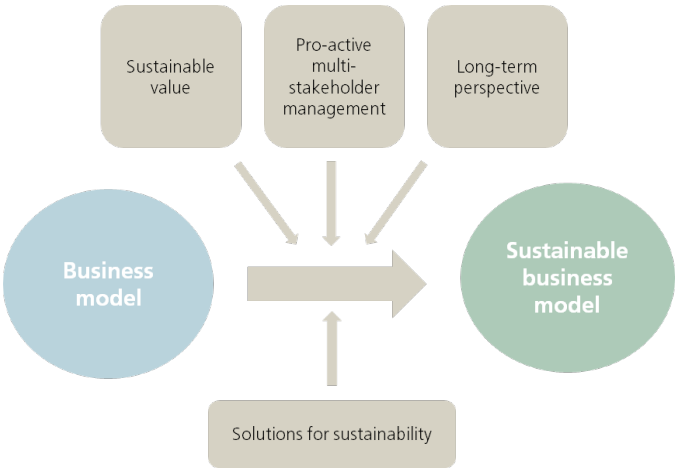

Figure 4: Sustainable business models (Geissdoerfer et al., 2018)

2.1.3 Business Model Innovation

Nonetheless, I argue that the BM literature has room for improvement, specifically in dealing with change. Indeed, the theoretical problem which will be addressed in the study is what I argue to be the major challenge of the BM approach: that the framework or components are not prone to change. As a matter of fact, even though the BM literature is advocated for its enhanced exploration of organisational issues compared to TCE and the RBV, it has the theoretical shortcoming that it fails to separate implementation issues and change in general from organisational structure (Bigelow & Barney, 2020). BM often presents a static picture of a business model at a given time, without explaining in any satisfactory manner how the components can or do change. Furthermore, in the event of changes to a firm's business model, BM does not provide clear implications or repercussions in the case of a change in a component. The BM approach does seem to assume that simply specifying the organisational structure of a business model is a sufficient explanation of the way it may be implemented. Similar concerns apply to how business models adjust over time, and it is clear that work on the dynamics of business models and how they co-evolve with the organisational structure over time is an important area for future research (Zott & Amit, 2013).

In an attempt to address this shortcoming, the concept of BMI is introduced, and has been described as a new source of innovation that 'complements the traditional subjects of process, product, and organisational innovation' (Zott et al., 2011). Despite it being a relatively novel concept, BMI has provided considerable insights. Foss and Saebi (2017) argue, for example, that BMI allows firms to introduce changes into the design and architecture of their BMs that are novel to a context and potentially the basis of

substantial appropriable value creation and competitive advantages. Our understanding of the nature of such innovation, its process dimension, and its consequences is also strengthened. Thus, by introducing the concept of BMI, I argue that the framework becomes more capable of managing change.

There are large differences in how scholars define business model innovation, especially regarding what that innovation actually means, such as in terms of novelty or radicalness, and the role business model innovation plays in enhancing a firm's performance. For example, while some suggest that business model innovation needs to be new to the firm (cf. Johnson, Christensen, and Kagermann, 2008; Osterwalder, Pigneur, and Tucci, 2005), others argue that it has to be new to the industry as well (Foss & Saebi, 2015; Leih et al., 2015; Santos et al., 2015; Stieglitz & Foss, 2015).

As argued by Bashir and Verma (2018), BMI is indeed a powerful tool that allows firms to reconfigure value creation mechanisms and increase performance (Desyllas & Sako, 2013; Hartmann et al., 2013b; Massa & Tucci, 2013). A number of researchers view BMI as a means of value creation and as a basis for the firm's competitive advantage (Amit & Zott, 2020; Chesbrough & Rosenbloom, 2002; Matthyssens et al., 2006; Bashir & Verma, 2017). BMI for existing businesses presents an opportunity to convert new market opportunities into new BMs, and creating novel customer value and value delivery methods (Markides, 2006; Matthyssens et al., 2006). Furthermore, the increasing importance of BMI in both academia and the industry demonstrates its importance as a phenomenon that needs to be conceptualised and theorised on its own.

The first attempts to identify and define BMI come from within the field of innovation and technology management, with two main perspectives identified in the literature (Zott et al., 2011): first, that a business model allows a company to commercialise innovative ideas and technologies; and second, that the business model itself is an entirely new form of innovation, along with traditional modes of innovation such as process, product, and organisational innovation, and includes novel forms of cooperation and collaboration.

Chesbrough and Rosenbloom (2002) describe an important role of the business model as capturing value from early-stage technology, by creating a 'heuristic logic that connects technical potential with the realisation of economic value'. In short, it serves as a kind of tool that aligns research development into new market segments to match customer needs. Moreover, technological innovation, when it is done in collaboration within a network of business partners, may even sometimes impact the firm's commercial and operational activities, which is to say its business model (Calia et al., 2007). Johnson and Suskewicz (2009) broaden the analysis and move away from the firm as a focal point. They advocate that if countries are looking to transition into a clean tech economy, such infrastructural change can be achieved by shifting focus from developing individual technologies to enhance systemic change. Regarding

technological innovation, a number of scholars argue that it is not enough to ensure a company's success, emphasising that the power of a business model to achieve success is higher than an idea of technology (Chesbrough, 2007a).

As touched upon previously, business models can not only lead to technological innovation through their novel value creation channels, but can also be a source of innovation in itself. Since business model innovation clearly impacts firm performance, an interesting question arises: how can a firm's existing business model impact and be impacted by innovative initiatives? For this reason, numerous scholars, such as Chesbrough, 2007a; Demil & Lecoq 2010; IBM Global Business Services, 2006; Ireland, Hitt, Camp, & Sexton 2001; Johnson, Christensen, & Kagermann, 2008; Sosna, Trevinyo-Rodríguez & Velamuri, 2010, have written on business model renewal and innovation, exploring how such processes can impact performance within incumbent firms. Chesbrough and Rosenbloom (2002) conducted an influential study on business model innovation in incumbent firms. They claim that the business model can function as a *heuristic logic* and may act as a mental map, which mediates the manner in which business ideas are perceived, by filtering valuable information from non-valuable information. Within incumbent firms, this filtering process is likely to ignore business model developments and innovations that differ greatly from the firm's existing business model. Zott et al. (2011) argue that this concept of business model, in its cognitive dimension, is similar to Prahalad and Bettis's (1986) notion of a *dominant logic*, which is a 'prevailing wisdom about how the world works and how the firm competes in this world'. This *dominant logic* can also act as a manner of filtering information, which may potentially prevent managers from considering certain opportunities when they fall outside of the prevailing logic. Chesbrough (2003) refers to this phenomenon as the *dominant logic trap*. In a similar strand of thought, Bouchikhi and Kimberly (2003) describe phenomena, which they term an *identity trap.* This is a similar idea to Chesbrough's (2003), but instead refers to the identity of the organisation in question, and when such strategic options are constrained, due to not corresponding to the organisation's identity, which can lead to an inability to innovate or adapt to a changing environment. Chesbrough (2010) deepened the analysis by identifying two separate barriers to business model innovation in incumbent firms: first, a barrier relating to the underlying configuration of assets, which he explains is the conflict between existing assets and business models, due to the inertia which arises from the complexity of reconfiguring assets and operational processes). The second barrier is of a cognitive nature and relates to the lack of cognitive ability of managers to value the potential of new technologies and ideas that do not directly fit into the current business model.

Additionally, Zott et al. (2011) identify that a specific leadership agenda may be required for business model renewal. Scholars such as Doz and Kosonen (2010) argue that companies often seek stability, which can often lead to rigidity, but should instead focus on being strategically agile by developing three core meta-capabilities: *strategic sensitivity, leadership unity* and *resource fluidity*. Particularly important in their framework is the role of the top management team in achieving collective commitment to take the necessary risks of abandoning existing business models and implementing new ones. Furthermore, Smith, Binns and Tushman (2010) emphasise how 'managing complex business models effectively depends on leadership that can make dynamic decisions, build commitment to both overarching visions and agenda specific goals, learn actively at multiple levels, and engage conflict'.

In terms of the relationship between business models and innovation, Zott et al. (2011) describe how the 'business model is mainly seen as a mechanism that connects a firm's (innovative) technology to customer needs, and/or to other firm resources (e.g., technologies)', and is 'conceptually placed between firm's input resources and market outcomes'. In this sense, the core logic of a business model 'revolves around a firm's revenues and costs, its value proposition to the customer, and the mechanisms to capture value' (Zott et al., 2011) and can be a vehicle for innovation as well as a source of innovation.

Despite these initial attempts to define BMI, there is still a deep ambiguity with respect to what is a BMI, with certain scholars describing it as a process (e.g. search, experimentation, transformation) (Demil & Lecocq, 2010; Doz & Kosonen, 2010), or as an outcome (i.e. the innovative BM) (Bucherer et al., 2012; Günzel & Holm, 2013; Johnson, 2010; Mitchell & Coles, 2004a, 2004b). This study assumes a dynamic view of BMI and conceptualises it as an organisational change process requiring appropriate capabilities. How one perceives and defines BMI has important implications for subsequent research. There is further disagreement as to what constitutes BMI: an innovation in the entire logic of the BM (for example, Giesen et al., (2007), or innovation in one or several specific components (Koen, Bertels, & Elsum, 2011). This study assumes that BMI is an innovation in the entire logic of the BM.

Thus, the research field of BMI lacks widespread agreement on the definition. To address this issue, three major literature reviews within BMI have been formulated, namely Schneider and Spieth (2013), Spieth et al. (2014) and Foss and Saebi (2017). The review by Schneider and Spieth (2013), including reviews of 35 research papers on BMI, identifies the "prerequisites", "process" and "effects" of BMI as the three leading themes in the BMI literature. They call for further research on 'the process and elements of business model innovation as well as its enablers and effects in anticipation and

response to increasing environmental volatility'. This study's findings contribute to defining BMI as a capability-led process.

Foss and Saebi's (2017) research focuses on BMI as a process of organisational change. This stream emphasises the capabilities, leadership and learning mechanisms that are needed for successful BMI. Moreover, BMI is often described as a dynamic process by: highlighting the different stages of the BMI process (e.g. de Reuver, Bouwman, & Haaker, 2013; Frankenberger, Weiblen, Csik, & Gassmann, 2013; Girotra & Netessine, 2013, 2014; Pynnonen, Hallikas, & Ritala, 2012); identifying the different organisational capabilities and processes required to support this change process (e.g. Achtenhagen et al., 2013; Demil & Lecocq, 2010; Doz & Kosonen, 2010; Dunford, Palmer, & Benviste, 2010); citing the importance of experimentation and learning (e.g. Andries & Debackere, 2013; Cavalcante, 2014; Eppler, Hoffmann, & Bresciani, 2011; Günzel & Holm, 2013; Moingeon & Lehmann-Ortega, 2010; Sosna, Trevinyo-Rodriguez & Velamuri, 2010); and proposing practitioner-oriented tools for managing the process (e.g. Deshler & Smith, 2011; Evans & Johnson, 2013).

Despite the number of articles written explicitly on BMI and the above brief description of what the research field suggests, BMI research does not present a well-defined cumulative research stream, with many articles being conceptual rather than theoretical or being fundamentally descriptive rather than explanatory. Moreover, the previous research has evolved in relatively isolated silos (with little cross-citation), and do not seem to build upon each other's findings.

For the sake of clarity, this study defines BMI as a dynamic process of organisational change and will contribute towards understanding the capabilities that contribute to BMI.

Sustainable Business Model Innovation

SBMI is a relatively new field that considers BMI from a sustainability standpoint. I argue that as SBMI is a form of BMI, it thus shares the criticisms towards BMI in general. SBMI is seen in a similar light to conventional BMI, namely as a process of business model exploration, adjustment, improvement, redesign, revision, creation, development, adoption, and transformation (Geissdoerfer et al., 2018). The process qualifies as a sustainable business model innovation or a business model innovation for sustainability when it aims at: 1) sustainable development or positive, respectively reduced, negative impacts on the environment, society, and the long-term prosperity of the organisation and its stakeholders or 2) adopting solutions or characteristics that foster sustainability in its value proposition, creation, and capture elements or its value-network, as advocated by Geissdoerfer et al. (2018). Indeed, while sharing the focus of traditional BMI on innovating the value creation, delivery, and capture mechanisms of

firms, SBMI goes beyond that, and incorporates a broader notion of value: from mainly economic to also include social and environmental value; and from a customer and shareholder focus to a multi-stakeholder perspective, including societal stakeholders (Bocken & Geradts, 2020; Bocken et al., 2013; Lüdeke-Freund et al., 2016; Massa et al., 2017; Sommer, 2012).

The changes that a firm must implement to transform their existing business model into a sustainable one can cover incremental adjustments to overhauling the entire business logic. Schaltegger et al. (2012) build upon the classification of Mitchell and Coles (2003), of business model innovation, which distinguishes between improvement, catch-up, replacement and actual innovation, and offer four stages for implementing a sustainable business model. The first stage is b*usiness model adjustment*, which denotes small changes in the minor business model elements, such as customer relationships, for instance. The second stage is one of *business model adoption*, which is characterised by mainly matching competitors' value propositions, with the end goal of not falling behind market standards and competitors. The third stage is *business model improvement and* is one in which substantial changes are carried out in major elements of the business model, such as the relationship approaches, business networks, and financial logic, without, however, impacting the value proposition. This leads us on to the fourth and last stage, which is *business model redesign*, wherein the value proposition and, thus, the underlying business logic are entirely reshaped. This can result in new products, services or product-service systems. This last phase is reflected in the work of academics (such as Linder & Cantrell, 2000; Sommer, 2012), but who argue that for a business model to be transformed, it needs to change the core logic of doing business.

The field of sustainable business model innovation is one characterised by scattered and contrasting definitions, as shown in Table 5, which creates numerous difficulties for firms attempting to implement sustainability. Several definitions focus on the process element of SBMI, such as Boons and Lüdeke (2013), who define SBMI as the adaptation of an existing BM to market sustainable innovations, whilst Roome and Louche (2016) define SBMI as the processes through which new business models are developed by businesses and their managers, and how companies revise and transform their business model in order to contribute to sustainable development.

This study defines and conceptualises SBMI as a dynamic, organisational change process requiring appropriate capabilities. It adopts a broader notion of value (from mainly economic to also include social and environmental value), and a multi-stakeholder perspective.

Source	Definition
Boons & Lüdeke-Freund, 2013	Sustainable business model innovation is understood as the adaption of the business model to overcome barriers within the company and its environment to market sustainable process, product, or service innovations. (p. 13)
Loorbach & Wijsman, 2013	Sustainable business model innovation describes businesses' "searching for ways to deal with unpredictable […] wider societal changes and sustainability issues." (p. 20)
Bocken et al., 2014	"Business model innovations for sustainability are defined as: Innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions." (p. 44)
Geissdoerfer et al., 2016	"Sustainable business innovation processes specifically aim at incorporating sustainable value and a pro-active management of a broad range of stakeholders into the business model." (p.1220)
Roome & Louche, 2016	Sustainable business model innovation describes the "processes through which […] new business models are developed by businesses and their managers […] how companies revise and transform their business model in order to contribute to sustainable development." (p. 12)
Schaltegger et al., 2016	Sustainable business model innovation describes the creation of "modified and completely new business models [that] can help develop integrative and competitive solutions by either radically reducing negative and/or creating positive external effects for the natural environment and society" (p. 3)
Yang et al., 2016	"Sustainable business model innovation can be more easily achieved by identifying the value uncaptured in current business models, and then turning this new understanding of the current business into value opportunities that can lead to new business models with higher sustainable value." (p. 2)

Table 5: Sustainable business model innovation definitions (Geissdoerfer et al., 2018)

SBMI as Organisational Capabilities

Organisational capabilities, or further elaborated as *dynamic capabilities,* are a phenomenon of strong relevance, as many academics have argued that developing organisational capabilities is strongly linked to their capacity to gain and strengthen their competitive advantage (Augier & Teece, 2008; Eisenhardt & Martin, 2000; Helfat & Peteraf, 2009; Teece, 2007; Teece & Pisano, 1994; Teece et al., 1997). The nature of such capabilities is at times difficult to define, with academics describing them as socially complex (Amit & Schoemaker, 1993; Collis, 1994; Schreyögg & Kliesch-Eberl, 2007), history-dependent (Amit & Schoemaker, 1993; Collis, 1994; Jacobides & Winter, 2005; Winter, 2000; Winter, 2003; Zollo & Winter, 2002) and based on tacit know-how (Collis, 1994; Leonard-Barton, 1992; Teece et al., 1997; Zollo & Winter, 2002). Categories of organisational capabilities can be observed in the literature. One of the first categorisations by Collis (1994) includes 'First category capabilities', which are 'those that reflect an ability to perform the basic functional activities of the firm'; 'Second category capabilities', which enable dynamic improvements to the firm's activities, such as continuous improvement activities; 'Third category capabilities', which mean 'to recognise the intrinsic value of other resources or to develop novel strategies before competitors'; and finally 'Meta capabilities', which relates to 'learning-to-learn' capabilities. Winter (2003), furthermore, distinguishes between 'Zero-level capabilities', which are operational or

ordinary capabilities. He defines these as those that permit the firm to earn a living in the present; 'First-order capabilities' are those that modify and change zero-level capabilities, as well as 'Higher order capabilities' or 'Dynamic capabilities', which are concerned with change. These are described as a 'learned and stable pattern of collective activity through which the organisation systematically generates and modifies its operating routines in pursuit of improved effectiveness' (Zollo & Winter, 2002).

According to Andersson (2013), organisational capabilities are often described as the processes through which firms utilise their resources (Penrose, 1959) in order to achieve a certain operational outcome (Amit & Schoemaker, 1993; Dutta, Narasimhan, & Rajiv, 2005; Grant, 1991; Helfat & Peteraf, 2003; Helfat & Winter, 2011; Winter, 2003), and to produce more efficiently than the competitors (Collis, 1994; Henderson & Cockburn, 1994). Therefore, any organisational capabilities, sometimes referred to as operational capabilities (e.g. Helfat & Peteraf, 2003) and lower-order capabilities (Collis, 1994; Winter, 2003), will always lead to a certain operation, within, for example, manufacturing, logistics or pricing, and result in a certain outcome (e.g. products, shipping or prices) (Collis, 1994; Helfat & Peteraf, 2003; Helfat & Winter, 2011; Teece, Pisano, & Shuen, 1997; Winter, 2003).

Nonetheless, the question still remains of how firms are able to develop these capabilities. Zollo and Winter (2002) propose a framework by demonstrating a *knowledge evolution cycle* and investigate the mechanisms through which organisations and firms can develop capabilities, which they define as 'routinised activities directed to the development and adaptation of operating routines'. They posit that *dynamic capabilities* are shaped by the coevolution of the three following learning mechanisms: *experience accumulation*, *knowledge articulation* and *knowledge codification*. They suggest that at any given time, firms adopt a mix of learning behaviours, composed of a semi-automatic accumulation of experience and deliberate investments in knowledge articulation and codification activities. They analyse these learning mechanisms depending on the frequency, homogeneity, and degree of causal ambiguity of the task at hand. They also point out the importance of how knowledge is *codified*, that is, when individuals codify their understandings of the performance implications of internal routines in written tools, and the surprising finding that solely codifying the knowledge into a tool may be more capability-building than the actual use of the tool itself.

Teece (2018) proposes an elegant connection between dynamic capabilities and business models. In this case, dynamic capabilities include the highest-order capabilities of sensing, seizing and transforming. These elements are needed to allow for the implementation and modification of the business model. The *Sense* capability describes the continuous process of monitoring customers' needs and aspirations and the identification of opportunities that could provide the organisation with a competitive

advantage. This is composed mostly of two elements: technological possibilities and technology development. The *Seize* capability reflects the actions taken to capitalise on identified opportunities by designing and refining the existing business model and committing resources to exploiting that opportunity. The two mechanisms behind this capability are anticipating competitor reactions and defending intellectual property. The last capability is to *Transform* aspects of the organisation and culture and apply the changes needed to obtain a new business model that capitalises on the identified opportunities in an efficient manner and, more importantly, allows for the identification of further opportunities. This dynamic capability of being able to continuously sense and seize opportunities and subsequently transform and reconfigure resources within the organisation is key to responding to (or creating) changes in the market. The building block of these capabilities is argued by Teece (2018) to be, on the one hand, organisational routines and processes and, on the other hand, non-routine managerial interventions.

It has been shown that the external environment and external stimuli play a decisive role in the development of organisational capabilities (Hannan & Freeman, 1977; Hannan & Freeman, 1984; Narduzzo, Rocco, & Warglien, 2000; Winter, 2000; Winter, 2003; Zollo & Winter, 2002). These capabilities consist of signals and influences originating from market conditions that are exogenous to the firm (see Nelson & Winter, 1982). These signals and influences may stem from competitors, customers, suppliers, governmental institutions, trendsetters, as well as cultural norms.

The external environment plays two distinguishable roles in the process of capability development (Zollo & Winter, 2002): first, it supplies diverse stimuli and substance for internal reflections on possible applications to the improvement of existing routines and thus capabilities, and second: it also functions as a selection mechanism in the classic evolutionary sense as it provides feedback on the value and viability of the organisation's current behaviours. Thus, the evolutionary theory of the firm stipulates that capabilities evolve continuously 'according to signals from the environment' (Nelson & Winter, 1982), and through the firm's 'search routines' for detecting external changes (Zollo & Winter, 2002).

The author would like to point out that similar studies (such as Mezger (2014)) have used Teece's (2018) "SST framework" to study the phenomenon. This framework combines the dynamic capabilities of sensing, seizing and transforming with business models. Indeed, Mezger (2014) provides a capability-based conceptualisation of the BMI process. Their findings demonstrate that BMI can be conceptualised as a distinct dynamic capability, and that this capability can be disaggregated into a firm's capacity to sense business model opportunities, seize them through the development of valuable and unique business models, and reconfigure the firms' competences and resources

accordingly. Their paper outlines how distinct organisational routines and processes undergird these capacities.

To answer the question of how firms engage in SBMI, this study will combine a number of concepts previously discussed and adopt the definition of a capability as a sequence of repetitive actions and routines that generate a stable output. This study defines and conceptualises SBMI as a dynamic, organisational change process requiring appropriate capabilities. It adopts a broader notion of value (from mainly economic to also include social and environmental value), and a multi-stakeholder perspective.

2.2 Preliminary Theoretical Framework

This study will consider a number of concepts previously discussed. As the logic of this study is mostly explorative, the choice of concepts and factors is quite exhaustive and often interlinked. Nonetheless, one general theoretical framework will guide the study, namely a capability-based conceptualisation of business model innovation (Mezger, 2014), as shown in figure 5. This capability-based perspective consolidates and integrates previously disparate discussions on BMI. It characterises BMI as an explorative and learning-oriented process (e.g. McGrath, 2010; Sosna et al., 2010), identifies sources of new ideas (Kim & Mauborgne, 1999), delineates component-based configuration aspects (Osterwalder & Pigneur, 2010) and suggests approaches to designing new business models (Johnson et al., 2008; Casadesus-Masanell & Ricart, 2010).

SBMI Second-order Dynamic Capabilities	**Sensing**	**Seizing**	**Transforming**
SBMI First-order Dynamic Capabilities	Technology sensing Business model sensing	Holistic focus (Re)combination of knowledge	Core competences and resources Integration of partners
SBMI Operational Capabilities	Recalibration of value chain Change of processes External collaboration Review of choice and use of materials Reputational changes Change in values Shift in innovation Differentiation in offering		

Figure 5: Preliminary Theoretical Framework

The theoretical framework used in this study, inspired by Teece (2018) and Mezger (2014), will combine several concepts previously discussed while integrating a dynamic capabilities perspective within the business model framework. These will be presented briefly as they have been already discussed in the theory section. As the logic of the theoretical framework is mostly explorative, the choice of concepts and factors is quite exhaustive and often interlinked.

The preliminary theoretical framework has its roots in dynamic capabilities; in this case, the highest-order capabilities of sensing, seizing and transforming (Teece, 2018). These elements are needed to facilitate innovation of the business model. The Sense capability describes the continuous process of monitoring customers' needs and aspirations. The Seize capability reflects the actions taken to capitalise on identified opportunities by designing and refining the existing business model and committing resources to exploiting that opportunity. The last capability is to Transform aspects of the organisation and culture and apply the changes needed to obtain a new business model that capitalises on the identified opportunities in an efficient manner, and more importantly, allows for the identification of further opportunities.

In terms of definitions, this study assumes a dynamic view of BMI and conceptualises it as an organisational change process requiring appropriate capabilities. It defines SBMI as a dynamic, organisational change process requiring appropriate capabilities, which adopts a broader notion of value (from mainly economic to also include social and environmental value), and a multi-stakeholder perspective.

3 Research Methodology

In this chapter, I will discuss the research methodology adopted in this study, focusing on the object of study, the research strategy, the case study design, the selection of industry, selection of case companies, data collection and data analysis.

The study will take the form of a multiple case-study, primarily drawing on Yin's (2009) understanding of the case method, by analysing the SBMI process in two case companies, both of comparable size and based in Sweden: Alpha and Beta. Both firms are professional service firms and offer architectural services as a main focus and source of income. These two firms were considered of particular interest as they present similar characteristics, being of similar size and facing the same market conditions and challenges, but they have significantly different sustainability profiles.

This chapter provides a discussion of the methodological concerns within this study. The object of the study will be defined, a research strategy will be unveiled, and the case study design will be explained. Furthermore, the choice of industry will be justified, and methodological questions regarding data collection, triangulation and data analysis will be addressed. The empirical data gathered originated from two sources to allow for data triangulation: in-depth interviews and official documentation, and data analysis is presented, using the pattern-matching logic (Yin, 2009).

3.1 Object of the study

The object of study is the SBMI at specialised architecture firms of larger size (over 300 employees). This denotes a knowledge-intensive, and professional service firm whose largest revenue streams and core business lie within architecture and selling architectural services (including urban design, landscape architecture and, to a lesser extent, interior design) (Winch & Schneider, 1993). In this study, the empirical research focuses on two firms which match that description: Alpha and Beta. Empirical material from other relevant actors within the construction industry will also be considered, such as the construction firm, city planners, among others, but always through the perspective of the individual architecture firm.

3.2 A Research Strategy

The theory section described previously established the preliminary direction of the research process. A *Holistic Multiple Case Study* (Yin, 2009) will be the method used in this study, which will be conducted on two architecture firms that have started a BMI process of implementing sustainability into their business model. The different types of case studies are visualised in Figure 6.

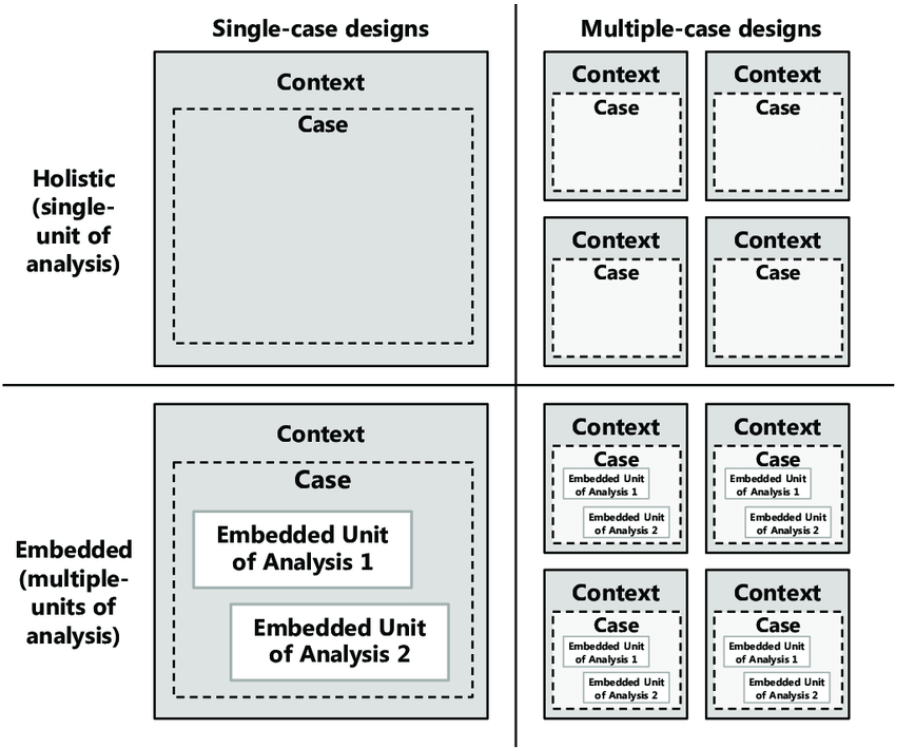

Figure 6: Basic Types of Designs for Case Studies (Yin, 2009)

The empirical material has been collected from the firms and relevant stakeholders within Alpha and Beta, over a period of a year, starting from September 2015 to September 2016.

3.3 The Case Study Design

Due to the nature of this study, the methodological design chosen is that of the *Case Study*. This specific research methodology was chosen to allow for a robust contextual understanding of the empirical phenomenon and an in-depth processual analysis (Larsson, 1993). A case, according to Miles and Huberman (1994), can be loosely defined as a 'phenomenon of some sort occurring in a bounded context'. Stake (1988) offers a slightly more specific definition of a case study as 'a study of a bounded system, emphasising the unity and wholeness of that system, but confining the attention to those aspects that are relevant to the research problem at the time'. It has been demonstrated that case studies are particularly useful in identifying the factors that explain a defined phenomenon (Eisenhardt & Graebner, 2007; Yin, 2009).

Due to the explorative nature of this study, that is, to understand how firms can practically manage BMI, and considering the fact that there is little control over actual events and the focus is largely on contemporary phenomena, a case study approach has been adopted (Yin, 2009). Furthermore, as the study will concentrate on how the case companies engage in BMI, an in-depth and extensive description is needed, which can be provided by and strengthens the research method choice of the case study.

The research design has been designed with the goal of shedding light on the empirical phenomena and proposing a theoretical understanding and model of how firms innovate their business models.

Other research methods, such as quantitative questionnaires or surveys, have not been used in this study. This is due to the nature of the architecture industry in Sweden, which is dominated by small, specialised and niched architecture practices, with only a handful of larger firms. Because larger architecture firms are more likely to document and formulate strategy, the sample was of a limited size; thus, a quantitative survey would not have been appropriate.

3.3.1 Ceteris Paribus Assumption

In facilitate a more in-depth explorative study of BMI, a *ceteris paribus* logic is applied. As there is little research in the existing literature on this empirical field, it has not been possible to identify which empirical settings and circumstances would be relevant. Therefore, to minimise contrasting factors that might impact the empirical phenomena, it is up to the researcher to explore BMI by selecting firms within the same political, economic, social and technological environment ("PEST"), that is, within Sweden, and to attempt to compare the two distinct case companies to grasp similarities

and differences in the choices and actions of the relevant actors in such a *quasi ceteris paribus setting*.

It is widely agreed that a perfect ceteris paribus environment is not possible when studying corporate organisations due to the complexity of the organisational structure, organisations of activities and processes, social complexity, path dependency, to name a few aspects (Gerring, 2006). Therefore, for that reason, this research design attempted to minimise the external circumstances as much as possible between the two case companies. By selecting two different firms that face various similar conditions in their marketplace and the environment in which they operate, such as industry, country, temporal and PEST conditions, a satisfactory balance between the common and the unique aspects is achieved in light of the empirical phenomena. It is within this context that the theoretical framework will best be applied, and the empirical dynamics at work will come to light.

3.3.2 Methodological Stages

To achieve the goals outlined in this study, four main stages were undertaken regarding the methodological design: the *design of the theoretical research design*, the *collection of empirical data*, the *analysis of the empirical material* and the subsequent *revision of the theoretical framework*, in light of the new findings.

The first stage was that of the *theoretical research design*. The direction was devised in a mostly inductive manner, drawing from the field of business models and BMI. The second stage comprised the *collection of empirical data*, which consisted of semi-structured interviews with relevant persons. These interviews were conducted in a semi-explorative manner, with the interview guide containing a number of defined themes, but with open-ended questions. This allowed for discussions revolving around concepts that were not directly referred to in the framework, but were considered by the interviewees to be of importance. Third, the *analysis of the empirical material* was completed, using both the theoretical direction as a guide and then applying a pattern-matching logic (Yin, 2009). Last, the fourth stage was that of the *proposal of the theoretical framework*, during which preliminary empirical findings and relationships were incorporated into the theoretical framework. Thus, a combination of both a deductive and inductive approach was used in this study.

3.3.3 Strengths of case studies

Once a researcher decides to pursue a certain research method, such as the case study, the strengths and weaknesses of such a method need to be identified and taken into

account throughout the research project. By becoming aware of the limitations of the research method chosen and subsequently developing a deliberate strategy to counteract these limitations, the research can lead to a more complete and thorough study, thus yielding more useful theoretical conclusions (Gummesson, 2000).

The case study was chosen largely due to its advantages as a research method. It is widely agreed that case studies present three main strengths: the likelihood of generating novel theory, the emergent theory is likely to be testable, and the resultant theory is likely to be empirically valid (Eisenhardt, 1989b).

The question of how to achieve a different, interesting and novel theoretical insight is central to theory-building. One instance where creative insight can be observed is in the case of paradoxical, contradictory or simply unusual empirical observations (Quinn & Cameron, 1988; Bartunek, 1988). It is through resolving these differences that the investigator questions the established theories and the status quo, effectively building a new theory. The choice of the case study method was motivated in part by its higher potential to generate theory with less researcher bias compared to theory built from 'incremental studies or armchair, axiomatic deduction' (Eisenhardt, 1989b). This is enabled through the constant reconciliation of conflicting realities derived from different types of empirical data across cases, investigators and literature. The kind of in-depth study obtained through such studies allows for the development of new concepts to link and reconcile the empirical data, an advantage that the case study method shares with only a few other research methods (Punch, 1998). As explained in the theory section, there has been limited research within the field of BMI, and therefore, there is a strong lack of theory and theoretical analysis of that phenomenon. For that reason, conducting research in this field will inevitably lead to novel theory, thus making the case study well suited for this endeavour.

The second strength is relating to the testability of the theoretical constructs and hypotheses within the case study (Eisenhardt, 1989b). Since the constructs will have already been measured during the theory-building phase, and due to this, the resulting hypotheses will probably also be verifiable. Thus, by applying a case study research design, the different business model components identified in the literature as being relevant for this study, as well as the subsequent hypotheses, can be tested empirically when analysing the collected data. This is an advantage of case studies, in contrast with other types of theories that do not rely in large part on direct evidence.

Another strength is that the emergent theory will most likely be empirically valid: the process of theory-building will be developed whilst collecting data points and evidence, and all new data will, in turn, impact the resultant theory. This leads to a final theoretical outlook that can be argued to closely mirror reality more than many other forms of theory (Eisenhardt, 1989b).

Moreover, case studies prove themselves to make valuable contributions in three main aspects (Punch, 1998): as the case being studied is quite unusual, unique or not yet understood, conducting a case study allows for an in-depth understanding and enhances knowledge surrounding the case. Second, only such an in-depth case study can shed light upon the truly important aspects of a new or persistently problematic area of research, particularly in situations involving complex social behaviour, such as the empirical object of study (Styhre & Gluch, 2009; Winch & Scheider, 1993). In such situations, quantitative research methods, which promote mapping and measurements, would not allow for a deeper and fuller understanding of the phenomena and processes involved. Thus, a case study would enable an identification, understanding and conceptualisation of the important features.

3.3.4 Limitations and concerns with the use of case studies

Nevertheless, case studies are not without disadvantages, which can be seen to stem from the same causes as the advantages mentioned before. One risk is that theory resulting from case studies relies too heavily on a vast amount of empirical data, and it may be tempting to generate a theoretical framework that attempts to cover all relationships. However, in doing so, the theory risks becoming too bulky and too rich in detail, thus sacrificing the simplicity and parsimony characteristic of good theory (Eisenhardt, 1989b). This can lead to difficulty in emphasising the most important relationships within the data, as well as resulting in a theory that is too specific and may only apply to the case in question. This challenge will be addressed by limiting the amount of empirical data, as well as the level of analysis, and analysing the detailed data just enough to generate parsimonious theory.

In order to minimise these limitations, this study will incorporate a *multiple case design* (Yin, 2009) and consider empirical data from multiple sources. It is generally accepted that empirical evidence and theoretical implications arising from multiple case studies are often considered more convincing and less prone to criticism (Herriott & Firestone, 1983), as well as allowing for more generic emerging theory (Miles & Huberman, 1994). Multiple case designs can have two types of logic: that every case predicts similar results (*literal replication)* or that it predicts contrasting results but for anticipatable reasons (*theoretical replication)* (Yin, 2009). In this case, the multiple cases of the two architecture firms: Alpha and Beta, due to their observed difference in results, are expected to yield *theoretical replication*. Specifically, in this case,

As a summary, the following two methodological steps have been taken:

1) A theoretical review is proposed to explain the factors impacting the firms' innovation of their business model. This review is the result of studying relevant literature relating to the empirical fields of business models and business model innovation.
2) Empirical material has been gathered from the multiple case studies in question, that is, Alpha and Beta. This material will shed light upon the capabilities determining the firms' SBMI and attempt to build upon previous research.

The empirical material has been analysed using the theoretical framework as well as pattern-matching, as advocated by Yin (2009). Based on the results of the empirical research, the theoretical framework has been modified to accommodate the new findings.

3.4 Selection of Industry: Architecture

The construction industry, which comprises architecture, is one of the world's most important in terms of sheer size as well as economic and environmental impact. The selection of industry was motivated by three main reasons: the critical importance of the construction and architecture industry, the decisive role played by architects within the construction industry, and the architecture sector's role in promoting sustainability.

3.4.1 Critical importance

The construction industry, of includes the architecture field, is one that has significant environmental, social and economic impacts on society. This is primarily due to its key outputs, namely buildings. The positive aspects of the construction industry include the provision of buildings and facilities to meet the living, working and other needs of human beings, as well as the creation of employment opportunities both directly within the construction field and indirectly through related industries. To highlight the importance of the construction industry, it contributed 388 billion SEK or 10% of the total Swedish Gross Domestic Product (GDP) as well as provided 311,000 jobs, that is, 6.6% of all jobs in Sweden in 2014 (Sveriges Byggindustrier, 2015).

However, the negative impacts and large amounts of resources consumed by the built environment and construction activities are well known, from the actual construction of the building to the finished product and its continued impact. Building blocks account for 40% of total energy consumption globally and produce carbon emissions

that will reach 42.4 tonnes in 2035, an increase of 43% from the level of 2007 (Zuo & Zhao, 2014). Moreover, not only does the construction phase consume a lot of resources, but the completed buildings, as well as the eventual renovation, refurbishment and disposal of the building, also contribute to these aspects. In total, this translates to a rate of approximately 40% of global material deployment as well as 25% of global waste annually (Mokhlesian & Holmén, 2012; Zuo & Zhao, 2014). Therefore, this industry is both of critical importance economically and environmentally in pursuing sustainable development.

3.4.2 Decisive Role of the Architect

Another reason why the architecture profession was chosen is that architects and architecture firms have a major influence over the design of the built environment (Revell & Blackburn, 2007). Despite the fact that the architects' role in the management of construction projects has decreased considerably in recent times, they are still able to greatly influence the outcome of such projects. They have the responsibility of submitting the first design and specifications of a planned building project, as well as evaluating and applying any changes to the overall design and administering the building contract and generally supervising the construction process (Whitham, 2014). The architect also greatly influences the building project by being the main interface with the client, thus acting as the intermediary between the client and the other stakeholders involved.

3.4.3 Sustainability within Architecture

Architects and the firms they represent are considered to be the strongest drivers of sustainability within the field of construction (Revell & Blackburn, 2007). They have an abnormally high level of influence on the final product due to client demand and through having a decisive role in the planning and designing of construction projects. Furthermore, there is widespread agreement that to pursue sustainability in construction in any meaningful manner, the sustainability features need to be incorporated early in the design phase, during which time architects have a strong influence in determining the development of the project (Williams & Dair, 2007). Moreover, as the client's requirements for sustainability are often quite vague, there is often a difficulty in translating these requirements into actual solutions, a task that often falls upon the architect (Mokhlesian & Holmén, 2012).

Problems and questions may also arise in the process of incorporating sustainability within architectural firms and their business models, particularly regarding the actual definition of sustainability in architecture (Chong et al., 2009). It is commonly

observed that the understanding of sustainability can vary among architecture firms due to different business concerns, priorities, and even within architecture firms themselves, as well as among clients and within the industry in general. For example, recently graduated architects tend to have a much stronger understanding and willingness to include sustainability into their work, often considering it a core value (Ahn & Pearce, 2007). Conversely, architects with much longer experience may see sustainability as a passing fad, consider it as a structure that lasts, or as a threat to the artistic and creative pursuits within architecture (Spector, 2006). Consequently, each firm may openly work on and develop their sustainable offerings, although these efforts may be contradictory in certain aspects.

Demand for sustainability may originate either from the customer themselves or from society at large. Taking this further, academics such as Bourdeau (1999), Williams and Dair (2007), Ahn and Pearce (2007) raise the question of what motivates clients to buy sustainable designs and whether those motivations align with the architectural firms. Furthermore, the nature of the clients in sustainable construction has a large impact, whether they are mainly large companies with a high willingness-to-pay and a demand for sustainability due to their profiling as an environmentally-conscious entity, for example, or primarily the public sector, which prioritises sustainability as a core value but operates with much lower budgets (Revell & Blackburn, 2007).

Going even further, the literature states that a firm which attempts to provide an offering that satisfies the client's demand for a sustainable product will need to design and package the offering differently or develop new pricing strategies for such a product (Kibert et al., 2000; Zhou & Lowe, 2003). This is particularly interesting considering that the architectural industry is one of the few that presents no low-cost approach whatsoever; thus, competition seems to rely solely on differentiation (Li & Ling, 2012). Architecture firms try to differentiate their offerings in terms of sustainability to observe potential first-mover benefits, but pre-studies suggest that sustainability has already become a widespread value among Swedish architect firms, and their offerings are impressively non-diversified (Larsson & Wiklander, 2013). Sustainability is often considered to entail extra costs, but often, this is not the case (Kats, 2003b). Many sustainable innovations within architecture have been shown to reduce costs in the operation of the buildings in the long-term (Ahn & Pearce, 2007; Bartlett & Howard, 2000). Thus, the willingness and capacity to pay for sustainability, both on behalf of the clients and architecture firm, have a significant impact (Sayce et al., 2007).

As I briefly touched upon earlier, it has been argued that sustainability itself is leading to a new form of demand, attracting new customers who differentiate themselves from "traditional" customers. Indeed, architects can either design buildings for the property developers, as has traditionally been the case, or for the final consumer. Often, different

approaches are necessary, depending on which client the architect is interacting with, and there may be a need to educate them on architectural or sustainability matters (Ofori & Kien, 2004). Certain studies demonstrate that there is limited cooperation regarding sustainability between different parties in the building process, or even with academia and environmental organisations (Gluch et al., 2006). However, others reveal that access to critical value-added sustainability information is often obtained from partners, leading to a form of value co-creation (Chong et al., 2009). A noteworthy observation in the field is that this demand for sustainable buildings seems to be much smaller than predicted (Zhou & Lowe, 2003).

The literature states that internal firm conditions impact the performance of architecture firms and their implementation of sustainability. Firms intuitively are at different stages of implementing sustainability within their organisation and offerings. Identifying the relevant events and processes can lead to a much deeper understanding of how sustainability is impacting the sector and which challenges and opportunities it may bring. Thus, firms need to determine whether sustainability projects need to be structured in a substantially different manner, in terms of, for example, work distribution, coordination and collaboration. Whether the company culture promotes sustainable solutions, or the opposite, whether the more conservative values dominate and thus act as an impediment to sustainability. Analysing the actual resources allocated to achieving sustainability and sustainable solutions can shed light on the dynamics at play, whether the firm has committed tangible, intangible, human or financial assets to improving their sustainability offerings and how the firm's competence base changes in response. Particular focus will be drawn to the key architectural processes and activities involved in working with sustainable constructions (Ngowi 1998, Rwelamila et al., 2000).

Questions revolving around whether innovations are needed to enable environmentally sustainable technology, how they should be developed, and by which actors, and who will bear the cost of developing these novel technologies are of interest (Nelms et al., 2007). The firm's decision on whether to safeguard the results of research and development for themselves or share them with their competitors and partners within the industry is of particular interest.

Moreover, standards such as green building standards and certification systems have been identified as playing an important role in sustainability and architecture (Zuo & Zhao, 2014; Casal, 2006). Certification systems include the *Leadership in Energy and Environmental Design (LEED),* the *Building Research Establishment Environmental Assessment Methodology (BREEAM)* or *Miljöbyggnad*, amongst others. Issues relate to the choice of standards to be adopted in projects and whether architects should prioritise to obtain and generate knowledge, and further specialise in one standard, or maintain

a minimum competence base in a multitude of standards (Nelms et al., 2007; Retzlaff, 2009). Whether certain standards are more beneficial to the company, or present specific risks and challenges, is worth exploring. It is not difficult to imagine that conflicts of interest can occur between the architect and the client in terms of which standard to apply. There also does not seem to be any dominant green building standard in the market today; thus, the market dynamics can be likened to a standard race (Blind, 2004), the implications of which can be of relevance to the study. Therefore, determining the impact of standards on sustainability in the architectural industry and whether they have changed the dynamics by reshaping the business and market conditions would be insightful.

But perhaps, one could argue that sustainability is not only driven by norms and values but also by market and societal factors. Therefore, one cannot ignore the contextual dimensions if striving for a deeper understanding of the factors behind sustainability in the architectural field. Investigating the impact of the political and societal environment on sustainable construction, whether regulations, for example, facilitate or impede upon this, and even the influence of stakeholders on the sustainability efforts of firms, is essential (Bon & Hutchinson, 2000; Kibert et al., 2000; Ofori & Kien, 2004; van Bueren & Priemus, 2002).

The architecture industry is particularly interesting as it combines various areas of expertise, such as engineering, art, finance and perhaps even fashion (Styhre & Gluch, 2009). Each of these specialisations and knowledge-traditions often influences the manner in which experts conduct their business. And precisely because architecture is the product of different know-how, the dynamics at play in such projects would be fascinating to analyse. This is especially so, given the advent and increasing penetration of sustainability, which one may understand as a cluster of norms, into the everyday business of architects. As touched upon earlier, sustainability first entered the profession of architecture through technologies emanating from the engineering world. One can imagine that this may lead to an unproblematic and swift adoption of sustainability within the domain of architectural engineering. However, conflicts may arise when sustainability is applied to the tasks of art, finance or fashion experts working within architecture, who may feel that their entire philosophy of work and vision is threatened. It would be worth studying whether these conflictual dynamics are at play and whether they play a role in achieving sustainability. The architecture firm is also considered to be a strong example of a *professional services firm* (PSF), a type of firm that is characterised by three main aspects: *knowledge-intensity, low-capital intensity* and *professionalised workforce* (Von Nordenflycht, 2010).

In short, an empirical justification and interest of this study is that there are clear changes taking place within the field of architecture, and sustainability seems to be

playing a large part in these changes. The fact that architecture firms are already changing their offerings in a substantial way is a prime example of this change. These changes and developments have predominantly remained shrouded in mystery from an academic perspective; thus, the architecture industry will be fascinating and insightful to study. The dynamics in the marketplace seem to have shifted, with new actors entering the market and new forms of knowledge bases and competencies emerging to meet new demands and expectations, thus leading to a shift in power between actors (Styhre & Gluch, 2009). Even the traditional business functions of architecture firms are being questioned, with many firms expected to provide financial solutions to their clients (Sveriges Arkitekter, 2017). It is fascinating amongst these developments that architectural firms are responding differently to these changes in their business environment, and wealth redistribution is occurring from one competitor to another. Thus, there is a profound need for a clearer understanding of these phenomena and an analysis of the questions, challenges and opportunities that architectural firms will and are experiencing. This understanding is essential to be able to identify, specifically, the strategic factors that may lead to stronger performance, future success and sustainability in the architecture market of tomorrow.

3.4.4 Application for other firms and industries

As the architecture industry is one characterised by *professional service firms* (PSFs), conducting an in-depth study of the industry could potentially provide valuable insights into the dynamics experienced in other PSFs and industries composed of PSFs. PSFs can be defined further as a form of Knowledge-Intensive Firm or Knowledge-Based Organisation (KBO), which can loosely be defined as organisations that have only the expertise of their staff as assets with which to trade. They deploy their assets in a distinctive way to sell a *capacity to produce*, rather than a product, and their offering is characterised by *standardised intangibility* (Winch & Schneider, 1993). This last concept is central to the KBO and refers to a profession whose 'product' is sufficiently *tangible* to prevent it from being openly traded as a commodity, yet sufficiently *standardised* to allow it to be differentiated from services provided by other firms, and thus traded widely (Larson, 1977).

Furthermore, the architecture industry is also characterised by its *creative* competence, and its ability to provide creative solutions to its clients' problems. Thus, this study may also shed light on comparable phenomena taking place in similar industries, such as those that are both *knowledge-based* and *creative*, for instance, the advertising, management consulting, or media production industries. Nonetheless, it may also have relevance for KBOs at large (Mintzberg, 1979; Mintzberg et al., 1988; Winch & Schneider, 1993).

3.5 Selection of case companies

The case companies were first and foremost selected following a *ceteris paribus* logic, that is, aiming to identify two case companies that share the most characteristics possible. This approach was chosen to better highlight the similarities and differences between both firms' BMI and to enable a study of the empirical phenomenon which would be more in isolation. Alpha and Beta are both companies operating within the same country and under the same PEST conditions. Furthermore, both companies are the largest specialised architecture firms in Sweden. Size was an important factor in selecting the case companies as the architectural industry is dominated by smaller sized firms, which are less likely to have a thoroughly developed and formulated business model and strategy. Both Alpha and Beta work openly with strategy and admit to experiencing strategic issues.

The second reason why the companies were selected was due to the positive access permitted by both these companies. This included permission for office visits to their headquarters, conducting in-depth interviews with their employees and relevant stakeholders, as well as access to relevant documentation relating to sustainability management and business models.

Both case companies were also selected due to the identification of BMI, internal changes and initiatives, as well as an open commitment to sustainability issues. This was an important factor as, intuitively, the analysis would be less fruitful if analysing two organisations that have not implemented or do not plan to implement BMI in any form. More interestingly, differences came to light between the two firms. First, the two firms were implementing BMI in different manners and to varying degrees, which sparked the author's curiosity and the case companies' potential for shedding light on the reasons behind the differing levels of BMI. Second, the managerial culture between the firms differed greatly: Alpha was managed by architects, whereas Beta was managed by non-architects. Third, the ownership structure differed, with Alpha being partner-owned, whereas the other was externally owned by private equity.

Thus, the main reasons for the selection of the case companies can be summed up as:

1) Similar-sized Professional Service Firms, operating in the same country and under similar PEST conditions, with same specialisation.
2) Good accessibility for office visits, in-depth interviews and official documentation.
3) Clear engagement in BMI and sustainability, but with observably different levels of implementation (an *offensive* vs a *defensive* approach to sustainability).

The companies also present certain structural differences, such as Beta being of smaller size, and Alpha having a slight international business focus (outside of Nordics and less than 5% of total revenues), whilst Beta has consciously decided to focus only on the Nordics. Nevertheless, a perfect ceteris paribus environment can never be achieved in practice, and it is believed that a cross-case comparison of these two case companies will be academically fruitful.

The cases and the research design were also chosen with the expectation that they would predict contrasting results but for anticipatable reasons (*theoretical replication)* (Yin, 2009). It is difficult to pinpoint, before dwelling into the empirical material, which factors would cause these contrasting results. However, based on preliminary research, it is believed that differences in the firms' business models and strategies would account for the contrasting results.

The author considered the option of studying individual architectural projects and focusing on how BMI is implemented in those specific projects. However, due to lack of access, this was not a possibility. Other smaller firms were also considered as potential cases, but certain risks came to light after explorative interviews. For example, it was found that the elements of their business models and strategies were not sufficiently developed or formulated internally for in-depth study, and that the amount of empirical material that could be collected from these small architectural practices would be much less compared to larger firms.

3.6 Data Collection

An advantage of case studies, as opposed to other quantitative and qualitative research methods, is the wide scope of empirical data collection (Yin, 2009). To allow an in-depth and through an understanding of the factors and dynamics at work within this case study, qualitative data collection methods have been combined, in the form of interviews and documentation. These two different data collection methods were used with the aim of increasing the chance of stronger substantiation of constructs and hypotheses through the *triangulation* of the data.

Data triangulation has been a priority in this study and has been used to develop measures of concepts, whereby greater confidence in findings was obtained by employing more than one method of data collection (Webb et al., 1966). Bryman and Bell (2003) describe the approach of triangulation as an attempt to 'cancel out the limitations of one method by the use of another in order to cross-check the findings'. In practice, this translated to the on-site interviews conducted with employees within the organisation being cross-checked with relevant documentation to verify that the

findings are substantiated. Furthermore, triangulation not only allowed for cross-checking of data but also allowed access to 'different levels of reality', for example, providing data on general attitudes, on the one hand, and the individuals' personal interpretations, on the other hand (Bryman & Bell, 2003).

3.6.1 The Interview Process

Interviews will be one method of data collection used in the project, considered an important method within the case study design (Yin, 2009). The interviews have been guided conversations rather than strictly structured enquiries, leading the researcher to simultaneously follow their own line of inquiry guided by the theoretical research design and to ask questions constituting the interview in a conversational and unbiased manner. Yin (2009) describes this as operating on two levels: 'satisfying the needs of your line of inquiry while simultaneously putting forth "friendly" and "nonthreatening" questions in your open-ended interviews'.

Two main types of interviews have been carried out in this study: the *in-depth interview* and the *focused interview* (Yin, 2009). The type of interview conducted was very much dependent on factors such as the interviewee's openness, interest in the study, trust in the interviewer, amongst others. In those interviews that could be described as *in-depth interviews* or *semi-structured interviews* (Bryman & Bell, 2003), there was a more extended discussion with the interviewee where the goal was not only to inquire about the facts but also about their personal opinions and experiences regarding certain events, thus departing from the strict set of questions. This type of interview took different directions, depending on the answers provided by the interviewee. These interviews sometimes occurred over several sessions as a closer relationship developed between the researcher and the interviewee. One aim of conducting in-depth interviews was to motivate the interviewee to assume the role of an 'informant' (Yin, 2009). Such informants can differentiate themselves from other interviewees insofar as they can provide deeper insights into matters (describing the situation in which an event took place, the dynamics at work, any conflicts, etc., rather than stating the firm's common policy guideline, for example). Moreover, such persons at times allowed access to corroboratory or contrary sources of evidence. However, to prevent the interviewer from becoming overly dependent on the informant or developing too close of a personal relationship that might cloud their judgement, evidence has been obtained from other sources.

Other interviews took the form of the *focused interviews,* which were typically much shorter (Yin, 2009). In contrast to *in-depth interviews,* the *focused interview* was more likely to follow the interview guide more strictly, derived from the theoretical research

design, but nonetheless preserved the open-ended and conversational nature of the interview. The specific questions were carefully formulated to prevent suggesting to the interviewee that knowledge about the topic had already obtained and to maximise the chances of obtaining fresh commentary on the matter, which provides the most effective corroboration. Even so, attention was placed on interviewees echoing the same answer (perhaps due to company guidelines, values, policies or instructions from higher management) and in the case of interviewees known to hold different opinions.

Thus, within this case study, a mixture of both *in-depth* and *focused interviews* has been used depending on which was better suited for the specific situation.

Nonetheless, the use of interviews as a methodological tool of data collection is increasingly being questioned because of issues of the social complexity of the format, such as social norms, scripts for talking, value-laden language, expectations of both the interviewee and interviewer, as well as political interests. With this critique in mind, the interviews were conducted not as a medium for the communication of 'truths' or 'genuine experiences', but more in a *Romanticist approach* (Alvesson, 2003), that is, emphasising the 'human encounter, encouraging interviewees to reveal their authentic experiences by establishing rapport, trust and commitment between the interviewer and interviewee' (Qu & Dumay, 2011). To reference Kvale's (1996) *miner* or *traveller* metaphor (that of either a miner probing for *nuggets of essential meaning* or of a traveller collecting a story to be told upon returning home), the interviews in this study were conducted with a *traveller* approach in mind, which is considered more relevant for social scientific studies. With this in mind, triangulation was used to cross-check whether these *stories* were embedded in reality and fact-checked.

Interviews Conducted

The data were collected on a continuous basis over a period of a year, in the form of one to two-hour semi-structured interviews. These interviews were conducted either in-person at the case company office or another location, or over the phone (totalling 24 in-person interviews and 21 phone interviews). All interviews have been recorded and transcribed. The majority of the interviews were conducted with current employees of either case company; however, a number of relevant persons who had been previously employed were also interviewed. Furthermore, to gain an understanding of the market conditions, the nature of demand and of the clients, several other individuals within other relevant organisations have been interviewed, such as other architecture firms, clients of architecture firms, including both corporate and municipal organisations, contractors, trade organisations and academic institutions. The on-site interviews were conducted mostly in Stockholm at the case companies' offices, as well as at other institutions.

Respondents were also selected from both within and outside the case companies. As considerable access was granted to me by both firms, I had the benefit of being able to be more selective in choosing the interviewees. Thus, three main types of respondents were identified and interviewed from within the case companies: individuals who are actively working with sustainability as their main or one of their main job responsibilities, individuals in managerial positions who make managerial decisions regarding sustainability and its implementation, and finally, other employees who conduct architectural work but who are neither sustainability-focused nor in managerial positions. This logic was designed to enable multiple perspectives on the empirical phenomenon, from both persons working directly with sustainability and those who do not, higher management as well as employees with more operational tasks. For example, the third type of respondent was selected to ascertain the level of sustainability that is actually applied in practice in the firm's everyday business. In every case, the respondents were interviewed separately, allowing for a cross-comparison of their answers. Moreover, a level of more informal data collection also occurred over coffee and lunch breaks, which were not recorded and not transcribed but still contributed to the understanding of the strategic concerns and sustainability concerns of the case companies.

Outside of the case companies, respondents were selected based on their interactions and discussions with architectural firms regarding sustainability issues, serving as either clients, consultants, contractors, partners or researchers. Additionally, experts who were knowledgeable about the developments in the Swedish architecture industry, who may not have directly interacted with the case companies, were also selected for interviews. Lastly, individuals in smaller architecture firms in Sweden were selected for interviews to provide a more holistic understanding of the phenomenon and its impact on the field of architecture. A list of the interviews conducted is presented in Table 5.

	Position	Company	Type of Company	Date of Interview
1				04-Apr-16
2	Former CEO	Alpha	Case Company	29-Apr-16
3	Partner and Sustainability Director	Alpha	Case Company	16-Mar-16
4	Vice CEO	Alpha	Case Company	27-Apr-16
5				29-Apr-16
6	Sustainability Expert	Alpha	Case Company	24-May-16
7	Economic Sustainability Expert	Alpha	Case Company	16-May-16
8	Engineer and Sustainability Expert	Alpha	Case Company	19-Apr-16
9	Sustainability Expert	Alpha	Case Company	20-Apr-16
10	Former CEO, Chairman of the Board	Alpha	Case Company	04-May-16
11	Senior lecturer	Alpha (also affialated with a Swedish university)	Case Company	14-Mar-16
12	Sustainability Expert	Alpha	Case Company	07-Apr-16
13	Landscape Architect	Alpha	Case Company	03-Jun-16
14	Digital Design & BIM Expert	Alpha	Case Company	02-Jun-16
15	Manager	Alpha	Case Company	07-Apr-16
16	Partner and Sustainability Expert	Alpha (also affialated with a Swedish university)	Case Company	30-Mar-16
17	Sustainability Expert	Alpha	Case Company	13-May-16
18	Social Anthropologist and Sustainability Expert	Alpha	Case Company	10-May-16
19	Interior Architect	Beta	Case Company	06-Apr-16
20	Strategic Advisor	Beta	Case Company	24-May-16
21	Sustainability Expert	Beta	Case Company	21-Jan-16
22	Consultant and Former Manager	Beta (also affialated with another architectural firm)	Case Company	13-May-16
23	Sustainability Expert	Beta	Case Company	04-Feb-16
24	Independent Industry Expert and Former Manager	Beta	Case Company	16-Jun-16
25	Office Manager Kalmar	Beta	Case Company	04-May-16
26	Interior Architect	Beta	Case Company	27-May-16
27	Middle Manager	Beta	Case Company	01-Jun-16
28	Partner and Sustainability Director	Beta	Case Company	21-Jan-16
29				12-Jul-16
30	CEO	Other Swedish architectural firm #1	Architecture Firm	28-Apr-16
31	Architect and Sustainability Expert	Other Swedish architectural firm #2	Architecture Firm	20-Apr-16
32	Sustainability Director	Other Swedish architectural firm #3	Architecture Firm	01-Jun-16
33	Lead Sustainable Engineer	Other Swedish architectural firm #4	Architecture Firm	11-May-16
34	Architect and Founder	Other Swedish architectural firm #5	Architecture Firm	03-May-16

35	Head of Architecture Department	Other Swedish architectural firm #6	Engineering and Architecture Firm	11-Apr-16
36	Chief Architect and Senior Lecturer	Other Swedish architectural firm #6 (also affialated with a Swedish university)	Engineering and Architecture Firm	17-May-16
37	Head of Architecture Department	Other Swedish architectural firm #7	Engineering and Architecture Firm	16-Mar-16
38	Sustainability Director	Swedish real estate firm	Corporate Client	25-Apr-16
39	Architect	Swedish real estate firm	Municipal Client	03-May-16
40	Director of City Planning	Swedish municipality #1	Municipal Client	27-Jun-16
41	Senior Project Manager	Swedish municipality #2	Municipal Client	13-May-16
42	Sustainability Expert	Swedish construction firm #1	Contractor	30-May-16
43	Sustainability Expert	Swedish construction firm #2	Contractor	28-Apr-16
44	R&D Process Manager	Swedish architectural trade organisation	Trade Organisation	13-Apr-16
45	Architect and Researcher	Affialated with a Swedish university	Academic Institution	27-Apr-16

Table 5: List of Interviews

The above list of interviews served as the primary source of empirical data, but another source of data has been included in the analysis as well, that of documentation, to obtain a deeper understanding of the phenomenon and the organisations, as well as for *data triangulation* purposes.

Interview Process

The interviews were conducted with a clear process in mind. There was always a quick introduction to the study, as well as explicit questions regarding the recording of the interview and permission to cite the respondent. The intention to share results and findings with the interviewee, at a later stage, was communicated. All interviews were conducted in English. As the interviews began with a question about the respondent's position and responsibilities, certain topics and questions were emphasised depending on the respondent's answer, characteristic of the semi-structured interview (Bryman & Bell, 2003). The interviewee was instructed to clearly specify if certain questions were not related to their responsibilities. Questions could be rephrased if it was felt that the respondent misunderstood or did not answer in a relevant manner. Moreover, if the respondent elaborated on a topic that seemed of interest to the study, the interview guide was often set side, and spontaneous follow-up questions were formulated to strengthen deep understanding and communication.

3.6.2 Documentation

The third source of empirical data was documentation. Key official documentation from the case companies has been analysed, such as strategy and sustainability reports, project plans, policy documents, information brochures, some of which have not been available to the public. A vast amount of material from other organisations in the architectural industry has also been included, which refers in part to the case companies. This documentation mostly consisted of strategy documents, sustainability reports and research documents. The examination of these documents has significantly contributed to the analysis of this study by, for example, cross-checking facts and obtaining a deeper background understanding of the issues raised by the interviewees. The list of the documents is as follows:

1) Carenholm, 2011
2) Sveriges Arkitekter, 2009a
3) Sveriges Arkitekter, 2009b
4) Sveriges Arkitekter, 2010
5) Sveriges Arkitekter, 2012
6) Sveriges Arkitekter, 2017
7) Beta, 2016
8) Alpha, 1996
9) Alpha, 2015a
10) Alpha, 2015b
11) Alpha, 2016

3.7 Data Analysis

Once the empirical research was conducted, the phase of data analysis began, with the goal of building theory from the case companies (Eisenhardt, 1989b). One starting point was to "play" with the data, that is, to rearrange it in certain ways to emphasise important or interesting factual findings (such as organising information in different arrays, creating a matrix of categories of the findings, drafting data displays, setting up information in chronological order) (Miles & Huberman, 1994). The main analytic technique used in this study is that of *pattern-matching* (Yin, 2009), where the goal was to obtain empirically-supported patterns and compare them to the predicted patterns as per the theoretical research design. Due to the presence of a demarcated theoretical research design in this study, emerging patterns relate both to the theory as well as empirical findings. This technique required that the effect of a variation in certain measurable theoretical concepts is known and thus can lead to a certain outcome or

variation in a dependent variable; in this case, it was expected to be differences in the firms' business model innovation.

The initial phase of data analysis involved analysing the empirical material independently of any specific direction of study, essentially letting the data 'speak for itself' (Ransom & Kirk, 1953; Blazer & Kaplan, 2000). Theory served to enable a more complete understanding of the empirical phenomenon, but also, undeniably, played a role in the data analysis. Nonetheless, it cannot be said that this study is unbiased in its interpretations and findings. This is in large part due to its theoretical underpinnings. Before the object of study was even defined, a literature review was conducted within business models (including business model innovation) and within the strategic management literature (especially RBV and organisational capabilities). This, undoubtedly, set the scene for the direction of study, the interview protocol and the subsequent interpretations and findings. Thus, it should be accentuated that if another researcher, with another research direction, theoretical background and even general interests, performed this exact study, the conclusions would unquestionably differ.

The empirical data for each case company are structured as follows: first, the context of the particular firms is given, including matters of ownership and profile. Next, the existing work and capabilities within sustainability for each firm are articulated, outlining also the general organisational strategy that the firm has applied. The following sections are ordered according to a business model logic, that is, the firm's offering, the internal dimension of the firms, the external dimension, as well as the general value formula for each of the case companies. This ordering process of the empirical data allowed for a classification of the events, decisions and actions and identification of the relevant factors, which greatly facilitated the analysis in general.

Once the empirical material was analysed in light of theory, I was able to identify a number of "possible" theoretical concepts, not only those explicitly cited in the research design but also new concepts that emerged from the data (Eisenhardt, 1989), however vague they were. These constituted the building blocks of my analysis, and building upon this, it led the way to a subsequent, much more advanced and rich, analysis.

The interviews and documentation in this case have been analysed separately and triangulated between themselves before analysing whether the findings could contribute to a more developed theoretical research design. Moreover, the data were analysed in light of the theoretical direction but also from different perspectives, to allow for the possibility of emerging findings that were perhaps not directly connected to the research design.

As the research will focus on the two case companies: Alpha and Beta, with a particular focus on their strategies, the level of analysis is expected to focus on the implementation

of BMI within the firm. The firm was analysed as the largest group, before narrowing down to smaller groupings, such as management levels, business area (i.e. architecture, landscape architecture, interior architecture), functions (i.e. architects, finance) and specialisations (i.e. sustainability, houses, apartment buildings, infrastructure).

3.7.1 Thematic Analysis

While analysing the empirical data, the process of Thematic Analysis (Marshall & Rossman, 1999) was used. This analytical process involved identifying prior constructs from the relevant literature, as well as emerging constructs that came to light during the analysis of the empirical data. The purpose of this exercise was to scrutinise the empirical material in order to identify, examine and outline patterns, or "themes", based on the research question. Therefore, themes identified relating to BMI, business models, organisational capabilities and sustainability were of crucial importance.

In practice, the analysis was conducted according to the six phases of thematic analysis, as demonstrated by Braun and Clarke (2006). These six phases comprise: Familiarising yourself with your data; Generating initial codes; Searching for themes; Reviewing themes; Defining and naming themes; and Producing the report.

The first step was characterised by reading the documentation received from the industry, completing the different rounds of interviews, transcribing those interviews, and then reading continuously through those transcripts. I tried to immerse myself as much as possible in the data by reading and re-reading the transcripts. During this process, I made sure to write down all initial thoughts and ideas, leading to a multitude of notes. These notes were reviewed in turn, which greatly helped to gain a preliminary structure and direction for the analysis, and to gain a relevant overview of the large amount of empirical data. Once this was done, I started with phase two, which involved generating initial codes. This entailed reviewing previous notes and coding the interesting or unexpected features of the data in a systematic fashion across all of the empirical material, identifying data relevant to each code. After this phase, I began searching for themes (phase three). This involved categorising codes into potential themes and ensuring that all relevant data was connected to each identified theme. A key aspect here was to harmonise the initial codes across the different documents and transcripts and identifying data relevant to each theme. The next phase involved reviewing the themes identified so far, especially checking that the themes corresponded to the coded extracts, as well as to the entire data set. The main purpose of this phase was to ensure that the analysis so far provided a coherent and relevant picture, in relation to the research question. The two last phases of the analysis were defining and naming themes, and finally *producing the report*. After reviewing the themes, a more thorough exercise was undertaken to refine the specifics of each theme, the overall findings and the story the analysis tells. A large part of this stage involved deciding on clear categorisations for each data point within the themes. Once this was completed, I

was able to translate the major findings into a written text. To provide a more coherent analysis, a selection of the most vivid and compelling examples was included, and an overall review was conducted to ensure that the analysis relates truthfully to the research question and literature.

Once these interesting findings were identified, I began with the process of pattern-matching (Yin, 2009). I derived empirically-supported patterns from these findings and compared them to the predicted patterns as per theory. The emerging patterns related to both the theory as well as empirical findings. Upon comparing the empirically-supported patterns to the predicted patterns, a number of surprising and interesting discrepancies emerged. These discrepancies were analysed in turn, leading to the identification of concepts that were then integrated into the proposed theoretical framework.

3.7.2 Cross-Case Synthesis

The research design, a comparative case study approach, was chosen in large part to enable a cross-case synthesis (Yin, 2009). Performing this cross-case analysis allowed for interesting and unexpected similarities and differences to come to light between both firms' business models and approaches to BMI. The processes involved in this cross-case synthesis included both thematic data analysis (Marshall & Rossman, 1999) and pattern-matching (Yin, 2009). Combining both these methods simultaneously proved to be very fruitful, especially in confirming prior theory and identifying new, emerging theoretical themes and constructs from the empirical material.

3.7.3 Validity and Reliability

An academic study that succeeds in contributing credible theoretical insights to its field must address certain validity and reliability concerns.

The issue of validity focuses mostly on the integrity of the conclusions derived from the study, testing whether the study actually measures what it aims to study (Bryman & Bell, 2007). Certain techniques have been used to increase the validity of this case study. First of all, by using different types of evidence, a more thorough triangulation of the data was possible. Through the different perspectives obtained from these methods of data collection, the definitions of concepts and measurements could be defined more clearly, thus enhancing the construct validity of the thesis (Cook et al., 1979; Yin, 2009; Gibbert et al., 2008). Secondly, as discussed before, the strategy of pattern-matching has been applied to test whether theoretical relationships correspond to the actual empirical relationships observed. Lastly, Yin's (2009) process of pattern-matching provides an iterative procedure, enabling the testing of both theoretical and empirical

data. Through this method, I validated the empirical findings and also modified the theoretical research design itself as any new relevant information came to light. This decreased the issue of *internal validity,* as it was possible to compare emergent theory (obtained from the empirical findings specific to this study) to existing theory (Eisenhardt, 1989b).

Reliability is a central issue in creating credible research, and its central tenet is that the research is transparent and systematic enough to be theoretically replicable (Bryman & Bell, 2007). This is addressed by explaining in detail how the study was carried out and how the empirical data were collected. To further strengthen the reliability of the empirical material, there has been an attempt to conduct interviews and collect documents repeatedly. This, combined with multiple sources of evidence, allowed for a higher level of *reliability*, that is, the affirmation that data collection procedures can be repeated and would still yield the same results (Yin, 2009). Moreover, there has been a transparent documentation of the research procedures in this study to allow for a 'case study database', where all documents relating to the case study procedures have been documented and made available for scrutiny (Yin, 2009).

Another measure taken was obtaining feedback from the respondents about the accuracy of the interpretation of the information they provided during the interviews. That was done to ensure that the understanding of the phenomenon described by the respondent to the interviewer was correct. By doing this, *respondent validation* (Mays & Pope, 1995) was also achieved.

Finally, regarding *external validity,* despite the fact that cases studies do not allow for *statistical generalisation* (Yin, 2009), they do allow for *analytic generalisation.* This means that through analysing the empirical data obtained from the case study, the empirical observations have been transformed into theory, thus disproving that 'case studies are devoid of generalisation' (Gibbert et al., 2008).

To further strengthen the external validity, a particular focus has been placed on the literature and theory review, presenting a clear rationale for the selection of the case study providing a cross-case analysis, and expressing sufficient information on the case study context, thus clearly expressing to the reader the researcher's sampling choices (Cook et al., 1979; Eisenhardt, 1989b; Gibbert et al., 2008).

4 Empirical Introduction

To obtain a deeper understanding of the object of study, I present here an introduction to the case companies. To allow for a thicker and more substantiated description, I have included, when relevant, material from the empirically collected data.

4.1 The Case Companies

An empirical introduction will be given on the case companies. To enable a more compete and deeper understanding of the firms, quotes from interviews will also be included.

4.1.1 History

Both case companies, Alpha and Beta, are amongst the oldest architecture firms in Sweden. Alpha is one of Sweden's leading architecture firms, founded in the mid-20th century. It has approx. 500 employees as of December 2020 and had a total turnover in 2020 of approx. 700 million Swedish Crowns (Allabolag, 2022). It is characterised by its shared ownership model, with each employee owning a minority share, including over a hundred partners. With its headquarters located in Stockholm, it currently has fourteen offices in Sweden, Denmark, Norway and England. In Sweden, they have designed several high-profile buildings within office complexes, stadiums and hospitals. Alpha is characterised by its large size, being one of the largest architecture firms in the Nordics, within the five largest in Europe, and amongst the fifteen largest globally. The firm is divided into the following areas of expertise: residential, building technology, retail, interior design, office, landscape architecture, sustainability, project management, master planning, education and healthcare.

Another of Sweden's leading architecture firms is Beta. The firm was established in the early 20th century, making it not only one of Sweden's oldest architecture firms, but one of the world's oldest which is still active. Beta has approx. 500 employees as of December 2020 and had a total turnover in 2020 of approx. 500 million Swedish Crowns (Allabolag, 2022). Until the mid-2000s, the company was composed of ten separate entities and daughter companies, until they were consolidated into one company. It is collectively owned by an external investment firm, which has a share of

80%, and by twenty or so partners with a minority holding. Beta has twelve offices in Sweden and Finland and has had a strong influence in the field of architecture in both Sweden and the Nordics, having designed some of the most iconic buildings within higher education and culture.

When Alpha was founded in the mid-20th century, the values of CSR and sustainability already played a fundamental role in the firm's mission and vision. Questions regarding the human well-being featured prominently in the architecture projects they carried out. Beta, on the other hand, did not have any explicit goals within sustainability. While the ideological outlook and philosophy of its founders did include sustainability aspects, such as resilience, during their national romanticist (1910s) and Nordic classicist periods (1920s), and an increased focus on the well-being of the inhabitant of building, during their modernist and functionalist time (1930s), the emphasis was arguably more on creating idealistic architecture, rather than architecture that emphasised ecological, social and economic sustainability.

Both firms present quite stark differences in their historical development: while Alpha has greatly expanded by growing organically, employing more employees, Beta has grown considerably by itself, mostly acquiring other smaller architecture firms. By the mid-2000s, Beta was composed of approximately ten separate companies operating under Beta as the parent company. In that year, Beta reorganised the group to consolidate and unite all companies under the same roof. The company has also undergone many restructuring initiatives in recent years.

4.1.2 Firm Philosophy

Alpha states that one of its main principles is to create architecture that can influence society and contribute to societal improvement. As an employee-owned company, it can dictate its own values; to allow them to permeate its entire organisation and every assignment it pursues. Alpha has three goals: to create emotive architecture, to constantly challenge themselves to improve their practice, and to explore the field of architecture through dedicated applied research (Alpha, 2016).

Beta's philosophy, on the other hand, is connected to the quest to provide high-quality and aesthetic architecture to its clients. However, the firm has also been highly involved since the late 1990s in the development of a sustainable city initiative (referred to as the "sustainable city project"), a unique project in terms of size, content, work methods and enduring construction. This project has attracted attention from all over the world and set a new model for urban planning. This model is acclaimed for its integrated planning process and sustainable results. Common feedback from respondents referring to the mission of Beta was to *inspire* their clients and partners, and to be the partner that will take the project even further.

Beta has four 'core' values: History, Holistic, Humanism and Innovation (Beta, 2016). It bases its work on over a century of looking to the future and on vibrant architecture that – to this day – maintains its functionality. It considers every assignment from a holistic perspective. It has a broad range of skills in-house, all of which work in partnership to ensure optimum results for the user, the client and society as a whole. Beta emphasises sustainability and environmental friendliness and is passionate about long-term economic and social sustainability. Its ambition is to create milieus that have not only been developed in line with sound environmental principles, but which also enable the people who use them to live in a sustainable way. Beta strives to create architecture that combines humanism and functionality. Humanism takes the approach that the individual, the user, must always come first. Architecture is not an aesthetic end in itself; it is part of a creative process. Innovation and creativity have characterised Beta's work throughout its history and remain distinguishing features to this day.

4.1.3 Early Approaches to SBMI

Alpha has been characterised by its continuous focus, since its founding in 1951, on social values, CSR and on environmental and social welfare. This has led to it having a clear goal of designing its business model in architecture with the well-being of the inhabitant at the forefront.

> Vice-President, Alpha: 'As owners, we have written down our core values, you could say. That is something that the board must also rely on, and in this, we are saying very clearly that we as owners, partners, shareholders, […] we say the main thing, the drive for the company is curiosity, thinking of something for the good of the society, sustainability. […] It is really something that is more than saying we are maximising the revenue for the owners. We really want to invest in things that will, of course, secure the company in the long run, which is, of course, very important, but also something that invests in society, I would say'.

Indeed, the Sustainability Director reiterates this point by emphasising the early commitment to CSR:

> Sustainability Director & Partner, Alpha: 'We were founded in 1951, and the social responsibility need was very important from the very beginning. The first commission we had was for a residential area; it really struck me because that project raises the same questions that we are talking about, when we speak about residential projects today. It was to put the human being in the centre and that's also something we say in the business plan, that our vision for architecture is to look at human beings and create environments

> for the human being from the need to be human beings and ensure the well-being of the human being'.

Alpha has a long history of not only promoting "ethical" solutions, that is, solutions that prioritise sustainability as opposed to profits, but also wanting to be an active participant in creating positive social and environmental change in society. The Sustainability Director confirms this by stating that:

> Sustainability Director & Partner, Alpha '… we want to be part of the debate in Sweden and push the society forward'.

This led to, in 1996, Alpha collecting the collective experience and knowledge of ecological issues within architecture and publishing a book (Alpha, 1996). The book functioned as a handbook for ecological construction and was distributed within the firm as well as outside. It sets forth Alpha's vision of ecology at the time and played a significant role in determining and embedding Alpha's future work in sustainability.

Beta's approach to sustainability, on the other hand, has changed a lot in recent years, from being more of a bottom-up initiative, with no clear strategy, to developing managerial initiatives and company-wide sustainability efforts. The firm has had an internal environmental 'task-force', called "Beta Green", which functioned as an internal think tank that develops and facilitates environmental project planning. However, this initiative was gradually abandoned.

5 The Case Comparison

Within this chapter, to better understand which capabilities contribute to SBMI and how, I will present the bulk of the empirical material describing SBMI within the case firms Alpha and Beta. SBMI, in the case comparison, is exemplified by the firms' attempts to innovate their business models by incorporating sustainability principles. The chapter is divided into the sections: Internal Dimension, which will describe the firms' internal characteristics, including the tangible, informational and organisational resources; Offering & Value Proposition, detailing the manner in which both firms incorporate changes into their offering and value proposition; External Dimension, regarding the firms' external relationships and how sustainability has impacted those; Corporate Strategy and Performance; and last, the Timelines of both case firms. The chapter continues with an Empirical Overview and ends with a discussion of the empirical findings, challenges and opportunities faced by the case firms.

Within these sections, I choose to present empirical material from both firms and integrate the cross-case analysis within the same chapter, rather than having separate chapters for Alpha, Beta and one for the cross-case analysis. The mapping element of the business model guided the structure of this chapter, in which the individual business model elements take precedence. This was done deliberately to enable a single in-depth discussion of each business model element whilst simultaneously presenting the relevant empirical data from both case firms regarding that business model element. I found that this brought to light the interesting disparities in a much more effective way, as opposed to dividing in separate instances the discussion of business model elements at Alpha, and the discussion of business model elements at Beta.

5.1 Internal Dimension

In this section, I will discuss the firms' internal characteristics, including the tangible, informational and organisational resources, and how these characteristics change as part of the firm's SBMI. The two firms exhibit diverging capabilities and resources within their field, although both are able to maintain their positions as market leaders. Both firms possess unique abilities in their field in Sweden, to innovate in the architectural projects that they compete in, and continuously strive for novel solutions to increasingly challenging assignments.

They have both also invested in business model innovation and implemented certain changes, such as building a resource and knowledge base within sustainability and sustainable solutions, albeit to varying degrees. The two firms have dedicated sustainability employees, including a Sustainability Director, who is part of the management team, advising and voting on company policies.

5.1.1 Profile & Culture

Alpha and Beta present profiles and cultures that are similar to a certain extent: both firms place significant importance on encouraging employees' new ideas and pursuing novel solving problems approaches, both of which facilitate SBMI. They both encourage this culture informally and formally through management initiatives, although it is observed that Alpha has more formal support for such efforts.

Both firms pride themselves on being quite flat, i.e. with a lack of strict hierarchy. Alpha is a firm managed entirely by trained architects, whereas Beta has brought in specialised management talent to fill certain management positions, creating more of a corporate feel to the firm.

Profiling itself as both innovative and sustainable has been an important part of Alpha's efforts. Innovation, as well as new solutions and ways of thinking, is actively encouraged in the firm, especially due to the increasing sustainability challenges faced by the architecture industry today. This is demonstrated in certain processes that the firm has implemented, such as the "Alpha Innovation Process" ("AIP"), in effect a semi-standardised process of managing architectural projects by including expertise from different fields.

Due to its previous commitments and initiatives within the fields of CSR and sustainability, the company has gained recognition within the field as a leader in sustainability design and architectural solutions:

> Sustainability Director & Partner, Alpha: 'I also think that we are expected to lead in this issue, as we are a big company, and we are also working a lot [with sustainability]. We have a lot of knowledge. So, I think there are high expectations of us as a company from both the politicians and also from organisations and clients'.

Large managerial efforts were e not deemed necessary to incorporate a sustainability mindset into the company culture, as it seemed to already be there.

> Former CEO, Alpha: 'I think in Alpha it was not such a big pressure [to spread awareness of sustainability internally]. It was quite well received, and you had education and we had the seminars, and we had a lot of improved skills. So, I think it was not a dramatic

> change to culture, more like deepened it and improved the skills. And it was all well acquired'.

This profile has led to higher expectations in sustainability from clients, the public sector and society at large. Moreover, it attracts sustainability competent and interested persons to seek employment at Alpha, knowing they will be able to work with these kinds of issues:

> Partner, Alpha: 'The positive thing about this aspect is that Alpha is well-known to have this knowledge of sustainability and that also makes people come to Alpha because they are interested [in working with these issues]'.

One of the founding principles of Alpha was the focus on CSR and the promotion of environmental and social welfare; thus, the company culture also reflects these values. According to a partner, one of the big factors impacting the focus on sustainability within company culture is that, due to profiling, many architects, engineers and other experts seek employment at Alpha, and this, in turn, leads to a very high degree of engaged employees.

Indeed, a culture that promotes sustainability and encourages these questions to be raised in projects existed even before the firm made significant changes in resources and created dedicated positions.

> Sustainability Director & Partner, Alpha: 'Before that [hiring dedicated sustainability experts], there were also very dedicated architects working on the environmental association issues, so that is still [the case] today. The people here are very committed to these issues, so you don't really need to… in some cases, you need to push from above, to set the agenda… but there is also a lot of engagement with employees that should be way better in taking this responsibility, and the moment we work with more of the refugees coming to Sweden or we get people to get a new place to live – like students, so the debate for sustainability is ongoing all the time within the company, and that's really challenging but also great inspiration for us working with [this issue]'.

One opinion expressed often by the interviewees is that the notion and awareness of sustainability are widely spread across the different levels of management in the firm.

For the case of Alpha, the ideology relating to CSR and sustainability has been present in large part since its inception. This has led to values relating to sustainability being much more integrated into the company's business thinking when it goes about its operations, thus impacting in great part the *dominant logic* of Alpha. Due to these pre-existing values, the firm had already invested in sustainability capabilities even before the market demanded them. The firm has also been able to consolidate its market

position, vis-à-vis its competitors, by strengthening its customer base through market signalling of its strong sustainability profile. Alpha has also been able to further improve its capabilities by attracting relevant human capital, such as sustainability-passionate architects and other employees who bring their innovative thinking and knowledge to the firm.

The culture of Beta understandably plays a major role in the firm's operations. As knowledge-sharing has been promoted as a main focus, this translates into a company culture that encourages employees to share knowledge with each other in their various job responsibilities, as well as other events. However, the firm's brand, currently, does not seem to be associated with sustainability in any major way.

> Office Manager, Beta: 'I think we are like the rest [in terms of sustainability profile] – people don't think of us either as worse or better than anyone else in that way'.

Historically, especially during the sustainable city project, Beta's profile was much more closely connected to sustainability and sustainable architecture and master-planning.

> Former Middle Manager, Beta: 'Definitely, I think it [the sustainable city project] raised the kind of awareness that we are involved in projects like that, and we have built them and are being awarded for those projects, so I think that definitely raised our profile in that respect'.

In connection with the principle of sharing knowledge among employees, the respondents expressed a recent, strong culture of welcoming initiatives within the firm. This encouragement of bottom-up activities, in combination with a lack of top-down support, has played a large role in establishing sustainability within the firm, leading to, amongst others, the creation of the sustainability network.

However, Beta began to profile themselves as a sustainability-conscious firm later, as demonstrated by their later developed Sustainability Plan. Respondents stated that this initiative contributed to increased sales with sustainability-focused clients, as well as attracting new hires, who have a specific interest in sustainability and developing their competence. However, the extent to which this initiative has succeeded is questionable. The culture within Beta has been described as both favourable and unfavourable towards sustainability and sustainability efforts. On top of this, the frequent restructurings within the firm have led to a fragmentation of the company culture, with constant changes in directions from senior management.

This is evidenced by the creation of the position of company-wide Sustainability Director, which has existed for a few years, as well as the promotion of sustainability within internal events, trainings and external seminars. Beta also undertakes

architecture projects and advisory roles, emphasising holistic approaches to urban planning, with environmental and social sustainability as high priorities. An employee mentioned that sustainability plays a significant part in how Beta conducts its business.

> Interior Architect, Beta: 'It depends on how you define that [i.e. Sustainability]. We always work with sustainability in all projects, and I have been working for several years in different projects, and we have always had some sustainable goal'.

Within the department of interior architecture at Beta, when asked whether the culture promotes sustainability, one respondent answered:

> Interior Architect, Beta. 'Yes, definitely… Really trying to lead by example, by having an environmentally aware office'.

Nonetheless, other respondents express quite the opposite position, stating that the company culture does not significantly promote sustainability in the everyday tasks of its employees. One middle manager, for example, stated that

> Middle Manager, Beta: 'Beta doesn't have a philosophy that they should push sustainability in every project or have any sustainability targets'.

Moreover, even when employees engage in sustainability efforts, these can often be neglected:

> Office Manager, Beta: 'But sometimes, they are not encouraged; then they become like all the other architects, accepting the fact that sustainability is difficult to promote'.

> Head of Sustainability Network, Beta: 'Oh, it's really hard to [give examples of how sustainability is promoted internally] … I would say… that when you're hired, it's a very big benefit if you've been working with these issues or if you have… They want to encourage that you work with these things but in the end, it often fails, when they don't take it very seriously. Or that it becomes too vague for too many people'.

From the empirical material, it is quite clear that Beta, in this situation, has acted as a follower, in terms of adapting its profile to match the changing market conditions. As this is a relatively new development, the firm has not been as successful in securing its client base within sustainability, relying instead on its traditional clients, who prioritise the aesthetic quality of a building rather than its environmental performance. Neither has the firm attracted as strong talent within sustainability, as those sustainability experts tend to favour other firms that have had an explicit emphasis on sustainable architecture.

Thus, Alpha can be described as having a more 'embedded' vision of sustainability, with a greater number of employees and management practices reflecting these core sustainability values. Whereas at Beta, which prioritised sustainability at a later point than Alpha, there can be an ambivalent attitude towards sustainability, with employees lacking a clear understanding of the vision, sustainability goals or means to achieve those goals.

> Head of Sustainability Network, Beta: 'Everyone is very keen on [sustainability] and realises that it's an important question and wants to work with it. But not everybody wants to argue for it, when we're selling. That, I believe, is the [problem]… When we have an internal meeting, everyone is: "Yes, of course. Yeah, this is what we need to do" and everybody is very much, in agreement. [But then the focus is lost…] I believe it's that they don't have the knowledge, and experience so they feel secure, selling in that idea. That's my [opinion]… So, it's only brought up when the client themselves are saying: "We need to make it a *miljöbyggnad*, or we want it to have a green concept…" and then we're very keen on joining that project, but we're not pushing these questions in projects ourselves, I would say'.

However, Beta's culture has also been described as promoting and encouraging new initiatives, especially among younger employees and new hires. An office manager described it by stating:

> Office Manager, Beta: 'What I like with Beta is that there is a spirit and a culture that is quite democratic, not so a hierarchical. And young people, if you want something in this company, you just have to work on it and that I think even helps to work more sustainability. Some people that really want to work with sustainability – that will happen. And I think we needed a strong leader in that field, and maybe now we have that. It doesn't need so much to make it happen'.

A common theme identified from the respondents is that, in part due to the openness of the culture, sustainability is being implemented in a bottom-up, 'grassroots' manner. One aspect of this is the welcoming of private initiatives from all levels within the organisation.

> Interior Architect, Beta: 'So all individual initiatives are welcomed. And that goes for sustainability issues as well. If the person wants to do things that, or to have an idea about sustainability, they are free to talk about it and try to engage people to make it happen. So, in that way, I think we might be better than some of our colleagues because of that aspect, but then in other ways, perhaps we are not, we, the structure could be developed more in Beta. The structure, the way we organise'.

These initiatives often lead to the creation of specific interest groups or 'networks', which explore an individual topic and decide on how to promote that within the firm. These groups are initially created on an unofficial basis, without direct support from senior management. However, some groups can, at a later point, be officially supported by senior management and receive financial support, or allocated time for network tasks. An example of this is the sustainability network itself, which started when a group of sustainability enthusiasts discovered a common interest and founded the group:

> Head of Sustainability Network, Beta: 'The network's role is to be a voice for everyone who works in Beta, it's supposed to be a bottom-up platform, so to say'.

The group was then declared an official network by senior management in spring 2015, and received funding, as well as allocated time per employee for group activities.

A point connected to the previous aspect is that Beta encourages the appointment of so-called ambassadors, or *champions*. These individuals are stated to be a considerable force for change within the organisation and are individuals who present a passion and are enthusiastic in a certain aspect of architecture and are motivated to push this focus further within the organisation. Feedback from the respondents suggest that these champions can play a large role in the pursuit of further sustainability within Beta; however, due to the limited number, significant change has not yet occurred.

Nonetheless, the efficiency of this approach is questioned, as it leads to many separate and uncoordinated efforts. There seems to be many geographically and departmentally separated initiatives, which have not culminated into any real change. Furthermore, being alone in pushing for a sustainability agenda in a whole office can prove to be a difficult task, with limited success.

Moreover, Beta, as a firm, has also been described as very project focused. This entails that the internal operations of Beta are organised in such as a manner as to prioritise the activities of projects, such as identifying and competing for potential projects and concentrating strongly on completing the necessary tasks to complete a project in the most efficient manner. While this focus has been shown to be effective in their business, it can impede upon other activities that are imperative for furthering sustainability, such as internal research and development of innovative solutions, research projects both internally and in partnerships with other parties, attendance of industry events to obtain up-to-date knowledge, etc.

Another key theme identified from the interviews was that of informal responsibility, or ad-hoc management of sustainability and its implementation.

One prime example of this is the main driver of sustainability within Beta, which is the sustainability network. As mentioned before, this group was created informally by a

number of enthusiasts and existed more as an interest-group for several years with little impact on the management and operations of the firm. The network mostly exchanged ideas about sustainability among themselves. It was only later that the network became official and was funded by senior management. Nevertheless, the group still mostly operates in an informal fashion. Its main purpose as a point of reference for other colleagues is by no means compulsory, and colleagues who seek their advice do so voluntarily. This suggests that additional sustainability expertise is only introduced into projects according to the initiatives of the project managers or members, rather than by default. Moreover, the head of the sustainability network, located in Gothenburg, is often pushed forward as the figurehead at her office for these issues, although she is 'not on paper responsible for pushing forward these kinds of questions'. Yet another example of this informal approach to sustainability is the expectation for each member to promote sustainability in their everyday work, without any targets or follow-up conducted to encourage or evaluate their efforts. Thus, the management of the group is very much based on expectations, rather than formal targets or policies.

Another instance of informal, or ad-hoc, responsibility for sustainability occurred during a five-month gap when there was no acting Sustainability Director within the firm. During this period, the sustainability network had to step in to continue the projects of the previous Sustainability Director. However, during that time, there was no person formally responsible for their management, even though the management of these projects was outside the formal mandate of the network.

Ideological Conflicts

Interestingly, both firms communicate that they experience an ideological conflict at times, concerning the changes relating to the concept of sustainability. This is where employees do not always share the same understanding of what sustainability entails or the importance of incorporating sustainability into their projects. This conflict stems in part from the imposition of new working values onto more traditional methods of providing architectural services.

Despite the strong culture of awareness and promotion of sustainability within Alpha, there still exists opposition to the concept at times, notably among, but not limited to, the more senior architects. One employee explains that architects are shaped by their environment and the types of questions they have worked most with during their career. For these senior architects, sustainability was not a major priority when their careers as architects were defined. Despite the changing conditions and values within the field, some still carry that legacy with them:

> Manager, Alpha: 'In the short term, it's somehow an obstacle because the senior people are the driving forces in the processes. So, if they are not on-board, it is very difficult to

> get those projects to become sustainable or relevant today […] But if you look in the two or three years to come, and if you want to do something now, then, of course, you can experience it as an obstacle, or at least as a something that is slowing down the development'.

The reasons why certain architects do not share the same priority for sustainability matters and are more averse to change are largely due to the idea that sustainability compromises the creative nature of architecture and design. One instance of this is that the general external appearance of a building can be drastically changed to be more sustainable, or the choice of materials can be restrictive due to their unsustainable nature. The Vice-President of the firm admits that there are "pockets" of architects who are reluctant to implement sustainability in the manner desired by senior management.

Moreover, as there is a large number of different competences within the firm, these competences can be divided into those that have architectural knowledge as their *core* expertise and those who have other specialised knowledge. A partner and academic researcher emphasised one of Alpha's current challenges in that field, namely enabling productive and efficient communication and teamwork amongst different specialists who might not have a strong understanding of each other's expertise and importance in the quest for higher sustainability. One of the main difficulties is creating processes that enable the different parties to collaborate efficiently, and to collectively set priorities and common objectives within the project. Common conflicts often stem from the prioritisation of design over technical goals.

> Partner, Alpha: 'I think that one of the issues that we are working with constantly is the meeting between different knowledge cultures […] This is, of course, one of the challenges, that everyone has to speak the same language, understand where we are heading together, making the goals together, etc.'.

This can at times lead to assignments being conducted in silos or in separate groups with low collaboration between them.

Regarding Beta, feedback was received by employees working with sustainability that one obstacle experienced in their work can be described as an ideological opposition to the notion of sustainability and its impact on architecture. This was personified in certain architects having a strong opposition to the inclusion of purely sustainable features, claiming that it impedes upon the creative integrity of their architectural design. At other moments, dedicated sustainability personnel can feel reluctant to raise sustainability aspects, as other architects can feel almost provoked by these comments, claiming that they have included sufficient sustainability into their design, due to a significant difference in the understanding of the concept.

> Head of Sustainability Network, Beta: 'And also, for architects who don't want to work with sustainability, they have maybe an old vision, that sustainability is something for people who are not very keen on the aesthetics, that it's someone that doesn't care if it looks horrible… [that it] conflicts with the creative [and can be a barrier to achieving sustainable architecture]'.

The ideological conflict seems to be amplified by several other characteristics, such as seniority in position and age. It has been observed that the older, as well as the senior employees in Beta, have a stronger ideological opposition to efforts in implementing sustainability. This can be explained in part by the stronger focus on pure aesthetic design at Beta, whereas Alpha has had a sustainability focus (albeit small) for decades.

Indeed, at Beta, the emphasis on sustainability in projects seems to be arbitrarily administered, depending on the person in charge and whether that person shares a strong passion for sustainability. An interest in sustainability is often correlated with more junior employees, who are often not involved in project management.

> Head of Sustainability Network, Beta: 'Yes [Sustainability starts as a priority but then decreases in importance as the project advances]. Not even always in the beginning, often it's a question which young architects are keen on discussing and pointing out, and we are often not in the earliest part of the project, so then it's always the ones who have been working for a long time, that have the most contact with the client, and so on. And they are not the ambassadors for sustainability at all, I would say. I mean, they are, in their mind, often, when you talk to them, they are getting a little bit, how do you say, provoked by the question: "Have you been thinking about that, sustainability, or…?" because they think: "Well yeah, we always think about sustainability", because they have another definition of what sustainability is'.

This phenomenon also explains one noteworthy observation from the empirical interviews, that of conflicting views on how present the focus on sustainability was in the respondents' perception of the organisation, and even how it seemed to impact their daily work tasks. What was particularly striking is the very strong difference in responses, with certain employees claiming that it is an inherent and inseparable part of the company and their work, whilst others posit the near opposite. An interior architect, for example, when asked whether sustainability is a big part of her job, replied that:

> Interior Architect, Beta: 'It's natural, it's every day. Everything we do is connected to sustainability. It's built in our everyday life'.

However, regarding sustainability efforts, the head of the sustainability network states that:

> Head of Sustainability Network, Beta: 'You couldn't see it at all, I'd say, almost. I'm very harsh now, but in general, in the big picture, I would say that we are working with it, but we're not working with it, as much as we could, or should'.

One element of this argument is regarding the office of Beta, which was expanded and renovated in early 2016. This development was strongly criticised by a middle manager, by being exclusively 'about design', with no elements of sustainability, and described as a missed opportunity for Beta to really publicise its know-how and expertise within the field and increase their profile as a sustainable firm.

This is further accentuated by the conflicting feedback received by respondents regarding whether they feel that Beta is ahead of the market in terms of sustainability, with several responding that Beta is ahead in terms of knowledge, investment and sustainable practices both in-house and in their projects, and some responding the opposite, namely that Beta is behind and urgently needs to invest in their sustainability efforts.

Thus, both firms experience ideological conflicts regarding the promotion of sustainability capabilities, albeit to different extents. Alpha, having already created a strong culture that espouses these values, nonetheless also experiences ideological tension. In both firms, this is experienced in large part by the more senior staff, who often share a different vision of architecture and view the recent requirements of sustainability as a temporary development in market demand, largely impeding what they see as their true purpose, i.e. designing aesthetically advanced architecture without having to compromise.

These ideological conflicts within both firms have implications for how the firms develop their new capabilities. This can lead to difficulties in devising new strategies and implementing those strategies at different levels within the firm. Initiatives such as creating new processes to ensure capabilities in sustainability are strengthened by, amongst other things, ensuring that a minimum of sustainability features are included in the offering, can be met with tension and challenged by middle managers. In Beta, this phenomenon has been experienced to a larger degree; nonetheless, despite their early history with sustainability, Alpha also considers this a significant challenge.

Risk-propensity

The attitude towards risk may affect SBMI, with high risk-aversion leading to more resistance to change. Alpha openly recognises that sustainability projects can have much higher levels of risk attributed to them, due to the uncertainty of benefits to the client and to other factors such as the untested nature of novel technologies and designs. However, the company states that it is of paramount importance to accept this risk in order to develop their own competence within sustainable design, and also to prove to

the market that sustainable solutions are viable, both economically and technically. However, regarding the projects completed by Alpha previously, one may say that they still adopt a predominantly traditional approach to their designs, with no large variation in the fundamentals. This slightly increased proneness to risk was not at all identified in the same degree in the empirical material from Beta.

5.1.2 Tangible Resources

In this section, I will discuss the existing tangible resources and changes to those tangible resources within the case companies in relation to SBMI.

Dedicated Sustainability Employees

Both firms have appointed a number of dedicated employees who allocate all or a given amount of their time to furthering sustainability capabilities.

Since 1998, Alpha has had a dedicated higher management position for a director of sustainability ("Sustainability Director"), with a seat on the board. The current director of sustainability is also a partner within the company and has previously held positions as an environmental consultant. The tasks of this are divided between management (implementing routines and structure within the firm to ensure better sustainability and quality in project), CSR (responsible for developing CSR strategy and goals, drafting environmental and sustainability reports, including the UN global compact report), and finally market issues (participating and presenting at conferences and other market events, to deepen understanding of the market demands within sustainability, and the future trends). However, even before the dedicated position of Sustainability Director was created, Alpha had a strong focus on promoting these ideas:

> Sustainability Director & Partner, Alpha: 'We have had environmental specialists for a long time, 17 years now, who have important knowledge within the company. Before that, there were also very dedicated architects working on the environmental and social issues that we still focus on today. The people here are very committed to these issues, so you don't really need to but, in some cases, you might need to push from above, to set the agenda. (…) At the moment, we work with the refugees coming to Sweden and we give them and other people a new place to live – like students, so the debate on sustainability is ongoing all the time within the company, which is really challenging but also a great inspiration for us working with it'.

The firm has maintained a number of dedicated employees within sustainability since the 1990s, which was quite unique at the time, and this number is regularly expanding.

> Sustainability Director & Partner, Alpha: 'There are also other architects [working with these issues]. They also have this [perspective] that they are working with a human being

> focus, so it's not unique today, but it was pretty unique if you look back. But today, social sustainability is what's on the agenda'.

These experts are spread across its offices and various fields, with around forty sustainability specialists. The team comprises architects, engineers, project managers, urban planners, landscape architects, social anthropologists, chemists, biologists, environmental and energy specialists, light designers and interior designers. The different competences of these employees range from architects, engineers, chemists to building physicists and social anthropologists, with expertise in novel building methods and materials, such as massive timber and both national and international building certification systems. Perhaps the unintuitive inclusion of anthropologists into the team enabled Alpha to significantly expand its capability within sustainability.

> Sustainability Director & Partner, Alpha: 'We have also employed anthropologists, so we can tackle the issue of social sustainability in our projects. We noticed that even if architects may address this issue, we still felt that we needed special expertise in that area. And that's very successful and after that, we have been able to lift projects to another level when it's about sustainability'.

However, as the concept of sustainability is still and has not been clearly defined in the market for many years, Alpha has invested in certain capabilities and offerings that do not match necessarily match market demand. Many of their innovative designs are not in demand by clients, leading the firm to offer more standardised designs, such as those required by green building standard certifications.

As for Beta, being one of the biggest architecture firms in the Nordics, its sheer size is a strong advantage in its pursuit of higher sustainability. Having approximately five hundred employees enables Beta to incorporate a much broader knowledge base and a vast number of competences in-house, such as architecture, urban planning, landscaping, interior design and project management.

To be able to offer sustainable designs, Beta has invested in acquiring a minimum amount of knowledge, experience, expertise, software and tools. These costs are recurrent, sporadic and more-or-less ongoing, as Beta invests in training existing staff, hiring external experts, improving tools and software, as well as having indirect costs and opportunities costs from allocating a number of hours per month to certain employees. This decision is explained in large part by the acknowledgement of sustainability as a growing driver of demand in the market.

Regarding Beta's dedicated sustainability employees, they have had a Sustainability Director since November 2015, who divides this role with his other responsibilities. Fifty per cent of his time is dedicated to his responsibilities as Sustainability Director.

In this position, he provides reports or feedback to senior management regarding notable developments or commercial opportunities within the field of sustainability. He also assists projects as an advisor in terms of sustainability expertise or building certification. Moreover, he attends external events to increase his knowledge of the field to be able to educate others and promote Beta and the company's sustainability profile to potential clients and partners.

The firm possesses a number of official and unofficial processes that significantly impact sustainability. However, the actual importance of these processes in the sustainability process is difficult to ascertain, as certain respondents provided contradictory answers. Some responded that, within Beta, such processes allocated specifically for sustainability were not being followed.

The company has also created an internal sustainability group named the *Sustainability Network* (or "Hållbarhetsgruppen") during Spring 2014, which currently has around 20 members. A temporary position was created for the current head of this group, who is standing in for the previous manager of the group who had been on parental leave. The internal sustainability group serves as ambassadors for sustainability and provides internal sustainability assistance for different projects. The group is composed of approx. 20 members, each with a total of 20 hours per year dedicated to their work within the network. One of the goals of the network was to spread sustainability knowledge across the firm, with the aim of having one member per office, essentially facilitating communication and interaction across the offices:

> Head of Sustainability Network, Beta: 'It's really a network between the offices and between colleagues to support each other and help each other in the projects'.

The network mostly operates informally, serving as a point of reference in sustainability matters. If an employee at Beta requires sustainability advice or expertise, he or she is directed to the network, which will then provide support insofar as they are able to, considering time restrictions. The group also makes decisions regarding sending participants to relevant internal or external seminars or training courses, how the group should organise themselves within the firm, which external collaborations could be of interest, and discusses whether new resources, services or persons are needed or should be recruited. Apart from being a point of reference for the firm, they also organise a monthly video-conferencing meeting where they discuss issues relating to sustainability as well as possible future initiatives. Furthermore, every member is expected to act as an 'ambassador' for the network, and promote sustainability in their everyday work, and interactions with colleagues and partners.

> Sustainability Director & Partner, Beta: 'I think very often, we try to inspire, but it might be a process before all that because there are so many issues to resolve in the beginning. So yes, with the sustainability part, we can add a little bit later. You start with an empty drawing and then you…maybe you don't start with sustainability; maybe you start with the residential needs or something for the office'.

However, each member of the network is currently only allocated approx. 2 hours per month, which is mostly used for attending meetings. Besides the other responsibilities of the network's members, it is unclear how they are able to carry out the other tasks. This demonstrates a lack of formal investment by senior management in developing sustainability capabilities.

The senior management is practically implicated in the network's operations through the Sustainability Director, who decides on the resources available to the group, the funding and time allocated for network work, as well as the responsibilities of the head of the network.

Such sustainability employees, in both firms, are vital for building capabilities and enabling a more sustainable architectural offering to clients. In comparison, Alpha has a much greater number of employees who dedicate their time towards sustainability; thus, those resources can impact a much larger number of projects. Having more specialised resources in project management also allows a more innovative environment in which new solutions are created to solve existing challenges. This is present at Beta, albeit to a much lower degree, indicated by the lack of a single employee whose workload is entirely dedicated to sustainability and the minimal time allocated for sustainability work.

Inter-disciplinary Knowledge Base

One significant change within Alpha, emphasised by the respondents, is the broad competence present within the company, as one partner describes:

> Partner, Alpha: 'What we can offer, what makes us different from especially competitors in Sweden, and also in other countries, I think, is that we have many specialists within the company. So, we can actually offer teams consisting of different types of competences, like daylight specialist, energy specialist, ecology specialists, landscape architects, urban planners, social anthropologists, etc. So, we can actually take on the whole project, and we can deliver the whole project'.

Moreover, this broad competence is utilised in a multidisciplinary or "inter-disciplinary" manner. The firm prides itself on having acquired a large amount of expertise in-house, ranging from the traditional architecture know-how to technical know-how and even social anthropological analysis, and applies this knowledge to all

their projects. This is done by ensuring that a variety of experts are involved in the decision-making process of each project, as per the Alpha Innovation Process. The senior management had a clear vision that, as architecture became more complex, the competence of the architecture firm needed to match these increases. This innovation process finds its roots in the historical development of Alpha, from a small, specialised architect firm to one of the largest in Europe with a wide range of competences in-house. As this is in large part how they choose to differentiate themselves from their competitors (composed mostly of smaller, more specialised firms), Alpha created the Alpha Innovation Process to ensure that its offering incorporates all the necessary competences, and by doing so, providing a much richer offering.

> Vice-President, Alpha: 'What I think has been our key, one of our key successes in this is that we started to understand that architecture quite early on; urban design is getting more complex in a way. That's because of society as a whole. There are so much more stakeholders to consider. There is more material to understand. There are more techniques to understand, etc.'.

Alpha promotes an interdisciplinary approach by ensuring that project teams have a diverse knowledge base, including expertise in traditional fields, such as architecture and engineering, as well as extending into other fields, such as sociology and ecology. However, the question of whether including this interdisciplinary expertise into the process actually leads to a final product that fully takes all those disciplines into account is of particular importance.

An inter-disciplinary to sustainability is also partially present at Beta. According to the Director of Sustainability, Beta has over one hundred individuals with some form of experience in sustainability and has worked with over one hundred projects where sustainability was a focal point. As part of their investment in developing competence within sustainability, Beta has developed expertise among their employees, for example, within building certification (LEED, BREEAM, Miljöbyggnad), technical environmental expertise (Passive House (i.e. low energy housing), daylight, moisture), sustainable landscape architecture and holistic planning expertise, as well as expertise in sociology and social sustainability.

Knowledge-sharing is a key focus at Beta for furthering sustainability in-house. This is mostly achieved through internal events such as presentations and design reviews, and by spreading knowledge from previous projects and lessons-learned throughout the company to other employees.

> Head of Sustainability Network, Beta: 'We're doing both [training existing employees as well as hiring new experts]. We have had internal workshops; we are sending people to get educated at EKBC [Sustainability Forum], where they go for seminars and

> conferences about sustainability. And we are trying to hire people who have more experience working with sustainability. Because we see that, even though we can hire the education in sustainability, we still need to have clients who want to work with these questions, and the contact with the market that is interested in working with sustainability'.

Nonetheless, judging from the feedback from employees, the firm still very much operates in 'silos', with minimal interaction between architectural groups, especially those with differing expertise. This leads to limited sharing of project-specific knowledge within the firm.

The positions of both firms as market leaders are explained in part by the large gradual investments in supporting and diversifying their knowledge-base, and that is what differentiates them from many smaller architectural practices. Although both firms have invested in expanding their knowledge base, it still remains far from playing a pivotal role in shaping the final product.

Sustainability Standards

Both firms have acquired informational resources, such as sustainability standards, which reinforce their sustainability capabilities.

Alpha has implemented certain standards, such as the business management system ("AlphaQ"), which is certified to ISO 9001 and ISO 14001. ISO 9001 is a quality management system standard, designed to help organisations ensure that they meet the needs of customers and other stakeholders while meeting statutory and regulatory requirements related to a product (ISO, 2016). ISO 14001 is a similar standard, related to environmental management that exists to help organisations (a) minimise how their operations (processes, etc.) negatively affect the environment (i.e. cause adverse changes to air, water or land); (b) comply with applicable laws, regulations and other environmentally oriented requirements, and (c) continually improve in the above (ISO, 2016). For Alpha, the quality system fulfils these functions by providing information on laws, building codes and other relevant documentation, with an effort within the firm to continuously improve the AlphaQ system with additional environmental routines. The system was created together with auditors from ISO, more as a team effort, as the ISO systems can be easily adjusted to the industry in question. Furthermore, the implementation of the ISO standards actually strengthened the sustainability capabilities within Alpha, as the firm spent large amounts of time and effort reformulating and discussing how best to implement sustainability internally and in their offering.

> Former CEO, Alpha: What I found out when we certified Alpha according to 14001 was that it was quite an open system. You can make it very suitable to your own company… it made us think about what we're doing and reflect upon it. That's one part and one level, of course, and then you have to organise across [the organisation], if you have the competence inside, in-house knowledge of sustainability. I mean you cannot just employ biologists or anthropologists or sustainability process managers, but you have to integrate them into the disciplinary groups in the everyday work. That's part of the management's task, to do that. And if you work with external experts, you have to create ways of working cross disciplinary with them. I think you have to build up a long-term collaboration with external companies. That's a management issue to organise cross-disciplinary groups'.

Regarding sustainable building standards, Alpha has certified specialists and assessors in the main environmental assessment system for buildings used in Sweden, such as the Swedish Miljöbyggnad, BREEAM, LEED and Passive House. The firm had considered concentrating specifically within one standard and developing strong expertise only within that standard. However, after discussions, the senior management determined that the client demand for different standards was so strong that to match the client demand, they would need to retain expertise and knowledge for all the main standards used in Sweden. This is further explained by the opinion that green building standards are not altogether that different and thus require similar skills.

> Sustainability Director & Partner, Alpha: 'But in all these standards, the focus is not that different actually. I mean, you should work with reducing the climate impact, energy, ecology, etc., but sometimes, the focuses are a bit different. So, we work with most of them, and as I said, we have specialists in this company, so there are people with great knowledge in a lot of different areas'.

The decision to train their architects into assessors of various green building standards was to retain more control over the projects and avoid having to redesign buildings if they did not fit in with the standard in question. Green building assessments can also be sold as separate services to clients.

> Partner, Alpha: 'It was down to control I would say. A lot is decided through the systems' requirements, so to speak, and to have the control and to be able to, in a way, as the architect or the architecture firm, impact the evaluation or which decisions are made, reduces the risk. At the moment, I think they are still good [green building standards], but there is a risk that the way the systems are built up is that they sub optimise certain aspects. If you just give them the results or give them the tasks from someone else, you cannot always compare data, for example, in how to optimise the energy from daylight. There is always a struggle between these different aspects. It has a much stronger impact on the project if you have more control'.

Alpha has led a research project, financed by Vinnova, aimed at defining how ecosystem services can be implemented in urban planning. This effort has resulted in a manual that has been widely distributed to municipal authorities and other stakeholders.

Moreover, Alpha has been a founding partner of the Swedish Green Building Council and actively participated in the development of the Miljöbyggnad standard, which is being continuously updated. Through this strong engagement, the firm has been able to gain extensive knowledge within the standard, as well as other green building standards, but it also can profile itself as an authority, having participated in the creation of the standard.

These standards have the benefit of easily communicating certain sustainability features to clients who may not have a deep understanding of the subject. Furthermore, as a 'package' of many sustainability features in a building, it enables a swift and rather easy choice for the client, to pick a desired label of certification as a requirement in a project. As it facilitates and simplifies the matter significantly, green building standards is the most common sustainability requirements in architecture projects. However, green building standards have been criticised by some of the respondents as being counter-productive, as they may be too restrictive and strict in their conditions. This may not allow the architect to develop new, creative solutions within sustainability, which could have larger effects than those stipulated by the standard.

Alpha has also taken the initiative to pursue the issue of social requirements in the supply chain and is now leading the working group to define social criteria for the industry-wide building material database ("Byggvarubedömningen"). The criteria were released in 2015 and represent an important step for the construction sector in putting pressure on manufacturers and making it easier to choose responsibly sourced materials.

Nonetheless, these sustainable building standards are not without criticism. While they address a certain number of sustainability issues, mostly quantifiable parameters, they neglect significant other questions:

> Sustainability Director & Partner, Alpha: 'The certification systems for buildings were actually the issues on the agenda, very much I would say… the world's most sustainable building, for instance, in Amsterdam; why is that the most sustainable building – yes because it has the most points according to the green building standard. So, that is how to measure the most sustainable when it comes to today, but, of course, it doesn't mean that because (the buildings have high) credit within these systems, that they are necessarily the best building. For me, it's when you attract or integrate, it's about first of all creating for the well-being of the human being, within limits, to avoid that the resources used are more than what we actually need. When it's about resources, building materials, we must reduce the climate impact, and we need to tackle the issues of climate change, with the well-being of the human beings in mind. Then, also, the ecological

> issues, ecosystem services are an important issue within planning, as well as to have this long-term economic aspect to look at. And also the need to look at architecture in the long-term period, if it is economically viable…'.

Furthermore, strict building standards, relating to regulations on how buildings can be constructed, in general, can sometimes impede upon sustainable and innovative solutions.

> Former CEO, Alpha: '… it's difficult to try new things, and there are always regulations or some standards that have to be met. The framework in trying new things is a little bit narrow. I think, it's necessary in our time to allow, at least, areas of innovation where you can question a lot of standards, a lot of cold traditional thinking, but that's not very common. I think the climate is not good enough'.

Beta also uses an integrated quality and environmental management system, which has been in place since the beginning of the 1990s. The system has been refined and developed gradually, in pace with changes in the company's organisation and business, and in response to external demands. The business system also complies with ISO 9001 and ISO 14001.

In addition, Beta also possesses different informational resources, such as software and tools. It has a comprehensive goal of increasing environmental awareness in terms of energy conservation, materials used and the interior environment. Underpinning these focus areas are the Tyréns/SundaHus Miljödata environmental database and environmental legislation updates to which Beta subscribes. The software consists of various platforms and programmes to promote sustainability, with the material database system *SundaHus* having perhaps the most important impact on the design. The services provided by the SundaHus programme focus on providing accessible information about the environmental-friendliness aspects of various building materials and products, by independently testing and identifying hazardous substances. Furthermore, it encourages a life-cycle perspective by advising on responsible and environmentally-friendly disposal of materials.

> Interior Architect, Beta: 'You send the materials and products to them [the SundaHus representatives], and then they check. They have chemists and professionals with material knowledge about the molecules. So, they check the materials and how the products are made, and if the construction of the product or the material is healthy for the staff that makes the material and how the transportation goes, and the different parts and then, once they have checked that, they give the material a letter, like A B or C or D for example, and then some of the letters are approved. Then you get the answers and then you can see whether it is possible to use that product or not. If it is bad, then you have to find something else and go and do that process again'.

These databases, however, represent a significant cost in subscription fees, and due to their difficulty of use, are very time-consuming. Furthermore, respondents have commented on the absence of certain materials being catalogued in the database, which makes decisions on those materials difficult. The process of including new materials in the database is a lengthy one, leading to long waiting times for the environmental information to become accessible for the architects.

Another internal tool at Beta is that of a project reference library. This is constituted of a digital database of previous projects, available internally to Beta. The goal of the library is to encourage lessons learned from previous projects, knowledge of innovative solutions from previous work. If a challenge occurs in a current project, the architect can refer back to the library to see whether it had occurred previously and how it was dealt with. Sustainability is one aspect of these referenced projects, and the library is also periodically used in the search for sustainability solutions.

One common idea within the field, especially amongst the clients but also with architects employed at Beta, is that sustainability is achieved through green building certification systems. Furthermore, the Head of Sustainability Network at Beta states that nowadays the main offering of the firm within sustainability is building designs intended to fulfil green building certification systems. She explains that this has become the norm, as Beta has gained experience over the years with the main certification systems used in Sweden (Miljöbyggnad, LEED and BREEAM), and clients often require these standards in their projects.

> Head of Sustainability Network, Beta. 'For now, it's very much about whether it's certified, in Miljöbyggnad or BREEAM, or LEED, or Green Building or… but that's our main tool now and very easy to point out'.

There is a strong desire to work outside of the limitations of these standards and push for more innovative sustainable solutions. However, building designs are often developed to only fulfil the certification requirements because, based on previous experience with the systems, this can be done relatively quickly and inexpensively. Initiatives to develop new innovative solutions in sustainability are often abandoned due to the risk-aversion of Beta's management, as well as the pressure to achieve higher profitability in each project.

It is also unclear among employees which green building standards achieve higher levels of sustainability and whether certain systems should be prioritised.

> Office Manager, Beta: 'And we also feel that those different kinds of certifications like BREEAM, LEED, many of them, they contradict each other. So, then it also makes everyone confused as to what is really the best way to go. And it's a lot up to what does that project think and what is the most... so it's not really a science, it feels like when we

work, it is a lot up to the builder, and the owner of the project – what do they want? And then they can choose the system that suits them best'.

Within Beta, there seems to be an agreement that the green building standards can also impede upon quality architecture. This is a challenge that is easier to address when the architects are well educated and knowledgeable about the standards.

> Independent Industry Expert & Former Manager, Beta: 'Yes, I would say that an architecture firm ideally wants to be at the forefront you know, teaching their clients about new systems. I would definitely say, I think that the certification systems, they have pros and cons. One big con is that they are kind of static, so they do not always work with the architecture. Sometimes they even work against the architecture and sometimes they're contradictory, daylight versus not having too hot spaces [for example]. I think there are people who are questioning these systems, and I would say that would be natural, for a bigger architect firm, that would be a natural undertaking for a bigger firm to be proactive and push forward these questions. And really train your employees, you know, that "Miljöbyggnad" is the thing really in demand now, so everybody really needs to be good at that and know from the start how to design so that the system does not come in the way of architecture, later on, if you see what I mean.

Beta has experts within the BREEAM Communities, LEED-ND and Green Star sustainable building certification systems. While admitting that these standards have been a powerful force behind sustainable architecture, they also present certain limitations, such as the emphasis on traditional environmental foci, e.g. energy consumption, but not other aspects, such as the carbon footprint.

> Strategic Advisor, Beta: 'I think it is good in a way that you have some kind of Green Building Standards. It helps us to talk about sustainability, but I also think that the Green Building Standards are a bit old fashioned. They should actually be modernised regarding the questions and the problems we have today and in the future. They focus more on energy consumption, and they focus much more on how not to have too much sunlight in the building, so you don't have to cool it down. They also focus on how much daylight you will have. They focus on intentions, and that is very important, of course, because that would be bad for your health. But I think today, if we had more materials, I feel that they have forced the development in the right direction. Today, we have new problems and different problems, so I think the Green Building Standards should have changed and developed. And now it's more about how you transport materials, how long they last, how you recycle them, if they are recycled and more a carbon footprint in the Green Building Standards than I expected. I also think that the Green Building Standards should be focused on the social sustainability aspect of things. It's a good way, but you have to modernise them and change them a bit'.

Another advantage communicated by employees is regarding the justification of extra costs arising from sustainability. Green building standards are a very legitimate and convincing way to get the client to invest more in sustainability.

> Independent Industry Expert & Former Manager, Beta: 'I was working with residential projects, and the budget is quite tight. So, I would say by working with these very regulated systems, like "Miljöbyggnad Silver", that, in its own way, is a very resilient way of working in sustainability. Because you cannot argue with it so much: this is the system, and everyone has to follow. So, if there are costs that are associated with the system, then you just relate back to the system. So, I will say for architects that are not so strong within the building hierarchy, it is good to have systems as it is a way to justify the extra costs'.

Sustainability standards, especially green building standards, constitute a fundamental aspect of both firms' sustainability capabilities, and they often serve as a signifier of sustainability in the offering. The various labels associated with such standards are the most common method of measuring sustainability in the market, especially from the perspective of clients. Thus, despite their shortcomings, developing a strong capability in implementing these building standards is absolutely crucial to meeting the clients' demands and creating added value for both the clients and end users. However, in many instances, these standards actually impede upon sustainable solutions by being too rigid in their requirements and forcing the building design to follow a certain, more predefined design. This can lead to an increased difficulty in applying new, innovative solutions that challenge traditional designs.

5.1.3 Alpha's Informational Resources

In this section, I will discuss Alpha's informational resources and changes to those resources in relation to SBMI.

The Sustainability Plan ("Hållbarhetsplan")

Perhaps the most apparent example of Alpha's efforts in sustainability is the implementation of the ongoing initiative led by senior management, called the Sustainability Plan. This initiative has the ambition of further strengthening Alpha's work within Sustainability. Included within this initiative is, for example, the Sustainability Analysis, as well as a yearly follow-up on sustainability within projects to ensure that the necessary focus is given to these issues.

> Sustainability Director & Partner, Alpha: 'Yes, we are discussing that a lot because, I would say that, most of our projects… I actually just minutes before here sent out a questionnaire because we must show that every year, how our largest projects, how much they work with sustainability and what type of questions and what is the level of energy

> in every project we do, and which questions have been most important in the projects to measure how we are moving forward. I think that today, most of our projects have some kind of sustainable focus. But as I said, not all clients put the highest emphasis on this question, but there are no clients that I would say don't mention sustainability today'.

The Sustainability Analysis ("Hållbarhetsanalys")

As part of the wider Environmental Plan undertaken by Alpha, the Environmental Analysis tool was implemented approximately one year prior to data collection. It is a significant part of the attempt to articulate sustainability efforts into the everyday work of architects and across different projects. The Environmental Analysis is a tool that is implemented in nearly all projects (except the smallest) and is used to determine the most important and urgent sustainability concerns specific to each project:

> Sustainability Director & Partner, Alpha: 'Well, in every project, we should identify the most important sustainability questions for that specific project, and there is also a tool [the Sustainability Analysis] that can help you identify those most important questions'.

This method enables sustainability to be incorporated from the early inception, throughout the design, and in the delivery of every project. The tool uses seven different categories to conduct a sustainability assessment of the project, with the UN Millennium Development Goals (United Nations, 2016) providing the basis for some of the goals: energy, climate emissions, ecosystems, ecology, climate change adaptation, health, well-being, materials, waste, hazardous substances, social, equity, engagement and long-term economy. Through this tool, the project members at Alpha can adapt the project, from the general design to the specific features, to best address the sustainability issues.

> Sustainability Director & Partner, Alpha: '…we have a tool for identifying the most relevant sustainability questions within each project. It's categorised into seven parts, which are pretty much what I just told you: energy, climate, emission, it's ecosystem, ecology and climate change adaptation, it's health and wealth being, it's material waste and also substances, and also equity engagement and finally, long-term economy […] We should always consider in our project. Then it's not relevant on all projects, and we need to put more focus on certain elements, depending on the project. Some of the issues are most important if you do a residential building – not necessarily a maximum focus on all the features but sort of decide where to, which questions to prioritise in each project'.

Alpha has currently developed a tool for buildings and is in the process of developing the same tool for interior design. Areas which are covered in this tool include: the general plan of the building, such as orientation, height, depth, room layout to ensure

daylight, choice of materials, and lastly, the technical facilities, such as ventilation, heating systems and lighting. This will allow Alpha to further develop their value proposition within sustainability.

United Nations Global Compact Report

Another important initiative is Alpha's participation in the United Nations Global Compact programme. This commitment binds Alpha to enact changes within their companies and in their operations as per the commitments set out by the programme, with many relating to sustainability. Subsequently, they issue a report to document these developments. Alpha was the first Swedish architecture firm to commit to the UN Global Compact initiative. The ten principles that are required of any participating company are the following: Human Rights (Businesses should support and respect the protection of internationally proclaimed human rights; and make sure that they are not complicit in human rights abuses), Labour (Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced and compulsory labour; the effective abolition of child labour; and the elimination of discrimination regarding employment and occupation), Environment (Businesses should support a precautionary approach to environmental challenges; undertake initiatives to promote greater environmental responsibility; and encourage the development and diffusion of environmentally friendly technologies), and Anti-Corruption (Businesses should work against corruption in all its forms, including extortion and bribery) (United Nations, 2016).

This report strengthens Alpha's brand as a dedicated player within sustainability, and also functions as a marketing feature of the brand, in attracting new clients.

Sustainability Project Feedback

One of the recent changes is from the sustainability group within the firm. They have initiated the organisation of a voluntary feedback session regarding sustainability in the early stages of projects. The main principle is that of internal criticism, in which sustainability experts, together with architects and engineers, would evaluate the sustainability issues, objectives, challenges and solutions in the project. The goal is for more specialised knowledge to be transferred from the sustainability experts to the architects, and for all to benefit and learn from previous experiences, especially in overcoming the challenges and difficulties faced in specific projects.

ReCapture

Alpha has developed a tool called "ReCapture", which is a 3D recycling tool: ReCapture collects all valuable information about a building's potential for reuse in a future-proof 3D model. Investigating a building's reuse potential has so far been a very

analogue and time-consuming process. This led to Alpha developing the ReCapture tool, a time- and cost-effective way to use 3D scanning to inventory a building's reuse potential before new construction and renovation. The tool creates a digital copy of a building while recycling experts identify its constituent materials and parts. It is then integrated with BIM. The service is based on four modules: data collection and identification, inventory for reuse, modelling and consulting and planning.

5.1.4 Beta's Informational Resources

In this section, I will discuss Beta's informational resources and changes to those resources in relation to SBMI.

Sustainability Plan

A sustainability plan had been implemented at Beta, with the ambition of raising the profile of sustainability internally. The aim is for the plan to be used during each project, identifying the sustainability concerns and impact of each project, and determining which steps can be taken to address these issues. The plan details Beta's visions within sustainability, their objectives and strategies (Beta, 2016). It sets out Beta's ambition to create a profile synonymous with durability, to develop the business in sustainability, and thereby meet the current needs without jeopardising opportunities to meet needs in the future. Their stated objectives within sustainability include: Becoming a company with a very good sustainability profile by delivering higher quality in projects, having a better market potential to attract competent employees, and contributing to urgent climate action. The sustainability programme they use will serve as a guide to achieving sustainable solutions in their projects and in their office environments. Central decisions are to be made on visions, goals, strategies, action plans, etc. The work that is done locally is adapted to each department's prerequisites, with complementary goals and action plans added as necessary. All employees should contribute with skills, initiative, creativity, solutions, development work, etc. Beta states that it will systematically develop and improve its sustainability and quality work by: increasing sustainability levels in projects, increasing the number of projects where sustainability requirements have been set, increasing the number of sustainability-skilled employees, increasing information about its strategies and projects, developing and applying any appropriate environmental management system, and preparing a sustainability report as well as reducing resource consumption in its operations.

Within its operations, Beta plans to: develop, update, establish and evaluate the company's environmental policy and sustainability plan as well as an accompanying action plan; clearly communicate its sustainability work internally and externally;

educate and train employees distributed across the country in SGBC “Green Building Standard” B and C; plan for other sustainability educational programmes; implement sustainability seminars within Beta's various offices; complete the work with the “Office Environment Manual” as well as coordinate with local office manuals and with the “Personnel Handbook”; review and develop "sustainability texts" in the operating system, website, intranet, tender documents, etc.; review membership of various sustainability organisations, for example, join the UN's "Global Compact", and participate in the Building Sustainability conference SGBC16; carry out an Environmental Investigation and / or Carbon Footprint Assessment; continue developing the Sustainability Network; start the work with an Environmental Management System ISO 14001: 2015 or similar system.

Beta also emphasises other sustainability measures that are to be encouraged internally, such as all employees should ensure sustainability in their projects and recommend sustainable solutions and choices. Within purchasing, there should be a focus on: Green lease agreement; Green electricity; “Swan labelled” [Swedish Ecological Label] and Fairtrade or equivalent products. Additionally, employees should switch off lights and turn off computers and screens when leaving for home. For waste management, all employees must sort separately: Paper, cardboard, incandescent lamps, batteries, electric waste, compost, combustible, plastic, glass (divided into coloured/uncoloured), metal. Regarding transportation, employees are advised to choose trains over planes, public transport over cars, and, if choosing a car, to pick an environmental vehicle. They should also try to always pick ecologically aware shipping companies. Prioritising video conferencing over in-person meetings is also recommended.

This project plan is the first holistic strategy developed for sustainability by senior management. It strives to harmonise the different sustainability efforts undertaken by different individuals and groups within the firm. This is achieved by creating and imposing news routines and formulating a more accurate value proposition in sustainability.

Sustainability Analysis

Moreover, Beta had recently introduced a sustainability framework, called the “Sustainability Analysis”, which is now a mandatory step to be completed before each project:

> Independent Industry Expert & Former Manager, Beta: ‘Some people only work with starting the project, the vision and the more general idea. And that’s when you discuss and already know what the client wants, and you try to relate to that, and you put it into the checklist, and then hopefully it affects the overall design of the building, so that it

can work with the building and not against it. But then again, it is also kind of common that other people take over later in the process'.

5.1.5 Alpha's Organisational Resources

Both firms have developed organisational resources to further their SBMI work within sustainability. This is most obvious when analysing their offerings and observing how both firms continuously update their offerings based on new insights. Disregarding sustainability capabilities, both companies can be described as being of comparable quality and ability in responding to market demands in Sweden. Both Alpha and Beta have secured large-scale, prestigious projects and out-competed competitors for many years. Their offerings are highly innovative, combining a large and varied body of knowledge, traditionally considered outside the field of architecture, and applying decades long architectural know-how and experience.

At Alpha, due to initiatives such as the Sustainability Plan and the Sustainability Analysis, sustainability efforts are compulsory in every new project. These efforts are included at an early stage (although these efforts and sustainability 'features' can still, of course, be impeded by client demands), with sustainability experts regularly attending nearly all project launch meetings. Alpha, being the first architecture company in Sweden to employ an expert in social sustainability, is often more competent in providing a holistic approach to sustainability, touching upon ecological, social and economic aspects.

Before sustainability knowledge became anchored within Alpha, there was a conscious decision to implement new processes and positions to enable the experimentation of new solutions, to facilitate advances in sustainability through learning-by-doing.

> Former CEO, Alpha: 'In the beginning, it was the manager of sustainability [who was in charge of promoting sustainability]. Then, there was a sustainability-responsible manager in each project and things like that, and there were opinions: "yes, it's so integrated in your way of working, in your way of thinking, that it's not necessary to have specific sustainable managers" or things like that. But I think it's a kind of process where you have to change the culture. In one stage of the process, it's necessary to have specified and appointed people to take responsibility for the development of the sustainability issues, but when you have a certain level of experience in the company, and a level of competence and knowledge and specialists integrated in the process, then you don't need that so much [managerial intervention]'.

The Ownership Directive ("Ägardirektiv")

During the process of deciding the company's overall strategy, an internal survey was conducted, which was named the "Needs Assessment" (or "Behovsanalys"). This survey consisted of interviewing employees who owned shares in Alpha to understand which direction and priorities they would like the company to work with. The results of this survey led to the establishment of the *Ownership Directive*, which is a steering document that focuses on value-driven objectives, instead of stating financial goals in the business plan:

> 'Now it's a very important steering document because now we are so many. It's really important for us to have more of a written statement' (Partner, ML).

These value-driven objectives include, amongst others, an internal requirement to only accept projects that meet certain sustainability requirements.

The Alpha Innovation Process ("AIP")

One of the most important changes within the company is the implementation of a process called the Alpha Innovation Process. This process has the goal of including an inter-disciplinary approach to each project by involving various experts and stakeholders as early as possible. It originated from the "Sustainable Integrated Design", which was an earlier initiative aimed at integrating sustainability specialists in cross-disciplinary working groups.

> Former CEO, Alpha: 'What we did at Alpha was to organise a group; we called it "Sustainable Integrated Design". Then after trying several different ways of organising different competences, we established a group within the Stockholm office and invited all kinds of different experts, like architects, planners, project managers, economists, biologists, sustainability project managers. We invited them to one group and said, ''yea, well you now have a group here to create the new businesses and new commitment to the client". It was more on a voluntary basis than it being organisational or structural. It was a structure, but it was more based on willingness and commitment from the specialists. That could work out quite well cause then they had a natural will to work together. Instead of organising environmental specialists in one group, internal architects in one group, planners in one group, school architecting in one group. That does not promote the interdisciplinary and sustainability work'.

Therefore, they have implemented the Alpha Innovation Process as a method and tool for involvement in early stages and identifying various needs. The process consists of inviting different experts in-house (for e.g. sustainability, daylight…), the architects in charge of the project, the client, the municipality, a number of people living in the area, and even academia, to participate in a workshop and dialogue on the planned

architectural project, in order to obtain knowledge from them and promote the co-creation of value to all stakeholders:

> Architect, Alpha: 'But at the beginning, we meet people from [our company], our environmental experts, the client, the municipalities, some people living in the area, academia as well, and everyone together, as we don't know everything [related to the project], of course. There is a lot of knowledge with our clients and the municipalities that we don't have. And instead of us doing the design and then receiving feedback, we say that we go together at the beginning and we do it together'.

A large part of the Alpha Innovation Process also refers to sustainability and involves discussions in the form of a workshop with the client and other relevant stakeholders.

> Sustainability Director & Partner, Alpha: 'First of all [what is included in the Alpha Innovation Process] is the location and how to orientate the building. Then, you can move forward on how the plan of the building should be, the height of the building, the depth, how the rooms of the building should be, how deep it should be to ensure daylight within the room. And then you could do different simulations throughout the process. And then finally, you can decide what materials we should have. Maybe we should work with wood or concrete, or what is the best from a sustainability point of view. And then finally, in the last step, we discuss technical facilities, like ventilation, heat systems, light, etcetera, artificial light, which are essential for the building's functionality. That is the last step I'd say. But the optimal way of working. Sometimes it works, but sometimes not. But in the very beginning, that is the way we make the process optimal. So that is how we are trying to plan our projects. And what we are pretty good at, I would say, is having workshops with our client to try to define the most important issues, and we also have tools for that. We call it the "Alpha Innovation Process" and, of course, sustainability is an important part of it.

However, one important aspect of this routine is that, despite the formal participation of various experts with different knowledge bases, it does not guarantee that such interdisciplinary concerns and issues will be highly favoured in the final design. This is due to the specific circumstances of the project and the demands of the client.

Alpha Research Lab

Another significant part of Alpha's SBMI was the establishment of the main research vehicle: the Alpha Research Lab. This organisation is of a smaller size than the Alpha Foundation, and is used solely for internal, practice-based research projects relating to sustainability. One of the main uses of the funds within the Alpha Research Lab arises when the client is requesting a sustainable or innovative solution that has not been tested or implemented before but is not ready to stand for the extra cost. In that case, funds from the Alpha Research Lab can be used to finance the extra hours and work

needed to investigate the application of the new technology. This can benefit the client directly in the specific project, but also develop knowledge within the firm, knowledge that can be used in future projects to create more value for the customer.

> Partner, Alpha: 'But then we have, for the past couple of years, another kind of research [fund]. Money that is more practice-based, research money that is much more in amounts, but it goes much quicker and said to be related to the actual projects that we have on the table. Like if you can identify a certain aspect that the client is not super interested in going so deeply into, then you can apply for it…To be able to do certain part of the project as a research project, so to speak; so it's very related to the practice. The client may be interested [in an innovative solution], but they say, "No, it's not within the budget" or they don't have time or yeah. Then we can do collaborative research, of course pay partly, since it's their project'.

This initiative significantly influences the final design and the final sustainability of the offering. However, it is still very much dependent on the specific client requests, and if the client lacks interest in such matters, they would often be dismissed from the project.

Breakfast Meetings

Another change was the establishment of the breakfast meetings: a channel to stimulate discussion both internally and with the clients and partners of the firm. These meetings occur on a regular basis, typically once or twice per month, and often focus on the notion of sustainability and related issues, such as daylight and densification. Responses from the interviewees suggest that these meetings play a large role in the sharing of knowledge both internally within Alpha and with external clients and partners, potentially leading to novel and innovative solutions within sustainability, and a co-creation of value for all parties.

5.1.6 Beta's Organisational Resources

Beta, through their SBMI journey, had implemented changes aimed at ensuring that sustainability is addressed in future projects, such as formulating an environmental project plan. Furthermore, the *Sustainability Network* provides valuable assistance in sustainability matters, but they mostly only assist when they are requested by the project manager, leaving the project manager in charge of determining whether to place more emphasis on sustainability. However, feedback from Beta employees suggests a much smaller capability to take risks and engage in more innovative solutions, with a preference for making incremental improvements to existing products.

> Sustainability Director & Partner, Beta: '…it is not really rocket science. I mean, you can find rocket science in small pieces, and someone who is really clever, but it is very

much about improving your products a little bit more. Sometimes, I think the market or the client thinks it is more complicated than it is'.

Quality System

Beta has also implemented an environmental management system, based upon the ISO 14001 standards, although it has certain drawbacks, such as only providing superficial support for sustainability. They have talked about an ongoing initiative to develop the system further.

> Strategic Advisor: 'This is a quality system that is based on ISO, but it's not a classified ISO. It is based on ISO because we had a consultant working for us to change it. We're actually working on a new system to try to modernise it a little bit, because our system is about testing yourself and it's not so easy. We want a system that is much more leading in our projects, easier instead of just building checklists, etc. This system is actually to probe projects more as part of the climate checklist, so we're actually developing that system right now'.

"Design Review" Sessions

Another change is the introduction of an internal workshop organised by Beta, called the 'Design Reviews'. These consist of architects presenting their current designs internally, with the goal of obtaining feedback and other perspectives from other architects. As a middle manager at Beta expressed, these sessions could be particularly useful in the pursuit of sustainability, as sustainability foci can be raised during these seminars, and if a number of enthusiasts were to really push, designs can be strongly altered to become more sustainable.

"Beta Talks"

The firm has also started organising seminars on a regular basis, as part of a programme called 'Beta Talks'. These talks are organised with the goal of raising questions and issues within the field of architecture and societal questions with, understandably, sustainability being a common theme. These events have been described as an important factor behind the propagation of sustainability knowledge from experts within the organisation. They are also a way to obtain knowledge and forge business relationships with external partners, and even competitors.

> Interior Architect, Beta: 'We host the "Beta Talks", and we have different themes on them. One of the themes has been environmental, and then we have one expert attending. Last time, I think it focused on BREEAM, for example. Then she goes to all Beta offices, and she describes the system and how it works for one and a half hours, and all Beta offices listen to her. So, it's like an internal training. That's internally, then we also have an external aspect that also works. We invite staff from other technical

> companies that specialise in, for example, how to make glass and how to make it environmentally fit. Then we invite our customers to come and listen to this for a lesson. So, its knowledge transformation or transfer. Internally and externally. Internal and external education and also, we try to educate the clients'.

"Green Bid"

One interesting change, implemented as part of Beta's SBMI, was that of the 'Green Bid'. This consisted of presenting a sustainable design alternative for each design proposal submitted to competitions. This was a strong factor pushing sustainability within the organisation; however, it was discontinued due to both the high cost of allocating time and expertise in developing these additional bids, but also due to low interest from the clients.

> Strategic Advisor: "We did the "Green Bid" on the questions we had from the client. Then we did an internal bid with green [as a focus] and in that bid, we suggested that if you do this, you can have a certified building; and if you do like this, you can have a much more sustainable or low carbon footprint. And, of course, that would be a different price from our work because sometimes we have to assemble more use and knowledge and use more skills than that. Then the client could choose, so even if they didn't ask for a green building in different ways, we suggested a possible way of doing it. We did that for a few years, but it was very difficult to regain interest from the clients to do green, because they are interested in doing a simple building as quick as possible with as low cost as possible'.

Education and Training

Beta has started organising certain activities, such as education and training workshops, within sustainability and sustainable solutions for its employees, with the goal of developing new and innovative solutions within sustainability. However, other than those, there seems to be a notable absence of routines, or processes, which are directly aimed at actively developing knowledge through foresight, assessment of consequences, and ad-hoc problem solving or managerial intervention.

> Office Manager, Beta: 'No [there are no sustainability processes or guidelines] – on sustainability, it depends on what you mean with sustainability, but not really if you think of more ecological thinking, not really. No processes that we are forced to fill out. The Swedish law is quite tough, so that we have to follow always, but not above that'.

In summary, it is clear from the empirical materials that Alpha has invested significantly more resources, at an earlier stage in developing sustainability capabilities. This is evident in its organisational approach, internal knowledge base, processes, offerings and external relationships. Consequently, this has translated into a consolidation of its

position as market-leader, with a larger market-share and higher profits. Beta, on the other hand, despite having had certain considerable initiatives within sustainability in the past, began investing in developing these capabilities and building the necessary knowledge base and processes within the firm at a later stage.

Thus, both firms possess a number of organisational routines related to their work with sustainability. Nevertheless, Alpha has formalised a greater number of standardised routines, such as the Ownership Directive, the Alpha Innovation Process, the Sustainability Plan, the Sustainability Analysis; moreover, it is an active participant in the United Nations Global Compact Report. It also founded the Alpha Foundation, a separate financial entity endowed with funding for research and development projects and collaborations. The firm has also implemented a routinised feedback session after each project that focuses on the sustainability learnings from that project and how these can be disseminated throughout the company. Regular breakfast meetings serve as an effective method for articulating findings to the rest of the employees.

Beta, on the other hand, has implemented fewer routines to disseminate sustainability efforts throughout the firm compared to Alpha. One of these routines is the Beta Talks, which are lectures or discussions revolving around contemporary subjects, often referring fully or at least in part to the phenomenon of sustainability. External guests are often invited to participate, with the goal of bringing external information into the firm and applied into projects. Another routinised meeting is that of the Design Review Sessions, which is a regular workshop, during which employees present their project but most importantly, the findings and learnings from such projects, with the goal of sharing valuable knowledge across the firm. The third main routine associated with sustainability is the Environmental Project Plan, which provides guidelines for employees to follow when engaging in projects, encouraging the implementation of sustainable solutions.

We see that, in general, Alpha has implemented and routinised a greater number of sustainability initiatives compared to Beta, with efforts in special funding and international accountability being the largest differences. This contrast is underlined by the head of the sustainability network at Beta, who states that their firm is clearly lagging behind in terms of developing sustainability capabilities.

> Head of Sustainability Network, Beta: 'Yea, definitely. We are behind, I would say. In our offering. As it is for now… Or we are very bad in communicating. We have the knowledge and experience in certain sustainable solutions or questions, but we are very bad in promoting them and communicating them. I mean, Alpha is always, I mean, since we are approximately the same size, Alpha is always our biggest competitor; we are, of course, measuring ourselves a lot with Alpha. And when it comes to sustainable questions, Alpha has always been very keen on being on the frontline… So, I don't know

if… yea. But if you compare with other (companies), such as [another competing architecture firm] for example, they at least haven't pointed out that they are working specifically with these questions or focusing on these questions. Maybe they have another strategy that they say that it's so evident that they need to work with these questions that they don't need to say it: "We're always working with these". I think a lot of, or at least a lot of… bigger offices which are working with sustainability, they are not [communicating]… but they may be behind on communicating them or not, as good as Alpha. They say: "Yea, but of course we got to know that, because it's [taken for given] ("hygienkrav") that you are"'.

5.2 Offering & Value Proposition

In this section, the manner in which both firms engage in SBMI and incorporate sustainability into their offering and offer value will be presented.

5.2.1 Offering

Both firms have made changes to their offerings. Nonetheless, as the concept of a sustainable architectural offering remains an abstract idea for many, there are exists diverging opinions on what it actually comprises.

Sustainability Offering

One large obstacle to changing the offerings at both case companies is the complexity surrounding a sustainable offering. Employees at both Alpha and Beta express difficulties in working with sustainability, stemming from an unclear understanding of what the concept means and ambiguity regarding actual implementation of sustainability into the offering.

An increasingly complex aspect of sustainability is social sustainability, which is becoming an important aspect of Alpha's offering. The firm has a total of eight employees who are fully dedicated to working in this field. Alpha's understanding of social sustainability can be divided into three aspects: environmental psychology, social politics and behavioural psychology. Environmental psychology involves designing the building in a certain manner, so it has a positive impact on the user. A notable example is how to design a school which would make the students eager to go to school every day and encourage them to learn. The second aspect is that of social politics and is mostly involved with questions such as inclusion and integration of the communities in the area. Drafting a project plan from a dialogue with local citizens is one example of an initiative. The third aspect is that of behavioural psychology, mostly relating to

the use of energy or disposal of waste. Depending on where the recycling station is located, for example, it can strongly impact the number of inhabitants who recycle their waste. Analysis of this type, leading to recommendations for the general design, which is increasingly becoming a part of Alpha's offerings.

> Interior Architect, Beta: 'But I do notice that the clients do ask for, they're aware of sustainability issues and they do want some aspects of their projects to be sustainable but not necessarily all aspects'.

One common theme identified at Alpha from the empirical material is the actual status of sustainability within the design process. Whether sustainability is and should be a core element of the architectural design, as opposed to an 'add-on', is of central importance:

> Partner, Alpha: 'I think within the architectural society and, of course, within Alpha as well, there is a different opinion on whether sustainability is the core of the architectural programme or something that can be fulfilled in a traditional, old fashioned or 'yesterday way' of fulfilling a programme, where sustainability was not [the core], because architecture always involves creating a programme and fulfilling a programme. You are making a programme into form, and whether sustainability is part of the programme or not, that is the issue'.

Moreover, due to a finite number of resources and budget in every project, there always needs to be a prioritisation of sustainability demands decided between the project members, as to which aspects will be addressed and which will be given less consideration in the final design.

The interviewees also expressed the firm-wide opinion that sustainability must be widespread across all levels and departments within the firm, rather than being reduced to a niche offering:

> Architect, Alpha: '…you have to understand that sustainability is not something that we work with in some pilot projects where you have extra money or where you can actually have the time to focus […] I think you need to have sustainability in your backbone as a response [to the pressure of building cheap housing]'.

This ambiguity is also experienced at Beta. One key concern identified from the empirical material was the uncertainty surrounding what actually constituted a sustainable building, with questions regarding whether energy use or building materials should be prioritised.

> Office Manager, Beta. 'Yes – the thing about energy and the energy use of a building – that affects us a lot. But then also, I think that maybe that is taking too much energy or

> too much focus, I would say. We focus so much on the energy use of buildings, but if you look at the energy that is used when you build? If you compare concrete compared to wood, and how much energy does it take to build those energy-saving buildings? It's only me, I think that discussion is everywhere - What is really environmentally friendly? What is really sustainable?'

At times, clients themselves know that they would like to include some form of sustainability into their project, but when the details are discussed, they may be reluctant to accept new sustainable features.

A number of environmental specialists at Beta place a large emphasis on the choice of materials used in architecture projects and how that plays a large role in the final level of sustainability. Often, society at large remains largely ignorant about the significant impact of the materials on the environment.

> Strategic Advisor, Beta: 'We had a project with a client, who wanted a sustainable focus. They were happy if they only built the house in wood or if we classified it as a silver building ("Miljöbyggnad"). And then I talked to the client and said to him that to classify this as a silver building, that is not sustainable, that is just a label; it's not so much sustainable, like if you look at the whole carbon footprint of that building. But if you build it in solid wood, of course, that is a low carbon footprint building. It's two different things. I was a bit worried that the community treats them as equal when they are not sustainable in the same terms. They are not equal at all and […]. Even if we design a building that has a very low carbon footprint in that, then he will go to a contractor that is going to build it, they wouldn't know how to go and buy those materials because the processes are more different from that'.

A prior CEO of Alpha also expressed the challenge of developing innovative solutions with partners during an architecture project, rather than merely fulfilling the sustainability requirements mandated by the client, some of which they might be legally forced to follow. He emphasised that the pressure to do the bare minimum sometimes hindered the long-term objective of thoroughly developing an innovative solution, one that may be easily adapted and used in future projects. Indeed, one clear takeaway from the respondents is that the architects within Alpha cannot solely develop innovative sustainable solutions; rather, this requires a collaboration between different fields of knowledge, such as engineering. Often, new technological solutions are developed by engineers but pose challenges for the architects in their application within the building design. A previous CEO of the firm clearly stated that sustainability is not about art or design, but rather about technology.

It is noteworthy that Beta also places significant importance on innovation generally in their projects. Searching for new, innovative solutions to challenges and problems that may arise is a big part of creating sustainable designs for them. This is corroborated by

them being ranked the fourth most innovative architecture firm in 2016 by the American business magazine Fast Company (Fast Company, 2016), although innovations within sustainability were not directly mentioned. Alpha was notably absent from the list.

Often, sustainability requires innovative solutions, as environmental sustainability can sometimes contradict human well-being, which includes social sustainability.

> Interior Architect: 'Yes, but it's not only the environmental in the societal aspects; it's also the environment for the humans who actually work in the building. For example, you can't build a building without a window, and you might have quite good energy reductions, like we did in the seventies, but the environment for the human beings that are going to stay, a visit, or work in that building would be very bad, I mean they might even get sick because they can't see daylight, and they can't see out through a window and that is a very unhealthy environment for them, so that is also sustainability, in my opinion'.

To incorporate sustainability features into an architectural design, there is common agreement at Beta, across the field that in order to do so, sustainability must enter the discussion already in the early stages of the building project, i.e. during the planning phase. This is done to ensure that the general design of the building will be developed in a manner that incorporates sustainability in its core design, such as the environmental performance and social sustainability. Raising these questions later in the process poses a significant limitation on the potential for sustainability to be achieved in the project, as any new features introduced must then be made to 'fit-in' with the overarching core design.

Thus, in line with Alpha's superior sustainability capabilities, the firm's offering also presents more advanced elements of sustainability, with a deeper understanding of issues within environmental, economic and social sustainability, which, in turn, leads to a greater implementation of sustainability measures in the final offering. Furthermore, the concept of sustainability has become deeply entrenched within Alpha's offering that it is difficult to separate the two.

An important development in Beta's sustainability offering took place in its involvement in the sustainable city project. It consisted of sustainable master-planning, that is, designing not only the building but all the infrastructure and environment within the designated area. The sustainable city project is an ongoing, retro-fit, residential, commercial, and industrial construction project with a strong focus on environmental sustainability and development and is commonly referred to as a "sustainable city". It is being built in a major Swedish city and has become an extension

of the city centre. Today, the sustainable city project is the largest sustainable urban development project in Sweden to date.

The project was significant due to its two overarching objectives: first, to demonstrate and promote a *holistic, integrated, systematic approach* to urban planning, and second, to *spearhead new green technology* within the construction, transport, engineering and energy industries. Beta was very much a key actor in the development of a holistic approach to architecture. The unique planning process resulted in new and integrated environmental solutions whereby the resources provided by one player are utilised by another. The project generated huge interest, both nationally and internationally, and served to significantly raise the profile of sustainable architecture.

> Strategic Advisor, Beta: 'I would say that the luckiest for us was that we were involved in a very early stage with the start of the sustainable city project. If you look at it now, of course, it's not so sustainable. The development has gone much further than when it was built. But if you looked at it then, it was very sustainable. It was a very new way of working with sustainability, and we were involved from the outset, before the buildings were there. So, we were very much involved with the urban planning process, so we actually had a lot of knowledge there, and we had the opportunity to have a lot of contact in Asia, and the effect of that. Asian countries are very interested in how we did it and how we standardised, because they have used our knowledge a lot and then they do it better today because the technology and the knowledge today are much more granted. That is a lucky thing for us. I would say that we had those projects before because that has helped us to focus more on sustainability and it has also given us a lot of knowledge about it'.

The sustainable city project operates according to its own "eco-cycle", which outlines environmental solutions for waste, energy, water and sewage.

The requirements and sources of energy are as follows: combustible waste is used to generate district heating and electricity; Biofuels are used to generate district heating and electricity; district heating and cooling are both produced using the purified wastewater; solar energy is converted into electrical power or used to heat water. Electricity should bear the Good Environmental Choice label, or equivalent; biogas is extracted from sewage sludge and food waste.

Water and sewage are managed in the following manner: rainwater from the streets is treated locally and hence, does not burden the wastewater treatment plant; rainwater from courtyards and roofs is led into an adjacent lake; wastewater is treated and then helps in the production of district heating and cooling; biogas is extracted from biodegraded sewage sludge; the biodegraded sewage sludge is used as fertiliser.

Household waste in the sustainable city project is disposed of as follows: combustible waste is converted into district heating and electricity; food waste is biodegraded to produce biogas that fuels vehicles, whilst the mulch becomes nutrient-rich fertiliser; all material that can be recycled is sent for recycling: newspapers, cardboard, glass, metal, etc.; hazardous and electrical waste is recycled or sent to landfill.

The preceding principles within energy, waste and water define the *sustainable city project model*, which focuses on energy-creation and renewable and green energies. This model was key in Beta's plan to develop a holistic approach and master-planning as a specific competency to create value in future projects. The very large and much bigger than expected interest in this sustainable approach led Beta to realise the potential that the market for sustainable construction presented.

Nowadays, the company bases a lot of its sustainability efforts on that model but has attempted to update it regarding other forms of sustainability, such as economic and social, while also incorporating ideas of resilience.

> Office Manager, Beta: 'In one way, sustainability – I know the whole definition about ecology, economy and social sustainability, and in one way I think, I mean it could be at all levels, but if you do really great architecture, it will stand for a long time and is appreciated; I think you will have less –what do you call it? Restorations and re-doings of the project and so on – so that is one way of looking at it; that you should do sustainable things but also consider how you should use materials both when you build it and then also in the building's ongoing use? How much energy will it take to use the building? So, we have all of it, and then we also have the thing with emissions, and how it is to live in the building or use the building'.

These are significant challenges for the firms when implementing sustainability into their offerings, mostly arising from the unclear nature of the concept and the ambiguity of translating the abstract concept into practice.

5.2.2 Value Proposition

Changes in the value proposition are crucial in SBMI. Being able to provide value to their customers is of paramount importance to both firms. The rationale for creating value for the client follows very much the same logic for both firms, that is, beyond providing the requirements and responding to the client's needs within traditional architecture, but also by providing extra value to the client through sustainability. Providing added value to the client is a great challenge not only for both firms, but for the industry as a whole.

Added-Value from Sustainability

One of the key challenges of Alpha in formulating new sustainability strategies is how specific sustainability solutions can create extra value for their clients. Certain solutions within one aspect of sustainability, specifically those related to the environment, with solutions within energy consumption and waste disposal, are easier to demonstrate direct value for the client in terms of long-term cost savings. Sustainable solutions that increase the well-being of the inhabitants or users of the building can also lead to great value for the customer, with employees reporting fewer sick days and increased productivity. However, statistics relating to the human well-being are often difficult to estimate, although intuitively all parties are in agreement over the benefit.

However, other aspects such as larger environmental benefits for the environment as a whole often fall within the public realm and are considered public goods. Thus, determining the added value for the client becomes difficult. Furthermore, initiatives within social sustainability, which benefit the community at large rather than the client directly, can indeed enhance the client's profile, but other benefits are also difficult to determine.

One crucial takeaway from the respondents is that the benefits of sustainability need to be clearly translated into added value for the client, as the level of sustainability will only increase reliably if the general client demand adapts to having a strong focus on sustainability.

A clear priority for Beta is also regarding the development of sustainable solutions for its clients, in order to bring extra value. The main sustainability offering of Beta is regarding certified buildings, which means creating building designs that fulfil the criteria of various green building certification systems or standards. This is in contrast to Alpha, which, despite offering certifications, provides a number of innovative solutions on top of that. Thus, Beta justifies the value for the client by emphasising the gradual cost-savings due to lower energy-consumption, but also the extra value of the property and resale price if a building is certified. When asked what motivates clients to pay extra for sustainability, one Beta employee answered that it always comes down to revenue.

> Head of Sustainability Network, Beta: 'I think it's about clients who want to be profiled as visionary, and being on the frontline of important questions and discussions, and also that some say that properties that have a certification increase by about 13% in value and they have an easier time finding tenants. It very much comes down to money'.

Nonetheless, justifying the extra added value to the customer from investing in sustainability is a significant challenge for Beta. This can often lead to clients refusing to bear extra costs for sustainability, despite Beta's efforts.

> Head of Sustainability Network, Beta: 'I think the main problem is that people still think that [sustainability] is not worth the extra cost that it implies'.

Private versus Public Goods

As mentioned earlier, both firms express the challenge of communicating the benefits of sustainability to their clients, and most importantly, persuading the client to pay extra for sustainability. Certain sustainability benefits are more easily demonstrable and even quantifiable, such as energy savings translating into additional savings or increased well-being for the users of the building, with employees reporting less sick leave and increased productivity. However, other benefits from sustainability may primarily benefit parties other than the client and may even be considered a public good. While these benefits may positively contribute to the client's profile and public relations efforts, as the main benefits lie elsewhere, it may lead to increased difficulty in justifying the extra cost to the client.

Both Alpha and Beta try to emphasise the quantifiable benefits of sustainability but experience shortcomings due to the lack of knowledge and skills to calculate such figures, as this task belongs more to the field of engineering than to architecture.

> Head of Sustainability Network, Beta: 'But in general, we are very bad at calculating costs. It's very rare that an architect can report the costs, and what is… we have a feeling of what's more expensive or not. But in general, we never talk numbers, or we don't dare to talk numbers, because it's so [difficult for us] …'.

5.2.3 Revenue Model

The empirical material also sheds light on how SBMI led to changes in the revenue model for both case companies.

Cost and Price Structure

On top of the actual incorporation of sustainability into the design, the questions regarding how much the offering will cost and how to set the price are relevant.

The largest factor by far communicated by the respondents in determining the level of sustainability in the architecture offering is that of client demand. Understandably, as the client is the one who commissions the project, presents the project requirements, controls the project budget, they are, of course, the one who has the final say. The architects can try to convince the client to incorporate certain sustainability features

into their demand, but they are powerless to implement these features if the client is opposed to them. The main reason for opposition is typically of a monetary nature, that is, if the budget is fixed, any features beyond what the budget allows are deemed unfeasible. This client-dependency and low willingness-to-pay on behalf of the client presents one of the main challenges in furthering sustainable architecture. Alpha takes measures to influence client demand, such as inviting clients to workshops, seminars, events and promoting discussion, dialogue and the sharing of knowledge as much as possible. Increasingly, some level of sustainability is becoming a common requirement in the client's demands.

One common practice at Alpha, in response to this challenge, is the creation of multiple bids for a single project. One bid would be a design that matches the client's expectations and incorporates certain sustainability features, whilst another bid would contain much more innovative sustainable solutions and would be presented to the client. If the second bid proves to be too expensive or risky for the client, the lead architect can decide to apply for funding from the Alpha Research Lab to finance the extra costs.

Furthermore, planning and evaluating projects in terms of their lifecycle is something that Alpha strongly promotes to their clients. This approach extends the timeframe in the analysis of the building project, including more long-term costs (and cost-savings) of the operation of the building, as well as considering the materials, planning for different uses of the building beyond the immediate client demand, and putting more emphasis on the eventual dissembling or demolition of the building in a sustainable manner.

At Beta, one of the major challenges in selling more sustainable designs is the client's demands for cost and time efficiency, with ever more pressure to build cheaply and swiftly.

> Interior Architect, Beta: 'But beyond that [sustainability], to be fair, one aspect of our work that's present is that we need to be efficient and fast to work with'.

A core element in applying sustainability to architectural designs is simply that of a higher time requirement. In the case of applying tested sustainability solutions, as opposed to innovative and riskier solutions, the difficulty or complexity of the task is of much lower concern than the additional hours required to implement those changes:

> Middle Manager, Beta: 'It takes more time; it takes more time because you can't just [apply it]. It's one aspect that you have to check very slowly'.

This translates into the number of hours for which the client is willing to pay, and the budgetary constraints. Understandably, this significantly impacts the building design, and leads to more expensive, innovative solutions with higher risk, instead of traditional, tested and ultimately less risky design features, which often have no sustainability focus. Moreover, as conventional designs are typically chosen, they often were not developed with sustainability in mind in the early stages, which further complicates the efforts, leading to sustainability becoming an add-on feature as opposed to a holistic design.

> Sustainability Director, Beta: 'I mean many companies are looking for buildings that have some type of certification, for instance, or it gives good publicity, or they are, I think, people also would like to do better, so more human reasons, moral reasons. But I think we, if you come into all of us, the whole market, we should do more, absolutely and coming to the market. I think that in the end, it is the clients who are deciding the pace we keep to develop our products. If we had even more eager clients, then we could deliver more advanced products, absolutely'.

Despite the often-higher cost of sustainability projects, these costs tend to be quite minimal and mostly in terms of an initial cost. With extra features within environmental sustainability, for example, technologies that reduce the amount of energy or resources consumed in the operation of the building, these costs are often recuperated within a few years. Of course, in the case of untested and novel sustainable technologies, the level of uncertainty and risk is much higher, and can lead to significantly higher costs in implementation. However, due to the amount of knowledge and investment in sustainability by Alpha, it is able to offer a strong sustainability offering, for example, certification requirements, for a negligible price difference.

The main determinant of the higher costs involved in offering a sustainable design at Beta is the number of additional paid hours required by the client. Although certain sustainability features may not necessarily require extra hours to apply, most demand additional hours, especially if the construction project has a very strong sustainability focus, which will impact the entire design drastically. This, the failure of successfully pushing forward sustainability into the final product, has been experienced by a number of employees. Most projects with a sustainability focus do not necessarily result in a sustainably superior building. Instead, the outcome of such projects end up being determined by cost.

> Head of Sustainability Network, Beta: 'No… no, no, no, no [i.e. the end-focus of a project is not sustainability]. It always is that you have a high ambition in the beginning,

> and then… No, I wouldn't say it's, no. [For most projects, the priority ends up being] The cost, yeah'.

Furthermore, employees at Beta explain that projects will only result in a sustainable building if the client specifically raises the question and directly requests a strong sustainability focus.

> Head of Sustainability Network, Beta: 'That's correct. As it stands, that's what we're trying to change in the network. Haha, forgive me… But we're still in the early stages of working with sustainability, I would say. Even though some persons like [the Sustainability Director] have been working with sustainable solutions and products for a long time. It's still seen as [a specific] expertise in that way, that it's only a few persons who have been working with that, and it's not on the broad agenda… it's not for everybody'.

However, these additional hours commissioned by the client often lead to cost savings in the long-term.

> Office Manager, Beta: 'Cost is always a difficult question – because if you consider four months, or three years of the building, then it would not cost more, but if you start to look at the whole life costs? I think it's cheaper to think sustainably. Definitely, definitely'.

One considerable extra cost of sustainable design relates to the certification systems, or green building standards. If certification is indeed a requirement of the client, this can lead to a significant fee to by paid to the certifying body in exchange for an official certification.

Ultimately, as communicated by employees in both firms, the main determinant of sustainability in the offering is that of client demand. Both firms strive to fulfil and go beyond their clients' expectations, and thus provide value. However, if those demands do not incorporate sustainability features in a significant manner, it is often quite difficult for the case companies to go against their clients and incorporate such features in the final offering.

Implementing Own Construction Projects

Alpha, being predominantly an architecture firm, has a core focus within architectural services. Nonetheless, the firm has engaged in building projects, which it has conducted from start to finish, including the architectural tasks but also managing the construction phase, which is normally undertaken by the larger construction companies. These initiatives have been a good way for Alpha to showcase its knowledge within construction services, but also, as most of these projects have a sustainability focus, to

showcase its knowledge within sustainability. One notable example of this is when Alpha served as both the architect and the client, enabling it to experiment with new concepts, energy systems and construction technologies (Alpha, 2012). Nonetheless, these projects are very limited and constitute a tiny fraction of Alpha's turnover to be relevant. Beta has not engaged in any such activity, as far as the empirical material suggests.

Long-Term Profitability of Sustainability

The question of whether projects with a strong focus on sustainability are actually profitable in the short-run is a common concern within the firm. Most of the interviewees at Alpha stated that sustainability is indeed profitable and leads to more business. A large number of sustainability-minded clients choose Alpha for their commissions due to the firm's strong profile and focus on sustainability. Projects with stronger sustainability requirements, especially those involving clients who are keen to exploit new methods and technologies, often lead to a higher number of commissioned hours for the architect.

Nonetheless, there is a consensus that sustainability is not always profitable or guaranteed to lead to higher revenues, and that the profitability of sustainability is difficult to ascertain. Nonetheless, there is a strong belief that investing in sustainability capabilities is a necessity to compete in today's market and, crucially, in the market of tomorrow:

> Partner, Alpha: 'It's not necessarily about throwing money into every single project, but rather what will we really see on the market in the next ten – fifteen years, we really need to understand, we really have to educate ourselves, we really need to be best because this is what we'll be… yeah, otherwise, you're out. I would say, from the market, okay. No one will ask for your services anymore […]; it doesn't necessarily directly translate into higher revenues or profitability. It's more about really pushing the whole knowledge, elevate the work that we do in the direction that we really think is what will be asked for and of course, what we believe in as well. Like the values of the company and the people working here. So, as well as being attractive for the clients, to be attractive for the new architects, talent that would like to work here – the young ones'.

This major theme was also identified in Beta by the respondents, concerning the profitability of sustainability efforts and sustainable design. The main perspective from the respondents was that it was complex to identify the actual additional revenue that is directly created from sustainability efforts. The Sustainability Director states that sustainability does lead to a slight increase in revenue.

> Sustainability Director & Partner, Beta: 'I can say that we are selling more of our products, and we are adding something too; we need another few hours [compared to the normal workload]; so, we are selling something more, absolutely'.

It is not uncommon for Alpha to commit to sustainability projects which they know may not be profitable in the long-run. However, they engage themselves anyway, with the goal of first, strengthening their profile in the market, and second, to develop expertise within the new technologies and methods, enabling them to work with these faster and more efficiently in the future.

Cost Pressure on Sustainability

At both firms, but especially at Beta, the constant priority on securing new projects, regardless of their sustainability nature, has also led to project employees having to deprioritise non-essential elements of the offering, such as sustainability. This reduced number of working hours that can be spent on each project is a strong impediment to employees' own ambitions. They often find themselves pressured to drop additional, innovative solutions over less efficient, easier to implement ones.

> Head of Sustainability Network, Beta: 'I mean, we need to buy ourselves that time [to focus on these new ways of thinking, and sustainability]. And it's very hard to do when everybody has a lot of things to do. But that can, of course, be something that Beta says that: "We need to say no to some projects, and work more [on existing projects]", but of course, that's very hard to do'.

Therefore, there is some debate within both firms as to whether sustainability actually leads to higher sales and profitability. Alpha's profile is more focused on sustainability compared to Beta, and arguably has led to a higher number of higher-profile sustainability projects for them. This type of client, with stronger sustainability demands and a corresponding higher budget, leads to more commissioned hours and thus higher revenues. At Beta, in contrast, there is a general belief that sustainability might contribute to higher profitability, but it is challenging to identify the actual additional revenue that is directly attributed to sustainability efforts. Thus, it is difficult to justify higher costs to the clients, let alone internally on sustainability investments.

Nevertheless, both Alpha and Beta, to a lesser extent, recognise the need to obtain sustainability knowledge and know-how in order to respond to the changing market norms, dominated by challenging sustainability demands. For this reason, Alpha may even engage in projects that are not profitable, in order to gather extra sustainability resources and invest in their knowledge base.

Revenue Streams

Alpha's SBMI journey has led to certain new revenue streams. The firm has approximately eight employees dedicated to social sustainability, whose goal is to have 70% of their consulting work in-house and 30% of the work externally with clients. The current situation is, however, 50% in-house and 50% with clients. The group manages its own projects and clients and offers consulting services within the field of social sustainability: environmental psychology, social politics and behavioural psychology. Furthermore, the assessment of green building standards is also sold occasionally, as a separate service to clients.

> Partner, Alpha: 'But then, of course, it's the service as well; it's also business, because it's a quite big task within the project, and it's a service where you earn money as well. To the clients, if they want to assess their building to ensure that you are fulfilling what you promised during the signing phase. And also, there is a lot of paperwork. Filling in all the materials described or that are within the building, and we need to assess them according to environmental aspects. So, it's quite a lot of paperwork'.

Although many respondents at Beta expressed the belief that sustainability led to more projects and, thus, higher revenues, several managers doubted this assertion. They argue that sustainability does not necessarily create any new revenue streams for the company; consequently, it is precisely for this reason that the extra investment in SBMI and sustainability is hard to justify internally.

> Strategic Advisor, Beta: 'In a way, you can say that it has [sustainability has created more business opportunities for Beta] because we have had a lot of new kind of clients when it comes to our urban sustainability, urban planning. It's new clients, but in a way it hasn't, because the challenge is having one to pay for it because many clients want to have a pretty simple project. Then it's difficult. It doesn't create much more business and again if society would have more focus in the regulations and in the carbon footprint, then we would have more business opportunities, because then we can do this lifecycle analysis and suggest materials and design with our inner processes, but this is more a circle in the economy; it can be recycled and it can be re-used. Then it has a very low carbon footprint. Then we can have that knowledge, and we can have that in our projects when we design; however, if no one asks for it, then it's difficult because then we can't do that'.

> Office manager, Beta: '[When asked if sustainability has created extra revenue streams into the firm] Not that I know of'.

> Former Middle Manager, Beta: 'Of course, that is an economic sort of challenge to dedicate funds for that particular work because it's not really a huge fee generator as such. And developers and builders have the concept that it's expensive to implement the

technology. Whereas the government and architects are trying to dispel that idea that okay, it may be a higher capital outlay, but in the long-term, there are certain economic benefits'.

Interior Architect, Beta: 'You know, it depends on how you define sustainability and what aspect you're looking at. Energy saving or resource saving or…so business opportunities, I'd say, maybe they're there, but I don't; in my experience, sustainability has been more something that is a necessity, rather than something that we would make money from'.

Sustainability has provided Alpha with new revenue streams, outside of the traditional field of architectural services. This is in contrast to Beta, whose development of sustainability capabilities has not reached the stage that would allow them to diversify their services and create new revenue streams.

Alpha has experienced new revenue streams through sustainability initiatives. The firm has now started to sell consultancy services in social sustainability, leveraging knowledge that has been acquired in large part through expanding their traditional knowledge base and employing social anthropologists, as well as services in the assessment of green building standards. These consultants work on both in-house projects, but also directly for external clients. Whereas at Beta, no new revenue streams were identified.

5.3 External Dimension

In this section, I will discuss the firms' external characteristics, including their relationships and partnerships with external actors, as well as the changes undertaken as a part of SBMI. Both firms invest in external efforts to strengthen their capabilities. The two firms display healthy external collaboration and cooperation within both research and development activities (with, for example, universities, research facilities, industry bodies) as well as in joint architectural projects (both firms having worked with each other in several instances). Both Alpha and Beta appreciate and recognise the importance of participating in such collaborations for the benefit and knowledge co-creation that it brings to their resource base.

A notable difference between the firms is that Alpha has a much stronger profile in sustainability towards potential clients, whereas Beta markets itself mostly as a provider of quality architecture, with less emphasis on sustainability. It may also be said that Alpha appears to make more effort in searching and consolidating external relationships. Through their partnerships, both professional and academic, and initiatives such as the "Alpha Foundation", Alpha presents a superior channel of relationships with relevant players in the field, ensuring greater access to the latest architectural information and research.

5.3.1 Relationship with the Customer

In terms of the client relations, it has changed for both case companies by putting a larger focus on innovation and sustainability. However, both firms experience similar challenges, namely, to concretise client's, often unclear and abstract, demands in sustainability, as well as the difficulty of 'selling in' the benefits of sustainability, and justifying the extra cost for the client to commission a sustainable design.

Unclear Client Demands

At Alpha, a common challenge arises regarding the sustainable designs, which are often abstract and undefined. Certain clients may have a defined environmental programme that has been formulated internally in their company, which can have more clear requirements, such as adhering to a certification level. But often, especially concerning social and economic sustainability, clients often express a strong desire to commission a building with these features but are themselves unsure of what they actually entail. Therefore, one main challenge for the architects at Alpha is to interpret the client's sustainability demands and actually apply them, in practice, to the design. This work is largely determined by the architects themselves, as the clients are not aware of what they are expecting, apart from an initiative that vaguely addresses issues within social and economic sustainability.

In general, Alpha's clients tend to have a strong awareness of environmental sustainability and the importance of implementing this into the architectural projects that they commission. However, perhaps due to the lack of a common definition and relative novelty of the concepts, clients may often lack an understanding of the importance of sustainability. In such cases, it is often up to the architects to educate the clients on these matters.

> Former CEO, Alpha: 'They [the clients] have their environmental or sustainability standards or programmes, or they are attached to or have adopted one of the assessment products or tools like BREEAM or LEED, things like that. So, I think that the consciousness amongst clients is quite widespread nowadays, and it's very seldom that they have no requirements at all… I think that awareness is quite widespread amongst professional architects. Sometimes they are far ahead of the architects, and then there are exceptions where clients are not aware or knowledgeable. It happens too; there are those cases, but I think they are in the minority. That is my impression… Talking about economic and social sustainability, that is a new development. Where the client is searching, and the consultants and owners are searching [for meaning]. So, for the green issues, I think that the awareness is quite well spread.

In the case of Beta, although some clients may oppose sustainability measures and any associated extra costs, there is also one strong driver for sustainability that actually comes from the clients themselves.

> Independent Industry Expert & Former Manager, Beta: 'I would say that it [i.e. Sustainability] was mostly client driven. So, if I look at what most competitions are about, then I see that "Miljöbyggnad Silver" is like the norm and that was also my experience in dealing with residential projects at Beta'.

There has also been a significant increase in demand for sustainable architecture at Beta, particularly from one type of client: public sector clients.

> Head of Sustainability Network, Beta: 'Higher demands from [municipalities] ("kommuner") and [county councils] ("landsting"), that they're asking for, when we are giving tenders, that they are asking for knowledge and experience… and also when we have clients that get a [right of land] ("markanvisning"), it's in the contract between the client and the municipality, that they have to consider certain sustainable aspects, so it's definitely coming from that side too'.

> Strategic Advisor, Beta: 'Municipalities do that [push for sustainability] with some new urban areas, because they want to create a trend in that area, and they manage it sometimes because then they can have a higher price of the ground and then they will have some kind of profiling in their city of their area in a way that could be very attractive'.

However, due to the abstract nature of sustainability demands, these efforts sometimes fail in achieving sustainability.

> Head of Sustainability Network, Beta: 'Even though we have more demands from governments or municipalities, or… it's still very fluffy, the demands, the definition is not very specific, so it very easily can still go around and not [lead to] work with sustainability'.

Need to Educate Clients

A large change in the customer relations due to SBMI is the increasing need for the case companies to educate the clients on sustainability matters. A factor that seems to play a large role in decreased demand for sustainable design is the difficulty both firms face in communicating the benefits of sustainable design to potential clients. The information, which is more easily communicable, is that of the environmental performance of the building, for example, the reduction in energy consumption, which can easily be transformed into cost savings for the client. However, other environmental benefits are more difficult to monetise, owing mostly to the benefits being in the public realm, such as lower pollution, using renewable materials and energy sources, or even preserving biodiversity. Aspects of social sustainability that focus directly on increasing the economic value for the client, such as designing environments which improve the

health and productivity of employees, are much more problematic to translate into numbers.

> Head of Sustainability Network, Beta: 'When you are talking about sustainability with a client, everyone is very nervous about *greenwashing*, and if it's going to be too expensive, and then in the end not be as good as they hoped, and it feels maybe that they are experimenting and… or they think that it's inflated, the importance of sustainability, so they're like trying to: "Yea, but you know, we have these documents that says that we have to consider that, that and that but…". Yeah, they're not taking it seriously'.

Target Customer Strategy

The respondents did not indicate that either firm has a clear strategy in terms of identifying clients; instead, they are flexible enough to accommodate a wide range of clients, thanks to the high level of knowledge within the firm. Nonetheless, both firms' largest projects are within the healthcare field, although they also conduct a lot of business within the field of infrastructure, education, offices and housing.

Consistent with Beta's historical profile, it seems that customers are not attracted to Beta due to its environmental and sustainability experience, but rather its history in producing quality aesthetic architecture.

> Interior Architect, Beta: 'We have an environmentally aware profile, if you like. We have a sustainable profile, and I'm sure some clients will be interested in that aspect of our work. However, I don't think that our clients find us and choose us, well, because we're sustainable but rather because we're aesthetically interesting'.

Sustainability Requirement

Another notable change at Alpha is that of the Sustainability Requirement. One of the ways in which Alpha is able to gain meaningful experience and learnings externally is by selecting the clients they interact with. The firm adheres to the principle of refusing projects that do not fulfil certain ethical or CSR requirements, such as the client having a track record of respecting employee well-being and human rights, and ensuring that the project will be conducted in such a manner that all stakeholders and personnel will be treated fairly. The Vice-President of Alpha expresses this point:

> Vice-President, Alpha: '… we are very selective about where we work internationally and with which clients. We are not running around doing purely *architectural image-wise* projects in Dubai or Qatar or something. Because the clients there, even if it were the Emir of Qatar, that's not what we want to be a part of. It also comes back to the ethics there. That has, I would say, been a very important guide for us'.

Furthermore, this viewpoint that certain projects are refused if they do not present sufficient priority to sustainability is reiterated within the firm.

> Sustainability Director & Partner, Alpha: '…there is always some kind of social aspect within that [architectural competitions in which Alpha participates] I would say, or it should also have a high level of sustainability that challenges us. Otherwise, we won't do it […] But at the same time, we are discussing, discussing pretty much whether to accept if there are clients and their projects, that we don't really think are in line with our values, Alpha's values or our business plan or what we actually want to do. Then, we shouldn't take those projects, especially at times when we have so many projects at the moment. The building sector is very hot at the moment. There is no building crisis, so then we can actually say that maybe we should just choose the projects and the clients that really want to put sustainability high on the agenda. When we are working abroad, then that is really important; we won't work there if there isn't a high level of environmental or social issues in the project and also when we are doing competitions. That is also important for us because otherwise, those projects won't help us to go in the direction which we really want to go in'.

Nonetheless, there have been ongoing discussions as to whether the right approach is to reject all client projects lacking a strong sustainability focus, and whether that will actually lead to higher sustainability in the field. Another approach being discussed is that of deliberately taking on clients with low sustainability ambitions, to be able to inspire them and educate them on the benefits of sustainability and thus, aspire to include at least some form of sustainability into a project that would, otherwise, be "unsustainable" as such.

> Sustainability Director & Partner, Alpha: 'Sometimes [I receive this question from employees whether] we should work with that client or that client, and is it actually in line with our values. But at the same time, they say that maybe there is a client who is not so good at working with this issue, so they don't have any ambition. Should we say no to that one or should we actually try to push that client a bit further than they would have done working with someone else? Because that is maybe the best way to push the market towards more sustainable development. So that is the question, should you avoid working with them or should you try to influence them, to work more with sustainability and I think usually, we end up trying to influence the client because I think that is maybe where we can have the biggest impact'.

On the other hand, it is suggested by employees that Beta would not turn down projects that lack a sustainability focus.

> Independent Industry Expert & Former Manager, Beta: 'I will say if you talk to a smaller company, there is much more of a sustainability profile, and can offer a new approach

for the project. There is nothing like that really at Beta, you know; you will take on a project even if it is not sustainable'.

Beta's clients tend to have strong demands, but with limitations, such as a low willingness to pay, when sustainability is associated with extra costs. There is also the risk of losing such clients if Beta employees push too hard for sustainability.

> Sustainability Director & Partner, Beta: 'Yes, in some way at least and if you turn the question around, if you say to clients, are you interested in sustainability or are you not, and whether they are not, this comes to prove actually that you are losing some of those clients. It is fine as long as it doesn't cost anything'.

5.3.2 Partnerships at Alpha

Alpha has a developed a strong belief that to succeed in SBMI and sustainable development, collaboration is necessary, both among different actors in society and between competences. The management of the firm started acquiring and developing knowledge in-house but also recognises external partnerships as essential for bringing new solutions that add value to their clients, especially within sustainability:

> Vice-President, Alpha: 'As I said, we do have a lot in-house with the inter-disciplinary approach. However, having those experts, they have friends outside and they build their alliances, so, of course, we are in quite a few, what do you call them, formal alliances […]. We do open up for an open source, but I wouldn't say we could manage with just having alliances. It's so important to have in-house [expertise], but it shouldn't be exclusive. It should be a combination'.

> Partner, Alpha: 'And then, of course, to be decisive about learning about what is going on all over and what's ongoing in the planning and building business, but also that we have all this network in terms of knowledge and production. And our relationships with academia and also international experiences, I would say [is one of our unique selling points]'.

> Former CEO, Alpha: 'I mean, of course, there is always a component of knowledge and competence, and it's becoming rather complex. Sustainable issues are becoming more and more complex. I mean both the green issues, economy and social, so it's, it requires a lot of special knowledge and process management skills to implement the different aspects of sustainability. That demands a great effort for the architects to cope with that variety and the big span of competence needed. I can see that more and more of the offices are collaborating with specialist firms and specialist companies, consultancies specialised in various fields of sustainability…They all quite often team up with, for instance, consultancies on place specialising in social sustainability or environmental

> sustainability. That's quite common. Maybe it's not a challenge, but I think it's kind of a necessary way to work and to team up with deep competence and the various aspects of sustainability'.

Alpha considers it has a responsibility to influence both the construction sector and society in general; and it wants to be at the forefront of sustainable development. Alpha is engaged in several organisations, such as the: Green Building Councils in Sweden and Denmark (with the CEO of Alpha being the chairman of the board), the Network for Sustainable Business ("NMC") and the Swedish Centre for Innovation and Quality in the Built Environment ("IQ Samhällsbyggnad"). It is also committed to the Nordic Built Charter, an initiative from the Nordic Ministers for Trade and Industry to accelerate the development of sustainable building concepts.

Academic Partnerships

Alpha has also started being very active in academic partnerships, having a number of employees who are both involved in academia, at architectural departments in universities, and employed at the firm. This enables Alpha to have greater access to the latest academic research and breakthroughs in the field, which it views as contributing to SBMI.

Alpha Foundation (or "ARQ")

The firm started engaging in several research & development activities externally with partners. One of these initiatives is through the "Alpha Foundation". A portion of the profits from the firm are channelled into the Alpha Foundation, or "ARQ". This foundation is a separate entity, with its own board and is primarily a vehicle for investment into various research and development projects, often with external partners. Alpha is one of the main contributors to the foundation. Its principal tasks are managing research and development projects, donating grants for research purposes, conducting assessments, and implementing innovative solutions, within the fields of architecture, urban planning, construction planning and project configuration (ARQ, 2016). These investments are considered as crucial for Alpha in developing both its sustainability capabilities but also its business opportunities:

> Partner, Alpha: '…we have, every time we generate revenue, we put money in our foundation "ARQ" or put money into knowledge networking. We're knowledge-intensive […] It is actually knowledge that we sell; therefore, developing knowledge is always an investment for future revenue. I would say that we would not be in the position that we are today if we had not previously invested in these aspects'.

One of the major partners in research projects is Vinnova, the Swedish agency for innovation, and the standard funding format involves co-financing, where both ARQ and Vinnova invest equal (or close to equal) amounts to a project. The main objective of projects financed by the foundation is to advance knowledge in the field by engaging in larger-scale research initiatives, ranging from industrial collaborations to funding PhD students, often in partnership with the public sector, industry and academia.

Acquiring Knowledge

While educating current employees in sustainability is a significant SBMI initiative within the firm, Alpha has also started the crucial process of acquiring the necessary knowledge externally. This is particularly relevant in the fields of economic analysis, biology and sociology.

Moreover, several respondents have communicated that knowledge co-creation is absolutely essential in the development of SBMI and innovative sustainable solutions, and in ultimately creating more value for the customers. In nearly every project, the dialogue between the architect, the client and other relevant project members leads to a sharing of knowledge and a more productive outcome. One partner, when asked whether it was common to reach new ideas and solutions together with the clients, answered:

> Partner, Alpha: Yeah, of course […] Yes, I would say it's that you are always in dialogue with your client and your project, so to speak. So, everything in the project is, I would say, the arena for new ideas to push things forward, so that happens all the time […] And they're also – the clients are also developing themselves and deciding on new levels of sustainability or whatever quality […] This is super important, I would say, the question on the work we do. We don't do things in isolation. We put our heads down and think for a while, but it's always in dialogue'.

5.3.3 Partnerships at Beta

Beta has also changed the way it views partnerships throughout its SBMI journey. With the appointment of a Sustainability Director, Beta has set a clear goal of complementing the companies' sustainability capabilities and competence externally. A significant part of the manager's responsibility involves communicating with potential clients during external events, such as seminars, conferences and competitions. During these events, Beta is advertised, resulting in numerous new partnerships, either in the form of collaborations or sales. Furthermore, the manager is often in charge of giving lectures or presentations on Beta's perspectives regarding the latest developments in sustainable architecture.

Acquiring Knowledge Externally

One of the means Beta uses to acquire more knowledge in sustainability is through hiring practices. Over the years, this has been a major factor driving their sustainability efforts, especially in terms of acquiring expertise in building certification systems and aspects of social sustainability, such as sociology.

In numerous projects, Beta is obliged to employ external resources, such as consultants, to complement its work, especially in the technical and engineering field, a knowledge-base that traditionally falls outside architecture, or in green building standards. When a middle manager at Beta was asked about essential external knowledge, the response was:

> Former Middle Manager, Beta: '[What we need for a successful sustainability project is…] Experience and knowledge [that we need to acquire externally], and you know having experience with cutting-edge technologies and key performance indicators [of green building standards] that are necessary. And sometimes, when you look at competitors' work, they may have a project with some 70 key performance indicators. And perhaps that is overkill, I don't know. Or perhaps it's the right way to go, but it could be a known risk. Ambition for a client can scare people off, simply'.

Knowledge Co-creation

One big change in the case companies' external relations is the emergence of knowledge co-creation. Respondents stated that discussions with partners during and throughout projects often had a positive impact on the progress of the project.

On the one hand, clients of architecture projects, ranging from public, municipal buyers, to private, global corporations, can contribute to the discussion on sustainability. Even though certain clients may just apply their organisation's minimum environmental requirements for the architecture project, others are much more willing to explore novel approaches to sustainability. The two main players in this category tend to be the municipal clients, who are looking to profile their municipality, and large, global corporations, who expect to benefit from positive branding and public relations by advertising an innovative sustainable building. Other benefits that clients can derive from sustainability measures are those regarding the well-being of the users of the building. By increasing employees' well-being at the office, firms can potentially reduce sick leave and increase productivity.

On the other hand, architects at Beta are able to further their technical knowledge through interactions with partners, such as construction companies, technical consultants (within, for example, ventilation, HVAC…). These interactions enable architects to gain knowledge of the new building and technical capabilities of partner

firms, which enables them to explore new architectural solutions based on these innovations:

> Partner, Beta: 'Some clients have a lot of experience and add a lot to the design process, without knowing how to decide. They can sort of shape it or they encourage a design process where we are actually working together and trying to find the best solutions. Absolutely'!

Research Projects

Beta has increased its involvement in research projects, with one notable example being the *HSB Living Lab*. However, nowadays, the research project has an overarching focus on sustainability and consists of a movable research, demonstration and housing structure, with the goal of testing new technical and architectural innovations. The building will function as a 'living laboratory' for ten years, during which inhabitants will participate in research on the built environment and their behaviour. The project is conducted in partnership with Chalmers University in Gothenburg, as well as other firms within real estate, technical solutions. It will also serve as a physical platform for the long-term research partnership within the framework of HSB Living Lab. The design of the building has been shaped by the needs of research, featuring facades with exchangeable materials, interior and exterior module principles, and standard sizes to facilitate the replacement of materials and simplify rebuilding. The overall goal of the project is to conduct research into innovative technology, sustainability, architecture and social contexts around the clock (HSB Living Lab, 2016).

> Strategic Advisor, Beta: 'Both students [and us] are involved with a lot of research projects. These projects include how to use the measurements and how they use water, how they use sustainability, both when it comes to social sustainability and when it comes to economical sustainability. It's a very wide range of studies. All sorts of functions and the waste management, etc. And, also how to share spaces, which is very important if you can share spaces in the future; one can have problems regarding affectations and use of land and use of space inside, etc. There's a lot of interesting things being studied'.

Research projects like these are a key means of obtaining new knowledge within the firm. They provide key input into the research and development of new innovative solutions that can be offered by Beta, as well as enable much closer and strategic collaborations with partners, which can be applied in future projects.

> Head of Sustainability Network, Beta: 'For now, it's [our partners are] mostly technology-specialised consultants. But we have also started discussing with other architectural firms, maybe then, with a very different type of focus and organisation than we have, where we can start collaborations and help each other, with these questions'.

Partnerships are a crucial manner for both firms in obtaining external knowledge, reducing the cost of new products and services, minimising internal and external risks, enhancing reputation and brand value, and forming strategic and deep-rooted collaborations that may lead to even more innovative outcomes.

5.3.4 Competitor

The relationship with competitors has also changed due to SBMI. Both case firms have become interestingly eager to share knowledge, showing little concern about divulging proprietary information.

Competition on Design

Alpha openly states that it does not compete on the basis of price but rather on design. The Vice-President of the firm clearly states that due to the high investments conducted internally to acquire the knowledge in different fields, senior management made a conscious decision to focus on design rather than price competition:

> Vice-President, Alpha: 'Really, we revisited [the question] a few business plans, strategic plans, but we said that we are not ready to compete on price, really. We need to understand that this complexity, this interdisciplinary approach isn't cheap in what we charge per hour'.

Open Knowledge-Sharing

Interestingly, for both case companies, it has become normal to have a high level of knowledge sharing amongst competitors, including between the case companies themselves.

Alpha is not concerned about competitors using its proprietary information, for example, innovative solutions for sustainability, for their own benefit. Instead, Alpha sees knowledge-sharing as a means of developing the market as a whole:

> Architect, Alpha: 'The fact that other people will implement [our designs] as well is only going to raise the awareness of the business, creating a larger space for us to implement our solutions in the future as well […] Everything that develops the entire business, and the industry is going to be good for us. Whether it is us doing it, or someone else using our ideas, or someone else doing it with their own ideas'.

A culture of knowledge-sharing is also quite apparent in the manner in which Beta interacts with its competitors, with it being common for Beta to highlight its latest projects and innovations at external events. Protecting proprietary information was not communicated as being a big concern, rather the opposite was true: Beta's gladly

communicates its latest design developments to the rest of the industry whilst gaining knowledge of other firms' advancements. Thus, Beta does not compete on the basis of proprietary information or solutions, but rather:

> Sustainability Director & Partner, Beta: 'Or, we can see what other architectural firms are doing [laughing]. We are sharing information very much […] not exactly like getting their drawings, but if you do something or have a challenge, there is this building that is not using very much energy, it is well insulated and has a green roof, it is not very complicated, really. We try to compete with durable good design, good product in many ways and sustainability is one of those, but it could also be a beautiful function or all of this'.

Collaboration with Competitors

Given the open approach of both firms in terms of sharing knowledge with competitors, they even engage in collaborations with competitors. One notable example of this is the partnership between Alpha and Beta, their largest competitor, in the design of a hospital ("the hospital project"), in Stockholm. This was a large public-private partnership, with construction starting in 2010 and ended in 2018. The project is the world's most expensive hospital ever built, but it has been marred by mismanagement as well as other problems (The Local, 2018).

5.4 Corporate Strategy

SBMI also has led to significant changes in the corporate strategy and performance of both firms, with notable differences between them. Alpha's corporate strategy is explicitly centred around sustainability: 'The aim of our business is to develop sustainable architecture and values for our stakeholders and our strategic plan sets a clear and challenging direction. Our mission is to enable sustainable life through the art of architecture' (Alpha, 2023). Alpha even outlined goals such as 'By 2030 all our architecture will be climate neutral, through design excellence' (Alpha, 2023a). This clearly shows that sustainability occupies a fundamental and key role in its corporate strategy and business model.

This is confirmed by the empirical material, namely that Alpha is ready to compromise revenues today for higher returns tomorrow. The demand for sustainable architecture is still very much in its infancy, and it is expected to grow substantially due to increased societal awareness and stricter government regulations. There is, therefore, a clear opportunity for architectural firms. As previously stated, architectural firms can make enormous gains by investing today in sustainability know-how, both by committing internal resources specifically to sustainability and by accepting higher risk (and thus less profitable) sustainability projects. Being an active participant in the sustainable

architecture debate and influencing the development (such as the standardisation process of the certification systems) can be an effective way of strengthening one's competence in sustainable architecture, as well as shaping the future demand. As the demand grows, so will the competitive threats, which make it even more important for firms to have already established competitive and high-quality offerings.

One can also infer from the empirical material the importance of measuring performance when it comes to the firm's sustainable solutions. This is something that is not considered a large priority at the moment, which can be explained by the relative novelty of the concept of sustainable architecture and the limited demand for it. However, it is of great importance if the firm wants to capitalise on this in the future. Understanding how the costs behind the development of these solutions and their current and future profitability impact the performance of the firm will be crucial to creating a viable and long-term business model. Accounting for sustainable architecture in financing reporting would enable firms to have much more transparency in taking strategic decisions going forward. This would enable them to organise the management of sustainability more efficiently by allowing for improved organisation and division of responsibilities across departments, with specific targets comprising a broader strategy for sustainability.

Beta's corporate strategy is formulated with a much stronger focus on other elements such as aesthetics, society and business development, although also including sustainability: 'We create beautiful and sustainable architecture. Buildings and spaces that don't just do what they are supposed to, but enrich people's lives, develop our society, and strengthen our clients' business – all at once' (Beta, 2023). This is confirmed by the empirical material, which suggests a lesser focus on sustainability and a greater emphasis, for example, on profitability.

The two firms have considerably divergent geographical strategies, mostly in their expansion plans: whereas Alpha has been investing in expanding beyond the Nordics, Beta has chosen to consolidate its position within the region. However, international expansion has proven to be not without difficulties for Alpha, with only five per cent of its revenue originating from outside the region.

Thus, perhaps the most important difference between the corporate strategies of the case companies is regarding sustainability, Alpha has established sustainability as its core-focus, whereas Beta has sustainability as one aspect among others. Empirical evidence of this contrast can be seen in Alpha's establishment of a near-zero profitability target for architecture projects. This was decided by senior management to encourage riskier, sustainability-intensive projects, in order to improve the capabilities within innovation and sustainability. It can be summed up as Alpha has a sustainability requirement for all projects, even with unclear profitability, whereas Beta has a profitability requirement for all projects, even with unclear sustainability.

5.4.1 Financial Targets

The two firms differ greatly in terms of formulation of their financial targets, with Alpha placing a stronger focus on non-profitable activities. It was a conscious decision amongst senior management, for example, whilst drafting the targets regarding sustainability, not to include a profit target in architecture projects, or to set a near-zero target. This was done to encourage the undertaking of projects with a strong focus on sustainability, despite the level of profitability being uncertain. According to a partner, revenue from sustainability projects did not become positive until the mid-2000s, when the idea was that sustainability should not necessarily bring in extra revenue; rather, it should not be an extra cost for the firm. Nowadays, there is a consensus within the firm that sustainability projects are a significant contributor to the firm's total revenue.

One key factor that explains why Beta's sustainability efforts have not come further is relating to its corporate strategy, which places a strong emphasis on direct profitability generated from projects, rather than investing in other, less- or even non-profitable areas that might have an uncertain impact on profits on the short-term, but would provide the basis for future capability development, such as within sustainability.

> Office Manager, Beta: 'I think there is only one way if we really want to have higher ambition in this field – and we have to have all the leaders going in that and wanting this. And to get the leaders to want this, then we need our CEO to really say that this is important, but I also think that this is a company where you have to see the business opportunity with sustainability. Or if we don't see that with sustainability, and if we are not better than we are now, we will maybe lose business'.

Another fascinating detail is that Beta, being owned by an investment fund, is dominated by a higher level of corporate managers, as opposed to architects. This dynamic can create a certain conflict in values and goals, such as whether the goal of the firm is to create profits or to create meaningful or sustainable architecture.

> Sustainability Director & Partner, Beta: 'I also think the owners have a lot of interest and patience…we are very much dominated by architects, and architects are not always good entrepreneurs. I think most or almost all of our owners have a lot of patience that we actually have to be a good architectural firm and not try to make money. We would like to make money, otherwise we wouldn't exist, but compared to other branches, I think we are not so eager […] No, it is not the highest priority. I think that sometimes it could be better for us if we put it a little bit higher, because it would also give us better possibilities to develop our skills in the long run; sometimes we are too devoted'.

5.5 Timeline Alpha

- 1950s: Foundation of the Firm and Branding

Alpha was founded in Sweden with a pre-existing focus on CSR. This is a defining moment, as since its founding, Alpha has been consciously branding itself as an architecture firm with a strong focus on ethical considerations. Nonetheless, the issues prioritised at the time were considerably different from those prioritised today.

- 1950s & 1960s: Involvement in Societal Issues

Welfare concerns were already high on the agenda, with large-scale projects such as the "Miljonprogrammet", with pressure to build a high number of residential buildings in a relatively short time. These initiatives were part of a larger societal movement ("Folkhemmet") to address the housing needs of all segments of Swedish society. Thus, the biggest priority was to address acute housing needs, often at the expense of other sustainability concerns. Many of the buildings built during this period are considered nowadays to be 'unsustainable', and often lead to costly renovations or complete reconstruction.

- 1994-1996: Early Development of Sustainability Capabilities

This period is key in understanding Alpha's development towards sustainability. There was a strong interest that led to new initiatives in sustainability to be launched. One of the most notable examples is the certification ISO 9001 being implemented, which was adapted to include sustainability concerns. Alpha also became a founding partner of the "Swedish Green Building Council", a non-profit organisation, which seeks to further environmental and sustainability work in the construction industry. This led to Alpha participating in the development of the "Miljöbyggnad" standard, which is still today the most used green building standard in Sweden. A major development internally within the firm is that the interest of the employees in such issues, without explicit support from management, led to the publication of a book comprising ecological building recommendations. This period is noteworthy, as it can be considered as the first formal investment by the firm in sustainability capabilities. Nonetheless, due in large part to the difficulty of defining the concept and thus determining which concrete steps needed to be taken to address the changing nature of demand, coordinating these efforts to build sustainability capabilities proved difficult. Thus, despite fewer sustainable constructions being completed by Alpha, the real impact of these initiatives was the promotion of sustainability within the firm, and the discussion of such issues on many different managerial levels.

- 1996: Further Strengthening of Sustainability Capabilities

In this year, a new CEO ("CEO #1") is appointed, becoming the main driver behind further sustainability efforts. One of these initiatives is that of the "Alpha Miljö" group, focusing on promoting sustainability issues within the firm, amongst its employees but also senior management as well as outside of the firm, amongst the firm's external relationships with partners, clients and competitors. A further strengthening of the firm's sustainability capabilities was the employment of the firm's first chemist, whose chief task was to analyse building materials, with the goal of reducing the environmental impact of new constructions.

- 1998: First Dedicated Sustainability Specialists

Large initiatives in sustainability began under the first appointed Sustainability Director, who was an architect but with a specific education in climate questions. She was supported shortly after by another Sustainability Director, who played a large part in formulating sustainability processes within the firm. Alpha started training its employees in green building standards, such as the Miljöbyggnad, BREEAM and LEED certification systems. It was predominantly within this period that Alpha started taking the concept of sustainability seriously, realising that the market conditions were gradually changing and that, in order to compete and meet future demands, resources needed to be invested into building their knowledge base. However, this development had not yet been acknowledged by many players within the industry; thus, conveying these issues to partners, clients and construction companies was challenging.

> Partner, Alpha: 'And then I'd say also we started in terms of sustainability and started to identify that as something important already in the 90s. And at that time, it was hard, you know, the construction business was not really into these questions at that moment, but I would say we realised that it really was a challenge for everyone too. So, then we also organised a small group of specialists, good at indoor climate, energy and daylight and solar energy, etc. and then that group of specialists has grown very much [since]'.

- 2001-2002: Investment in Social Sustainability Capabilities

The firm took the unexpected and unprecedented decision to commission social anthropologists to complement existing sustainability capabilities, becoming the first architecture company to do so in Sweden. These resources were employed with the goal of further strengthening Alpha's knowledge base within social sustainability, a new concept within sustainability, which the firm identified as an element of the changing market demand. However, the actual definition and understanding of this concept is still nowadays murky at best, amongst the industry players, without any clear agreement on what the concept entails and which concrete measures can be taken to address those issues.

- 2005-2010: Change of CEO

A new CEO ("CEO #2") is appointed, who becomes a strong champion of sustainability, invests significantly in physical and human capital to improve Alpha's sustainability capability. The environmental management system ISO 14001 is implemented and certified during his tenure, installing formal routines as part of its sustainability efforts.[7] Furthermore, he implements new routines into the firm such as the "Sustainable Integrated Design", and encourages more sustainable solutions to be incorporated into the firm's offerings, but including sustainability experts from various backgrounds in the projects:

> Former CEO, Alpha: 'We were very integrated in our competitions and commissions to integrate sustainable solutions in energy and indoor climate, and so we had programmes for that. But we found out that more and more specialities required a more structured way of working together, so we tried first in many ways, or several ways, to organise with collaborations, because there's a tendency that these different specialities go into their own silos and have their own clients and work cross-disciplinary, but then we created a group in Stockholm where we invited people who were interested in collaborating in a holistic way, cross-disciplinary together with planners, architects and environmental specialists, biologists, economists, project managers in one group – and then they formed a way of working together in a more integrated way. And we called it sustainable integrated design, of course'.

A number of sustainability experts within the firm also mentioned the unpredictable event of the release of the documentary in 2006 by Al Gore, named "An Inconvenient Truth". This film seems to have had a radical effect on the firm and strongly invigorated the firm in developing sustainability capabilities and promoting these values to its external partners.

- 2009: Alpha Founds Sustainability Organisation and Consolidates the Sustainability Function into Organisation

Alpha enters as a founding member into the Swedish Green Building Council and leads to the development of green building standards, such as Miljöbyggnad ["Environmental Building"]. On top of having established the "Sustainability Integrated Design" group at the Stockholm office, the first group consisting of inter-disciplinary sustainability experts, during CEO #2's time as CEO, Alpha formally employed a social anthropologist for the first time (although the firm had previously

[7] The ISO 14001 standard consists of implementing processes so that an organisation considers all environmental issues relevant to its operations, such as air pollution, water and sewage issues, waste management, soil contamination, climate change mitigation and adaptation, and resource use and efficiency (ISO, 2015).

commissioned their services), having realised the value such expertise brought to the company and its offerings.

> Former CEO, Alpha: 'And we found out that [the social anthropologist] she became so popular in half a year, and was wanted by cities, by contractors, by property companies – so there was a real demand for that kind of knowledge that she had. And that was a really clear signal of the growing interest in sustainability, and that was in 2009. And then, she created a division and I think now, I'm not sure, but I think there are about between 5 or 10 specialists like anthropologists and ethnologists and people like that, but more behavioural science than technical. So that was quite interesting to experience that – we were in the right spot at that time'.

- 2010-: New Leadership

CEO #2 steps down as CEO, and CEO #3 is appointed as the new CEO, who experiences a sharp increase in the demand for sustainable design during her tenure. In response, she invests significantly in training for accreditation of green building standards, and in research & development initiatives through the vehicles of the Alpha Foundation and ARQ.

- 2015: Further Implementation of Sustainability Routines

The Environmental Analysis tool is introduced, to be used in future projects. This tool is compulsory in all future projects and features a checklist of sustainability concerns that the lead architects must complete and report back to the sustainability director. Nonetheless, even though the tool pushes the architects to mention sustainability issues in the discussions with the clients, there is no obligation to include such measures if the client's budget does not permit it or is opposed in any other manner.

- 2017: Change of Leadership

CEO #3 steps down, and a new CEO #4 is appointed.

5.6 Timeline Beta

- Early 1900s: The founding of Beta

In contrast to Alpha, Beta was not founded with an explicit focus on ethical values, but rather as an artistic endeavour, relying upon an offering of high quality and advanced architectural services.

- 1963: Management Passes to Son

The founder dies in 1963, but the firm remains in family ownership as the founder's son takes over the firm. This is seen largely as a continuation of the management and artistic philosophy of the previous leadership.

- 1970: Another Change of Management

Once again, the management of the company goes from father to son. This also marks a period of continuity.

- 1980s: Expansion of Beta

The company experiences strong performance, and a large expansion ensues as regional offices open in Swedish cities.

- 1994: Large Scale Project in Sustainability

Beta's first significant initiative within "sustainability", with a focus on a cyclical, holistic approach is that of the "sustainable city project". The firm develops a conscious plan to develop master-planning as a separate competence and sellable service, that is, the holistic design of the built environment as a whole, including the relationship of the building to the surrounding area. The model achieved significant attention around the world and contributed largely to Beta's knowledge and brand within sustainability.

> Former Middle Manager, Beta: 'It was very much a role model which was visited by a lot of delegations from around Europe and around the world. And there was a lot of curiosity about what it was and was it an eco-city and what an eco-city is. So, a lot of study and visitors came, and we realised that this you know, had phenomenal potential. As a model and as an export concept I guess'.

However, pioneering work as this may have been at the time, the accomplishments of sustainable city project have been criticised (DN, 2013). Moreover, the design of the project does not seem to have led to further similar projects for the firm, suggesting that the capabilities required were too specific to be applied elsewhere, i.e. in more common architectural projects.

- 2010: First Organisational Changes regarding Sustainability

This year marks a significant step for the firm, as Beta employs the first sustainability expert, a certified building engineer. This resource is of importance as it enables the firm to start building capabilities within sustainability, such as producing GBS certified buildings, and furthering education in certification among its employees.

- 2013: Change of Leadership

A new CEO is appointed.

- 2014: Sustainability Director Position Created

The firm acknowledges the growing importance of sustainability in the market and nature of demand and decides to take strong measures by creating the position of

Sustainability Director. A sustainability director is appointed to create an overview and formulate a strategy within sustainability to ensure that Beta can compete in sustainability-focused projects, and match customer demand. This is in sharp contrast to Alpha, which created a similar position sixteen years prior. Nonetheless, this marked a strong development for the firm, as the priority of sustainability issues was elevated to senior management.

- 2015: Further Sustainability Measures and Managerial Musical Chairs

This year marks great instability within the management of the firm. Regarding sustainability capabilities, in the spring of 2015, Beta's management makes official and funds the 'Sustainability Network', with a head representative, which had previously been a grassroots initiative created by the employees themselves, with no formal support from senior management. In doing so, the firm signalled the further recognition of the lack of capability within the field of sustainability. In May 2015, a new temporary CEO is appointed, followed by, in June 2015, the resignation of the sustainability director, with the position left open. In September 2015, the temporary CEO steps downs, and a new CEO is appointed. What is noteworthy here is that the new CEO is not, in opposition to most architect firms, an architect herself, but rather an experienced corporate manager. A new sustainability director is appointed in November 2015.

- 2016: Formal Formulation of Sustainability Strategy

A clear and strong articulation of the firm's strategy within sustainability comes with the publication of the company's first sustainability plan. This document sets out the general strategy of the firm regarding building sustainability capabilities and targets and sets out concrete measures for achieving them. The strategy also focuses in large part on environmental sustainability and marks a significant commitment by the company to address sustainability issues.

- 2015: Change of Leadership

CEO steps down, and an interim CEO is appointed.

- 2016: Change of Leadership

Interim CEO steps down, and a new CEO is appointed.

- 2019: Change of Leadership

CEO steps down, and an interim CEO is appointed.

- 2020: Change of Leadership

Interim CEO steps down, and a new CEO is appointed.

6 Summary of Empirical Differences

This section summarises the empirical differences between the case companies. The following tables represent the differences between the case companies with regard to their internal resources (Internal Dimension), offerings and value propositions, as well as their external relationships (External Dimension).

6.1 Internal Dimension

The following table summarises the differences in the internal dimension between the case firms.

		Alpha	Beta
Internal Dimension	Tangible Resources	Broad, multidisciplinary competence	Broad, multidisciplinary competence
		Sustainability Group Function	Sustainability Network
		Sustainability Champions	Sustainability Champions
	Informational Resources	Material Database	Material Database
		Sustainability Plan	Sustainability Plan
		Sustainability Analysis	Sustainability Analysis
		UN Global Compact Report	Eco-city Master-planning Experience
		Sustainability Project Experience	Sustainability Project Experience
		Embeddedness of Sustainability Efforts	Green Building Standards
		Green Building Standards	Project Reference Library
		Green Profile	
		ReCapture	
	Organisational Resources	Alpha Innovation Process	-
		Project Feedback Sessions	Design Review Sessions
		Alpha Research Lab	-
		Alpha Foundation (ARQ)	-
		Increased External Knowledge Sharing	-
		Increased External Collaboration	Increased External Collaboration
		Increased Internal and External Training	Increased Internal and External Training
		Sustainability Board Presence	Sustainability Board Presence
		AlphaQ Quality System (ISO 9001 certified)	ISO 9001 (soon to be implemented at time of data collection)
		ISO 14001 certified Quality System	Quality system based upon ISO 14001 (but not certified)
		No Profit Requirement	Green Beta (discontinued)
		Sustainability Requirement	-
		Tools (Sustainability Analysis, Environmental Questionnaire)	-

Table 6: Internal Dimension of the Case Companies

Changes to internal resources are essential for SBMI and the creation of value for the customer. Investments in internal resources have enabled both case firms to engage in the development of new and innovative solutions. In both firms, these investments took the shape of tangible, informational and organisational resources, as demonstrated in table 6. It is evident that Alpha's internal resources are significantly larger than Beta's, with more advanced tangible resources, such as a much stronger group function within sustainability, openly exhibiting a green profile and having implemented more organisational routines to supplement its sustainability capabilities. Alpha also has an obligatory and routinised work process (the *Alpha Innovation Process*), which ensures that all strategic priorities are considered in new projects. Alpha's innovation capability is further strengthened by two the organisational entities: The *Alpha Research Lab* and the *Alpha Foundation (ARQ)*, both of which provide supplementary funding to innovative projects.

It becomes clear from the empirical material that both firms understand, to varying degrees, the importance of engaging in SBMI and integrating sustainability into the structure and organisational processes of the architecture firm. This is key to establishing a new business model and developing sustainable architecture. However, this is much clearer to Alpha than to Beta. As an example, both firms have developed dedicated know-how, but Alpha goes further in creating a sustainability department within the firm and having dedicated sustainability resources, who would gather sustainability expertise and build upon it. The role of the sustainability department is cross-functional and assists in advising on sustainability in all steps of the architectural process: design, managerial, procurement and production. At Alpha, the sustainability experts also worked as internal consultants, being assigned to various internal projects, on top of their usual responsibilities in architectural projects.

Regarding the structural difference between shared ownership (partner-owned architectural firms) and external ownership (for example, by an investment fund), the empirical material shows that shared ownership allows for higher levels of SBMI. The mechanism behind this, I argue, is that partners, who are working architects and much closer to the industry, projects and clients, are more perceptive and receptive to changes in the external environment and demand. As they experience the changes first-hand, it becomes clear that adaptations are required to respond to those changes. This is once again exemplified by Alpha, which has clear processes directly connected to sustainability (such as ISO 9001, ISO 14001), or incorporates sustainability elements into existing processes to ensure that sustainability remains a central element throughout the entire architectural process. Updated processes and routines are the embodiment of specialised expertise (either obtained through previous experience or through cognitive search) and play a central role in ensuring that the ways of working and offering change.

Out of the different informational resources, acquiring knowledge in sustainability, I argue, is the most crucial in developing SBMI and sustainable architecture. However,

the empirical material shows that obtaining this knowledge has been challenging for the case companies, and it is inherently complex, for several reasons. First, it is multidisciplinary and relates in large part to fields such as the structural design, the management of energy, water, materials, waste, of the quality of indoor environment and the operations and maintenance of the building. Second, due to technological advances, the nature of this knowledge is constantly changing. Thus, due to the complexity of this expertise, as well as the fact that it lies largely outside of the traditional competency of the architect firm, it is a great cost to the firm to develop this knowledge in-house; therefore, firms have an incentive to outsource this competence, as is the case with Beta. It did not possess the know-how internally due to limited prior investments in sustainability. The empirical material strongly shows that Alpha instead developed exhaustive in-house knowledge of sustainability by investing significant resources, thereby eliminating the need for external consultants. This situation can be exemplified by a typical make or buy situation (Williamson, 1985).

There are advantages to either make, as Alpha, or to buy, as Beta. By buying, Beta effectively outsources this function to firms that are experts in the field, and whose core competency is within sustainable construction and engineering. The empirical data suggests that it is a large cost to Alpha to maintain cutting-edge knowledge in-house, and there is also no guarantee that in-house knowledge will match the level of specialised external firms, which have it as their core business. Nonetheless, the cost of external consultants is undoubtably very large as well. I argue that in either case, it is of strategic interest that the architect firm develops at least an understanding and basic in-house expertise within sustainability, as both case companies have done, to provide a much better understanding of the challenges and benefits of sustainable construction. This will be useful both in terms of selling the benefits to clients, but also in terms of accommodating sustainability in the basic architectural designs. Most importantly, it would provide an in-house counterpart with sufficient specific knowledge in sustainability to successfully manage the relationship between the architecture firm and the sustainability-focused engineering partner firm.

What becomes clear from the empirical data is that both case firms have significant shortcomings in developing financial knowledge, an element which is considered to be significant in developing SBMI and a novel revenue model. Detailed analysis, for example, the cost-structure or calculations on the lifecycle of projects, is strongly lacking in both firms. This lack of competence has several consequences: first, it hinders the creation of a drastically new revenue model and reduces the ability to convince clients of the financial costs and benefits of sustainable construction. Increasing the financial uncertainty towards the client (adding to the uncertainty of the concept of sustainability in general) makes them more likely to choose the safer, more predictable, and cheaper conventional architecture options.

Second, the lack of detailed financial analysis at the case firms strongly impedes upon the firms' understanding of the factors driving value creation in sustainable

construction. The empirical material suggests that by shedding light on which features of sustainable construction bring the most value to the clients and understanding the costs and benefits of these features, it would enable the case firms to create much more cost-effective solutions or solutions that are targeted towards the client's specific needs and financial circumstances. This approach would allow tailor-made offerings that would maximise value and reduce uncertainty for each customer, rather than providing a more general offering (and less value) to clients who may have substantially different needs. This would allow for uncaptured value to be appropriated by the case firm. This situation furthermore weakens the case companies' position in relation to the construction firms, as they possess, in general, much greater competence in this area; thus, they are able to advance their specific interests much more than the architect firms. The case firms find themselves having to find this competence externally, leading to costly and suboptimal collaborations with external consultants and firms whose interests may not be aligned with the architectural firms.

It comes to light from the empirical data that an important prerequisite for developing SBMI is the development of a corporate culture which, on the one hand, promotes risk-taking and innovative thinking and, on the other hand, also instils strong normative beliefs and values in sustainability.

As sustainable solutions are by definition innovative, architecture firms need to ensure that higher risk projects and internal research are accepted and even encouraged internally. Given that the market of sustainable architecture is just starting to expand, it is crucial for architecture firms to undertake higher risk projects and be willing to compromise more on the revenue and profitability of current projects. This is neccessary to enable future returns and competitive advantage through the development of novel (and thus risky) innovative solutions in sustainability and the accumulation of sustainability-specific knowledge. One way to obtain this is by changing the organisational landscape to promote higher risk-taking. Examples of this can be seen at Alpha, which, for example, removed the profitability requirement on sustainability-focused projects or started 'subsidising' such projects internally to allow for more hours of research and development than the client is actually paying for.

The data also shows that developing strong norms and values in sustainability plays a pivotal role in developing sustainability capabilities, which may lead, in turn, to a competitive advantage. In practice, Alpha enabled risk-taking from the top down. However, in order to garner support for sustainability, it also encouraged sustainability values, from the bottom up, engaging employees who need to "feel and breathe" sustainability. Instilling a sustainability mindset into the architects, especially the senior ones with long-established routinised working methods, is not without difficulties but has been deemed essential at Alpha. Methods employed to achieve this include internal communication and awareness campaigns, external speakers, training sessions led by either external or internally-employed sustainability specialists and enthusiasts, and conference attendance.

6.2 Offering & Value Proposition

The following table summarises the differences in the offerings & value propositions between the case firms.

		Alpha	Beta
Offering & Value Proposition	Arrangement of Value-Creating Activities and Resources	Sustainability as Add-on	Sustainability as Add-on
		Sustainability as Core	-
	Offering	Sustainability-Focused Offering (including "Alternative Green Bid")	(Now-defunct Sustainability-Focused Offering - "Green Bid")
		High Sustainability and Aesthetics Focused Offering	-
		High Aesthetics Focused Offering with Sustainability Angle	High Aesthetics Focused Offering with Sustainability Angle
	Value Proposition	Lower Operating Costs (Energy-Saving Measures)	Lower Operating Costs (Energy-Saving Measures)
		Higher Resale Value (Green Building Certifications)	Higher Resale Value (Green Building Certifications)
		Higher Well-being and Productivity (Environmental Psychology, Behavioural Psychology)	Higher Well-being and Productivity (Environmental Psychology)
		Pure Sustainability Gains (Low-Impact Building Materials, Social Politics, Behavioural Psychology, Green Building Certifications)	Pure Sustainability Gains (Low-Impact Building Materials, Green Building Certifications)
		Green Profiling (Green Building Certifications)	Green Profiling (Green Building Certifications)
		Outsourcing Gains (Off-Loading of Sustainability Requirement)	Outsourcing Gains (Off-Loading of Sustainability Requirement)
	Revenue Model	Social Sustainability Consulting	-
		Green Building Standards Assessment Consulting	-

Table 7: Offering and Value-Proposition of the Case Companies

Regarding the offerings and value propositions of both firms, the largest difference between both firms is the sustainability-as-core arrangement of Alpha, as opposed to the sustainability-as-add-on arrangement of Beta. This leads to a more complete offering from Alpha, with sustainability-focused architectural services being offered to clients. The value proposition for both firms is similar, although Alpha applies more developed tools to achieve the added value to its customers. The sustainability value proposition is composed of six factors: *Lower Operating Costs* (sustainable buildings have lower operational costs), *Higher Resale Value* (sustainable buildings have higher resale and rental value), *Higher Well-being and Productivity* (sustainable buildings increase the well-being and the productivity of the occupants), *Pure Sustainability Gains* (sustainable buildings create fewer environmental externalities), *Green Profiling* (sustainable buildings create positive PR value for the owners) and *Outsourcing Gains* (as the definition of sustainability

and the client's sustainability requirements are vague and difficult to realise without significant effort, the client often outsources the definition and realisation process to the architect). Moreover, the revenue model for Beta is the conventional architecture revenue model, whereas Alpha has diversified by generating revenues through two other channels: engaging in consultancy services focused on social sustainability and conducting assessments for green building standards.

The empirical material indicates that SBMI has led to changes in the firms' offerings & value propositions, namely the development of sustainable offerings. These sustainable offerings are composed of both environmental and social sustainability gains, which create value for both the firm and society. It is, nonetheless, focused predominantly on environmental sustainability, of which the use of physical resources is key. Physical resource use is, of course, a major component of sustainable architecture, with the fundamental assertion that fewer resources need to be consumed. But also that the physical resources used in construction are resilient and durable materials, which will extend considerably the lifecycle of the building, compared to conventional construction. Renewable resources are utilised as much as possible, and buildings are constructed in such as manner aimed at reducing total resource consumption. For example, building with timber reduces the construction period drastically, which saves energy, with the added benefit of being able to store carbon dioxide from the air, once the building is complete. There are additional factors than just the resource utilisation which are also of concern: the sourcing of such materials and the energy impact those materials have on the construction process (the choice of materials impacts the energy consumption during construction). Feedback from both firms strongly suggests a common understanding of this principle as being a constituent part of sustainable architecture.

The value added from social sustainability can be categorised into three parts. Environmental psychology involves designing the building in a manner that positively impacts the users. One notable example is how to design a school which would make the students eager to go to school every day and encourage them to learn. The second aspect is that of social politics, which mostly addresses questions of inclusion and integration of the communities in the area. Drafting a project plan from a dialogue with local citizens is one example of an initiative. The third aspect is that of behavioural psychology, primarily relating to the use of energy or disposal of waste. Depending on where the recycling station is located, for example, one can strongly influence the number of inhabitants who recycle their waste. The value added in practice from designs incorporating these elements include, of course, the socio-economic benefits such as encouraging better use of resources and recycling, gathering support and encouraging participation from the local citizens. Moreover, there are some economic benefits, such as well-being/productivity and cost reduction.

Another key value-adding aspect of sustainable architecture is that of the reusability and flexibility of buildings. By designing architectural structures with versatility, you

can decrease the need for the building being demolished to accommodate another building that would fill the function needed at that point. This durability of the architecture design ensures a much longer lifecycle for buildings, improving the material and energy efficiency.

One key element of sustainable architecture, as identified in the empirical material, is the importance of of cost-conscious consumers. Feedback received from and about customers of sustainable architecture all indicate that the economic aspects of the offerings are the most important, namely the affordability of sustainable solutions, and the largest factor as to whether a customer actually purchases the sustainable design or not. Therefore, it is of great strategic interest to the architect firms and arguably a prerequisite for a successful SBMI to substantially develop the economic aspects of their offerings. Development aspects include advanced economic analysis, providing clear economic figures to the customers, for example, on the economic lifecycle of the architectural project, the actual costs and benefits, the rate of return, etc. Providing a much clearer economic outlook will greatly aid customers in making their decision and increase their willingness-to-pay, especially considering that sustainable architecture is by its nature innovative, and therefore presents a higher degree of uncertainty and risk compared to conventional architecture approaches.

In Figure 7, I rate the sustainability value proposition of the case companies against international standards in each respective domain, on a scale from zero to ten. Zero being non-existent and ten being a leader in the field internationally. These ratings are based on the evaluation of the empirical material (interviews, documentation) and assessments of sustainability initiatives and projects conducted to date. The following parameters are measured: Sustainability Coordination refers to formulating clear visions and strategic objectives, whilst securing commitment from key stakeholders; Circular Architecture refers to renovating, reusing and recycling existing value while maintaining social and cultural worth; Climate Neutrality refers to reducing greenhouse gas emissions from materials and energy, balancing with renewable energy or carbon sinks; Social Sustainability refers to applying equal rights and opportunities for all, regardless of gender, ethnicity, disability or age; Economic Sustainability refers to the profitability of projects; Digitalisation refers to the use of digital technologies; Space Optimisation refers to the efficient usage of all spaces within projects.

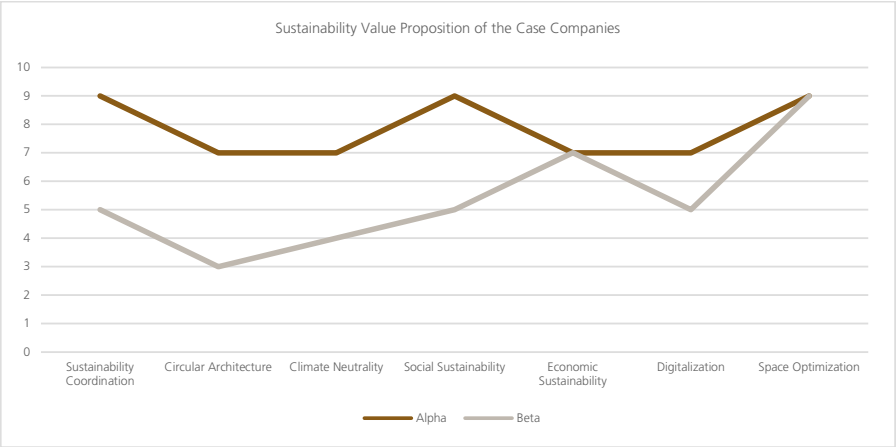

Figure 7: Case companies' sustainability value proposition ranking

6.3 External Dimension

The following table summarises the differences in the offerings & value propositions between the case firms.

		Alpha	Beta
External Dimension	Relationship with Customer	Project Selectivity on Sustainability Grounds	-
		Knowledge Co-creation	Knowledge Co-creation
		Interpreting Client Demands	Interpreting Client Demands
		Educate Clients	Educate Clients
	Relationship with Partner	Increased Academic Partnerships	Increased Academic Partnerships
		Increased R&D Partnerships	Increased Partnership with Consultants
	Relationship with Competitor	Breakfast Meetings	Beta Talks
		Increased Joint Architecture Projects	Increased Joint Architecture Projects
		Competition Solely on Design	Competition Solely on Design
		Increased Open-Knowledge Sharing	Increased Open-Knowledge Sharing
		Increased Collaboration with Competitors	Increased Collaboration with Competitors

Table 8: External Dimension of the Case Companies

The manner in which both case companies interact externally can be described as being predominantly similar. Neither firm has a clearly defined target customer strategy, for example, and both firms openly share proprietary knowledge. However, it may be argued that Alpha's project selectivity can be considered a form of target customer strategy, and is driven by both ethical considerations and sustainability concerns.

Another change that is observed in the empirical material pertains to the relationship with the customer, a factor that is shown empirically to be of great importance. This is apparent for two reasons: first, the relationship becomes fundamentally dependent on the level of trust between both firms. Trust is a significant factor in sustainable architecture due to the uncertainty and ambiguity regarding the concept of sustainability and related solutions. Moreover, as most customers lack the competence to evaluate different solutions and tend to be risk-averse, they may be suspicious of any new developments and reluctant to buy any sustainability-related services. The level of trust, in turn, determined by previous interactions and past successes and projects between both firms, plays a crucial role in providing more certainty to the client and making them more likely to accept and pay for new sustainable solutions. It is essentially easier to convince someone with whom you have a long and beneficial history. This trust can be an important source of competitive advantage, specifically because it is difficult to imitate, due to history, causal ambiguity and social complexity. This trust gives the architect in question a great advantage over other architectural firms, leading, in effect, to the customer becoming less risk-averse in their interactions with the architect. Trust is especially important in fields where there is a high level of uncertainty, such as sustainability.

The relationship with the customer also becomes of great strategic importance in terms of knowledge transfer from the architect to the customer. As most customers do not possess knowledge of architecture and construction, the architect's role is vital in providing information to the customer, which would guide their choice. As explained previously, being able to provide as much transparency as possible (such as a clear idea of costs and benefits) to the customer will greatly increase their chances of commissioning sustainable architecture.

Furthermore, as the empirical material clearly shows, the relationship with the customer becomes even more important, as the architect firms are not merely responding to demand but actively creating it by educating customers (who have no prior experience with sustainability) on the value and importance of sustainability. Thus, architect firms would stand to benefit by capitalising on this opportunity to gain a competitive advantage (as well as create sustainability gains at large) and have a clear strategy on how to go about this. This might include exploring novel forms of collaboration with customers, and even using new interfaces to reach them, including using media to shape demand and indirectly engage with customers. Thus, architect firms need to be aggressive in their relationships with customers to ensure that they shape the demand in the long-term and ensure a competitive advantage.

One major finding relates to the relationship between architect firms themselves. This strongly influences how these firms innovate: both case firms openly share virtually all information relating to their latest innovations or architectural solutions, whether it is conceptual (such as areas in which social sustainability can be incorporated into architectural designs) or tangible (novel architectural solutions). The platforms through

which the case firms share this information can be public seminars organised at the firm's premises or industry-wide conferences through which projects are explained in large detail. As this is an industry-wide standard practice, it leads to each firm building upon another's innovative or novel solution, leading to even further innovations, which are then, in turn, shared publicly.

The architect firms also have formed partnerships with firms with specialised sustainability competence. As mentioned previously, architect firms would gain substantially from outsourcing the competence within sustainability to firms that are experts in the field, and whose core competency is within sustainable construction and engineering. It is, of course, important that the architect firm develops a basic understanding and in-house expertise within sustainability with the goal of being able to interact successfully with the partner firm, and contribute in an informed manner to jointly developed, innovative solutions. This basic competence is also essential to successfully manage the relationship between the architecture firm and the sustainability-focused engineering partner firm. A successful strategic partnership, which may even develop into a form of alliance, would contribute largely to the architect firm's competitive advantage by enabling, for example, the development of unique and competitive relation-specific assets through knowledge-sharing, complementary resources and capabilities, and less costly governance mechanisms (Dyer & Singh, 1998).

The sources of these are relation-specific assets (facilitating the development of unique and competitive assets), knowledge sharing routines (allowing for a deep exchange of knowledge resulting in joint learning), complementary resources/capabilities (the combining of complementary, but scarce, resources or capabilities which results in the joint creation of unique new products, services or technologies), and effective governance (incurring lower transaction costs than competitors) (Dyer & Singh, 1998). For example, the architecture firm can develop a deeper understanding of the construction firm's business model, what their interests and concerns are in every project and which processes and routines they employ in project management, with the ultimate goal of increasing the architect firm's influence in the entirety of the project. In return, the architect can provide specialised competence within architecture and sustainable architecture, and by joining together those specialisations with that of the construction engineer, more cross-disciplinary, more unique, technically advanced and potentially scalable solutions can be developed, providing both firms with a superior offering and competitive edge over their competitors. This could also provide the architect firms with access to competencies which they themselves describe as much-needed to create even more value for the client, such as engineering and finance.

6.4 Firm-specific Characteristics

Based on the empirical evidence, a summary outlining the main empirical characteristics of both firms is presented. Alpha is characterised by a shared ownership structure, a values-based strategy, a practitioner-managed firm and a top-down organisational culture. In contrast, Beta exhibits an external ownership structure, a target-oriented strategy, is corporate-management and a bottom-up organisational culture. The advantages and disadvantages of their respective business models are discussed. These characteristics have been shown to have greatly influenced each firm's direction and approach to sustainability.

Regarding Alpha, the empirical characteristic of Shared Ownership is embodied in its partnership ownership structure. The advantage this structure gives to the architectural firm is that it keeps all control of the firm within its own boundaries. No external investors sit on the board with voting rights, leading to the firm's most strategic decisions being made by the architects themselves. An example of how this is advantageous is that Alpha does not face any pressure to pay dividends to external investors, potentially allowing for greater internal resources. The disadvantage of this, on the other hand, is that without any, or limited external, presence in the management or board of the firm, there is less room for diverse opinions and challenges to management decisions, which could increase the risk for a *Dominant Logic Trap*. It is also evident that Alpha bases its strategy on values, which explains in part its early investment in sustainability capabilities before the demand existed in any significant manner. The advantages of this are that the firm naturally acquires a strong ethical profile, which is indirectly communicated to customers. Moreover, value-based foci such as sustainability are more deeply embedded and easier to incorporate within the firm. The drawback is the increased risk of reduced profitability, as the firm's values can take priority over profitability. Another empirical characteristic of Alpha is that it is managed by practitioners, with architects themselves occupying all the management roles. This ensures that the management team has unparalleled insight into the field of architecture and possesses industry-specific tacit knowledge, with many even actively participating in architectural projects on top of their management responsibilities. However, it can also lead to a level of strategic myopia, as the management team would not be benefitting from experience and insights outside of the architectural industry, where, for example, innovative business practices may have been implemented and which could also potentially benefit Alpha. Another characteristic of Alpha is that of a Top-Down Culture, in which initiatives are mostly instigated by mid- or senior management. In practice, this has led to Alpha supporting the building of a sustainability capability internally, but it can also lead to a certain level of organisational rigidity, as formal approval from management is needed for any initiative. Additionally, in terms of approach to sustainability, one may describe Alpha as adopting an *accommodative* (Schaltegger et al., 2012) approach. This relates to a cautious

modification of internal processes and a modest application of sustainability goals. Examples of this are sustainability management systems and tools which are introduced to have limited control. A certain degree of organisational change is required, such as training of employees, leading to sustainability objectives being introduced into many business processes.

Beta, on the other hand, presents significantly different empirical characteristics. As opposed to being partner-owned, it is predominantly (80%) owned externally by an investment firm. The advantage of such ownership structure is argued to be access to a much larger pool of resources, with owners who would be more likely and willing to inject capital into the firm. However, a disadvantage is the risk of divergent interests between the firm's management and its owners, and how these conflicts are settled. Beta's strategy is much more focused on financial targets compared to Alpha. The strategy is devised with profitability as a main priority and economic analysis being more prevalent than in other architecture firms. Nonetheless, the stronger focus on profitability may work to stifle initiatives related to values, especially if the profitability of those initiatives and projects is uncertain. Moreover, Beta can be described as being corporate-managed, with many CEOs being "career managers" and coming from outside of the architecture and construction field. This brings, of course, a number of advantages, such as having a broader outlook and bringing external experience and competence into the firm, leading to potentially significant efficiency gains and other benefits. The drawbacks, which are due in part to this development, have been the recent development of the firm, including frequent reorganisations and restructuring, changes in management and the resulting low morale among employees. Lastly, a significant difference between the two firms is Beta's Bottom-Up Culture. The firm encourages and empowers its employees to propose and carry out new initiatives, of which the Sustainability Network is a prime example. Nonetheless, it is shown in the empirical material that despite the approval of bottom-up initiatives, there exists a level of managerial indifference and a general lack of support for such initiatives. Regarding its approach to sustainability, Beta adopts a *defensive* (Schaltegger et al., 2012) approach, which can be seen as a means of protecting the existing business and revenue generating rationale, without introducing any sustainability elements in the business model that might significant change the existing business logic.

	Organisational Characteristic	Advantage	Examples	Disadvantage	Examples
Alpha	Shared Ownership	Complete Control	Larger internal resources	Unchallenged Management	Dominant Logic Trap
	Strategy based on Values	Ethical Profile	Embeddedness of Sustainability	Inefficiency Loss	Weaker Financial Performance
	Practitioner-Managed	In-depth Market Insight	Industry-specific Tacit Knowledge	Strategic Myopia	Lack of Innovative Business Practices
	Top-down Culture	Corporate Support of Initiatives	Sustainability Function	Organisational Rigidity	Need for Board-level Approval
	Accommodative Approach to Sustainability				
Beta	External Ownership	Access to Pooled Resources	Takeover by Investment Fund	Divergent Interest	Owner's interest has priority
	Strategy based on Targets (Project-focussed)	Focus on Profitability	Stronger Economic Analysis	Stifling Ideals	Revenues Precede Values
	Corporate-Managed	Strategic Outlook	Efficiency Gains	Disconnected Agenda	Frequent Reorganisations, Restructuring, Low Morale
	Bottom-up Culture (ad-hoc)	Empowerment of Employees	Sustainability Network	Managerial Indifference	Only 2h /month for Sustainability Work
	Defensive Approach to Sustainability				

Table 9: Firm-Specific Characteristics of the Case Companies

7 Analysis

This chapter constitutes a discussion of the analysis and findings of this particular study. The research question that guided this study was: "Which capabilities contribute to sustainable business model innovation and how?" This study proposes a capability-based conceptualisation of SBMI, aiming to identify the different capabilities affecting SBMI and shed light on how they contribute to SBMI. In doing so, the study also identified findings on the interactions of SBMI with external actors, the SBMI process and its determining factors. The findings are analysed and compared to the existing literature, where the concepts will be interpreted in a new light, and through the lens of the empirical findings, after which a revised theoretical framework will be presented as an answer to the research question.

7.1 SBMI

The empirical material strongly confirms the notion that sustainable business model innovation is composed of distinct capabilities which drive SBMI within the case firms. Indeed, after careful analysis of the empirical data, these capabilities are best described as dynamic capabilities. BMI presents three core dimensions of BMI-related capabilities: (1) identification of opportunities for new business models, (2) design of a new business model to address such an opportunity and (3) implementation of the new business model (Teece, 2007), which I argue also apply to SBMI. Furthermore, I argue that the phenomenon of BMI is best studied through the lens of SST for the following reasons: one major capability which was identified was the ability to recognise change and consequently identify commercial opportunities and threats (which I argue can be described as Sensing). Another reason involves how these opportunities and threats are addressed and exploited (which I argue can be described as Seizing), and the third reason encompasses the ability to adapt a firm's resource base (which I argue can be described as Transforming). The following sections use these three dimensions and provide case examples to describe distinct capabilities of SBMI.

Thus, the findings will be studied through the perspective of Teece's (2018) SST framework, which proposes an elegant connection between dynamic capabilities and business models. In this case, dynamic capabilities include the highest-order capabilities of sensing, seizing and transforming. These elements are needed to allow for the implementation and modification of the business model. The Sensing capability

describes the continuous process of monitoring customers' needs and aspirations as well as the identification of opportunities that could provide the organisation with a competitive advantage. This capability is mostly composed of two elements: technological possibilities and technology development. The Seizing capability reflects the actions taken to capitalise on identified opportunities by designing and refining the existing business model, as well as committing resources to exploit that opportunity. The two mechanisms behind this capability are anticipating competitor reactions and defending intellectual property. The last capability involves Transforming aspects of the organisation and culture to apply the changes needed for obtaining a new business model that capitalises on the identified opportunities in an efficient manner and, more importantly, allows for the identification of further opportunities. This dynamic capability, which enables continuous sensing and seizing of opportunities followed by transforming and reconfiguring of resources within the organisation, is key to responding to (or creating) changes in the market. The building block of these capabilities is argued by Teece (2018) to be, on the one hand, organisational routines and processes and, on the other hand, non-routine managerial interventions.

The fundamentals of the preliminary framework were inspired by Mezger (2014) and Teece (2010, 2018), aiming to specify more clearly the content and nature of the specific capabilities behind BMI. Nevertheless, despite the clear benefit of this model in conceptualising how firms engage in BMI, this study showed that the model proved itself insufficient for explaining the SBMI. Indeed, there was a lack of focus in the preliminary framework on the types of capabilities needed for SBMI. The reasons for this are elaborated in the following sections. However, in summary, I argue that the nature of the dynamic capabilities within SBMI differed to such an extent from the BMI-focused preliminary framework that a new framework was necessary. It is noteworthy that there have been previous attempts to provide a framework for sustainability efforts within firms, such as those by Antikainen et al. (2017); Geissdoerfer et al. (2017); Roome and Louche (2016). One of those is by Aminof et al. (2017) who developed a conceptual framework for shaping the industrial systems towards circular economy (CE) ecosystems (a form of sustainability-focused ecosystem). This model proposes how value circles and co-creation of value with a variety of partners are crucial aspects in enabling CE. That model takes a distinctively disruption-based approach (Christensen, 2001) coupled with an alternative view of sustainability (circular economy), which assumes that economic growth is decoupled from resource consumption and pollutant emissions, as end-of-life materials and products are conceived as resources rather than waste. This model, however, did not prove to be useful in explaining the empirical phenomenon, as the empirics did not suggest the presence of disruptive innovative practices within the SBMI efforts at the case companies. Additionally, notions of circular economy principles were not used as the rationale for the underlying changes in their business models. Therefore, Aminof et al. (2017) proved inept at shedding light on SBMI in these cases. Geissdoerfer et al. (2017), however, developed a range of new tools and techniques to facilitate the design of more sustainable business models, which they name "The Cambridge Business

Model Innovation Process". It is a framework developed to guide organisations' business model innovation efforts and map out the necessary activities and potential challenges. Whilst this framework could be applied to the empirical material, only the outcomes of the concept design in their case company were analysed, as opposed to observing firms that undertake a holistic and all-encompassing SBMI. Their framework also has a very strong practitioner focus, detailing, for example, the specific activities and challenges in each step of the process of BMI. Therefore, Geissdoerfer et al.'s (2017) model also proved itself underdeveloped, especially in order to conceptualise SBMI in terms of dynamic capabilities. Finally, Roome and Louche (2016) present a framework that focuses on how new business models for sustainability are fashioned through the interactions among individuals and groups both inside and outside companies. Their findings show that three elements contribute to the path of transformation towards business models for sustainability: building networks and collaborative practices for learning and action around a new vision, the deployment of new concepts drawn from outside the company, and elaborating an implementation structure within a reconfigured network. Although their findings are valid and relevant for this study, their framework takes a strong process-perspective, which was not suitable for mapping the dynamic capabilities viewpoint behind this study's conceptualisation of SBMI.

Therefore, I propose a new dynamic capability model for SBMI, whilst keeping the dimensions of sensing, seizing and transforming. In the revised theoretical framework, I suggest a breakdown of capabilities into second-order capabilities ("learning-to-learn", meta-capabilities); first-order capabilities (affecting reconfiguration) and zero-order capabilities (operational) (Teece, 2018; 2007). This breakdown is built upon operational capabilities identified from the empirical material. The sensing second-order capability is composed of the first-order capabilities of cross-disciplinary sensing, organisational sensing and stakeholder sensing. The seizing second-order capability is composed of the first-order capabilities, including cross-disciplinary consensus building, reorganisation of BMI and stakeholder alignment. Finally, the transforming second-order capability is composed of the first-order capabilities of the incorporation of cross-disciplinary knowledge, cultural and organisational change, and stakeholder integration.

7.1.1 Sensing Capabilities

The first dimension of SBMI, sensing, denotes the identification of opportunities and threats for new business models. I argue that it is composed of cross-disciplinary sensing (such as identifying innovative technology, methods and tools from the combination and cross-fertilisation of multiple separate competences and expertise), organisational sensing (such as identifying organisational practices, processes and other organisational changes) and stakeholder sensing (such as identifying sustainability-related knowledge, changes in market demand and trends). As explained in the empirical material,

technology is a key driver of sustainability. It is widely acknowledged that higher order technological competences are a significant determinant of innovation (Danneels, 2002; Song et al., 2005), even within the field of sustainability. Similarly, firms apply technological competences to identify opportunities for new business models (Mezger, 2014). Thus, he argues, based on technological change, that firms with the ability to acquire new, emerging technological know-how and relate this knowledge to specific business model components, are better able to identify opportunities for new business models, which I argue applies also to sustainable business models. Aside from solely focusing on sustainability sensing, a second capability exists, which is that of sustainable business model sensing, for the identification of opportunities, and it represents a key differentiator for firms strategically focusing on SBMI. Firms who engage in SBM sensing systematically analyse sustainable business models of competitors, adjacent firms, as well as other industries.

Regarding technology innovation within sustainability, previous literature brings to light the multidimensional and complex nature of combining highly innovative technological advancements with BMI (Hart et al., 2003; Yu & Hang, 2010; Zott et al., 2011). This pattern is strongly supported in the empirical material. Both case firms face difficulties in identifying, developing and implementing technological innovations within their SBMI. The main reason behind this is the high level of risk and experimentation associated with new technologies. This risk leads to uncertain benefits for the case companies, making it difficult to properly invest in a technology without knowing how it will perform in practice. There are even competing technologies, further complicating the decision of which technology to invest in and implement with SBMI. Novel and innovative technologies also tend to be expensive, particularly when the technology is in its infancy. This makes it expensive for the architect firm to implement internally and expensive for the end-client, given the uncertain reliability. However, both case firms understand the immense importance of technology in SBMI and have adopted different approaches to address this challenge. Beta partook in research projects such as HSB Living Lab, the research project focusing on sustainability and consisting of a movable research, demonstration and housing structure, with the goal of testing new technical and architectural innovations. The building will function for ten years as a 'living laboratory', where inhabitants will live over the course of ten years, and research on the built environment and the behaviour being conducted. Alpha also promotes technological innovation through the Alpha Research lab, for example. The initiative focuses on internal, practice-based research projects relating to sustainability. One of the main uses of the funds within the Alpha Research Lab is to address situations where the client is requesting a sustainable or innovative solution that has not been tested or implemented before but is hesitant to bear the extra cost. In such cases, funds from the Alpha Research Lab can be used to finance the extra hours and work needed to investigate the application of the new technology. This not only benefits the client directly in the specific project but also develops knowledge within the firm, which can be used in future projects to create more value for the customer. This phenomenon of experimentation supports the finding by Guo et al. (2016) that

BMI takes shape through experimentation, and an exploratory orientation is a crucial factor that initiates the experimentation process for BMI.

The operational capabilities of cross-disciplinary sensing, as identified from the empirical materials, include:

1) Assembling cross-disciplinary teams for sustainability projects consisting of many different but complementing competences (architects, engineers, project managers, urban planners, landscape architects, social anthropologists, chemists, biologists, environmental and energy specialists, light designers and interior designers). An empirical example of this approach is the Alpha Innovation Process, which was a process of including an inter-disciplinary approach into each project by involving various experts and stakeholders as early as possible. Another empirical expression of cross-disciplinary teams was the earlier Sustainable Integrated Design process. The integration of this vast range of expertise allows for much higher levels of knowledge sharing and generation. Thus, it enhances the identification of opportunities and threats compared to teams consisting solely of architects, for example.
2) Another capability of cross-disciplinary sensing involves the firm having active routines and a focus on acquiring new employees and consulting existing employees with connections to the construction and engineering industries, as well as to universities and research institutes. This enables the awareness of the latest sustainability developments from separate research fields outside the firm to be known and considered by the focal firm.
3) The final sustainability cross-disciplinary capability is that of active routines for acquiring new employees and consulting existing employees with the goal of identifying relevant competencies in digitalisation (such as CAM/CAD and BIM) and new sustainability-enabling technologies, with the aim of recommending which knowledge should enter the firm, either by recruitment or training of existing employees. Empirically, these two capabilities are observed at both case firms through their hiring practices (employees and consultants) and, in the case of Beta, through acquisitions of other architecture practices.

The operational organisational sensing capabilities include:

1) The ability to establish relations with managers within the industry and complementary industries to identify any sustainability-related organisational advancements unbeknownst to the firm. This is exemplified empirically by external partnerships that both case companies have within architectural projects in which a construction firm is involved, and in other collaborations such as with Vinnova, where they are involved in industrial collaborations with construction and engineering companies.
2) Another organisational sensing capability involves drawing inspiration for new ideas from openly communicated sustainable business models in other

industries, such as construction. This is empirically observable through the participation of the case companies in various external events, conferences and meetings (such as the Breakfast Meetings at Alpha and the Beta Talks).

3) A third organisational sensing capability is the establishment of a new strategy without a profit requirement for purely sustainable projects. This allows for knowledge generation and understanding of which BM components and their composition are of greatest importance. This translates empirically into the absence or low profit requirement observed to varying degrees at both case firms, where long-term gains are prioritised over short-term financial gains.
4) Finally, the change of sales focus and increased selection of projects based on sustainability grounds represent the last organisational sensing capability. This is observed empirically at both firms and allows for a constant re-evaluation of sustainability elements in the conventional architectural process.

The final group of operational capabilities relate to stakeholder sensing, taking place outside of the firm boundaries. This is exemplified by the following capabilities:

1) The establishment of research and development activities through co-funded research institutes, as empirically demonstrated by the HSB Living Lab, Alpha Research Lab and Alpha Foundation initiatives; collaboration with external partners and even competitors, such as the collaboration of the case companies in the development of the hospital project; and organisational structure to allow for informal meetings with multiple industry players, including direct competitors (i.e. Breakfast Meetings, Beta Talks).
2) External collaboration in architectural projects by competing architectural firms (such as the hospital project).
3) A high level of informal knowledge sharing within the architectural industry and even amongst competitors, including between the case companies themselves.

The operational capabilities that constitute the second-order sensing dynamic capability are represented in Table 10.

Second-order Dynamic Capability	SENSING		
First-order Dynamic Capabilities	Cross-disciplinary sensing	Organisational sensing	Stakeholder sensing
Operational Capabilities	Cross-disciplinary teams Cross-sector-based recruitment Technology-based recruitment	Cross-industry relationship building Sustainabile business model sensing No-profit strategy for innovative projects Selectivity of projects	Joint R&D activities External collaboration Informal knowledge sharing

Table 10: The Capabilities of Sensing

7.1.2 Seizing Capabilities

The concept of seizing has also been developed to reflect a more complex process. The identification of new sustainability potential, sustainable business models of other firms or co-creation of new ideas does not automatically lead to new business models. Instead, firms need to transpose these findings into new and testable sustainable business model configurations. The ability to systematically develop new sustainable business models rests upon two pillars: a distinct focus on sustainability throughout the entire business model, which is a core element of a systematic approach to SBMI, and the development of new business models is essentially the combination of sustainability, technological, market, and business model knowledge. I argue that firms with an institutionalised assessment of all business model components (not just the core product or relevant production processes) are more effective in developing and advancing new sustainable business model concepts. Linking sustainability, technology, market (or customer), and business model-related knowledge is transformative learning and a key contributor to SBMI, in line with Gebauer et al. (2012). Obtaining feedback from direct customers and end-users also seems to be important in seizing opportunities and allows firms to iteratively test ideas and changes in their SBM efficiently, thus encouraging organisational learning.

The first capability of seizing identified is that of cross-disciplinary consensus building. This is exemplified empirically by:

1) A continuous focus on the latest sustainability developments to allow for the best composition of offering and value proposition.
2) An evaluation of customer preferences and business model acceptance to test different compositions of sustainable business model components.

3) SBMI based on the integration of architectural, technological, economic and sustainability competences.
4) Evaluation sessions and initiatives with direct customers and end-users, such as HSB Living Lab, to gather multi-level feedback.
5) Involvement of multiple private and public players in testing of new sustainable technologies (i.e. HSB Living Lab).
6) Experimentation of new sustainable business models, such as the architect firm being both client and architect.
7) Reporting of sustainability data and performance allows public cross-examination and feedback, which feeds back into SBMI (i.e. UN Global Compact report).

Indeed, this form of consensus-building is particularly important to overcome the barrier of unclear early profitability of SBMI, especially in the short-term. Achieving SBMI is inherently challenging, and the added necessity for SBMI to be significantly profitable further complicates the endeavour (Bocken & Geradts, 2020). This underlines the importance of creating consensus and convincing involved stakeholders across multiple fields that SBMI is a worthwhile ambition from a social and environmental perspective but also in terms of economic value.

The second capability is that of reorganising the BMI process, according to the opportunities identified in organisational sensing. This involves:

1) Shifting the focus from product innovation to sustainable business model innovation. This is exemplified empirically as changes in the case companies' revenue models, production processes, customer relationships, partner networks, and the incorporation of sustainability into the architectural process.
2) The creation of separate, test-pilot offerings and value propositions that are sustainability-focused, as exemplified empirically with "green pricing" (lower pricing to encourage long-term knowledge and experience gains in sustainability) to encourage demand.
3) Systemic review of sustainable business model components within the early innovation process, such as the empirically-observed Alpha Innovation Process.
4) Breaking down the different components of sustainability which in turn allows for new processes.
5) The development of sustainability-focused processes that incorporate economic, social and environmental sustainability.
6) Board-level focus and representation of sustainability allow for SBMI prioritisation throughout all business areas, as exemplified by heads of sustainability sitting on the board of the case companies.

One finding from the literature is the reluctance of firms to allocate resources and reconfigure resources and processes in the early stages of BMI. This reluctance may be due to, for example, senior management not agreeing on the appropriate BM to adopt

(Björkdahl & Holmén, 2013; Chesbrough, 2010; C Zott et al., 2011). The empirical material both proves and disproves this claim. Whilst analysing the empirical material from Beta, we see that this finding is strongly supported: higher management and leadership did not allocate resources, such as dedicated hours, materials, training or external expertise to sustainability or change the standard architectural processes used at Beta in projects until much later. This is due to, I argue, management's failure to recognise the business potential of sustainable architecture and the unclear benefits of allocating resources to such activities. Once the sustainability champions lobbied higher management sufficiently, only then were limited resources allocated and new routines set. However, the experience at Alpha disproves the literature. Quite surprisingly, decision-makers at Alpha were more willing to allocate resources to sustainability work and even allow certain changes in processes. The quite exceptional nature of this was that the business potential at the time was generally considered to be minimal. These changes were done, I argue, mostly due to ideological reasons.

Another interesting point concerns the recombination of business model components and profitability. Authors such as Hart et al. (2003), Schaltegger et al. (2012) and Stubbs and Cocklin (2008) emphasise the challenging nature of combining profits together with social and environmental benefits and how this difficulty hinders SBMI. The empirical finding mostly aligns with the predicted pattern insofar as, for both firms, profitability is indeed low or even absent in highly innovative or sustainable projects, although both case companies have taken different approaches. Beta, for example, had a much stricter approach and simply turned down highly sustainable or innovative projects where profitability was not guaranteed. Alpha, on the other hand, accepted the challenging nature of the triple bottom line and, in response, adopted a long-term perspective on profitability. This entails accepting projects that are hardly profitable or even not profitable initially to allow for knowledge and know-how generation internally. The goal is to generate profits in future projects when acquired competencies allow for more efficient and value-creating architectural projects. However, an interesting empirical finding suggests that the challenge of balancing profits with sustainability and the subsequent managerial effort to overcome that obstacle may actually lead to sustainable business model innovation. For instance, the measure taken by Alpha to counteract this lack of profitability is to sell sustainability consultancy services externally to allow for new revenue streams than their core business. This change in their business and revenue model allows Alpha to diversify its offerings and capture value through other means than traditional architectural projects. While the empirics confirm the predicted pattern from previous research, an interesting contribution is that this study has brought to light that the response to the challenge of balancing profits with social and environmental benefits may itself lead to SBMI. Indeed, the practice of accepting non-profitable sustainability projects goes directly against theory. Porter and Kramer (2011) argue that sustainable innovations must be anchored in a financial value-creation logic and that the level of business potential must be sufficient to motivate the development of any novel sustainable offering. They suggest that charitable or philanthropic aspirations alone will not suffice in justifying

such an effort. However, it is clear from the empirical material that architecture projects, which would be unprofitable if undertaken (and this is known to the firm from the beginning), are nonetheless accepted. The value created from these projects is not financial but rather a learning process during which the firm accumulates new experience and knowledge, articulates and tests new sustainable ideas and offerings, and then incorporates that knowledge into the SBMI process (Zollo & Winter, 2002). This represents a clear managerial strategy put in place to encourage companies to take on unprofitable projects in order to advance and accelerate SBMI. Alpha did undertake numerous sustainability initiatives and published explicit sustainable architectural recommendations in the form of a book, even when the benefits were wholly intrinsic. Considering that these early sustainability efforts led to consistent sustainable innovation over a prolonged period and ultimately culminated in SBMI, this study strongly advocates that intrinsic values and aspirations can suffice in justifying and even propelling sustainable innovation. Nonetheless, the study does support another claim by Porter and Kramer (2011), as mentioned previously. Namely that merely developing a sustainable solution, offering or product often is not enough to generate extra revenue. Other measures have to be taken, such as adapting the market positioning of the company (and the product) to match the message of the offering, as well as adapting the internal operations of the firm, its processes, competences and culture. This is supported by the case companies, in which the development of a sustainable offering is accompanied by changes in the firm and product positioning to match the changing customer demand (for example, the Green Bid and profiling of the case companies as sustainable), incorporating cross-disciplinary knowledge and carrying out cultural and organisational changes to facilitate SBMI.

The case study has brought to light another capability that previous research has overlooked, namely stakeholder alignment. This can be described as the firm's efforts to align its interests with stakeholders and shape existing market conditions. This translates into the ability to:

1) Engage with market shaping actors, such as public and interest organisations, for example, lobbying groups, standard-setting bodies, consumer bodies, and even competitors.
2) To influence sustainability market conditions such as demand through those engagements.
3) To co-formulate regulation and standards by participating in regulation and standard-setting organisations.

Empirical examples of this include active involvement of the case companies in interest organisations (i.e. Swedish Association of Architects) and public organisations (law-setting bodies, municipal clients, universities) as well as participation in defining sustainable building standards in partnership with the Swedish Green Building Council.

The capabilities which constitute the seizing dimension are represented in Table 11.

Second-order Dynamic Capability	SEIZING		
First-order Dynamic Capabilities	Cross-disciplinary consensus building	Reorganisation of BMI	Stakeholder Alignment
Operational Capabilities	Incorporation of latest developments into offering Feedback on experimentation of sustainable business model components Integration of cross-disciplinary competences Multi-level feedback Private-public partnerships SBM experimentation Sustainability reporting	SBMI as primary focus Value proposition experimentation Review of BM components Deconstruction of sustainability Development of sustainable processes Board-level sustainability representation	Cross-industry involvement Shaping of demand Co-formulation of standards

Table 11: The Capabilities of Seizing

Stakeholder Alignment

Building upon the research on alignment beyond the value chain, particularly drawing from literature on innovation networks (Bouwman et al., 2008; Ojasalo, 2008) and networked enterprises (Solaimani & Bouwman, 2012), I argue that the process of stakeholder alignment at play between the market and the firm turns out to be much more complicated than suggested by theory. Rather, stakeholder alignment depends on the interaction between, on the one hand, the market-setting organisations in the market and, on the other hand, the market-setting activities within the firm, indicating a two-way relationship.[8] The market-setting organisations in the market consist of the consumers (who strongly define sustainability demand through their consumption or non-consumption of goods), interest organisations (such as green building standard-setting bodies or trade organisations), public organisations (law-setting bodies, municipal clients, universities), as well as competing architect firms. The marketing and externalisation activities within the firm include private partnerships (when architect firms collaborate either with other architect firms or other private firms to deliver an offering or project), public partnerships (for example, research collaborations

[8] Especially true in the case of the firms being market-leaders, as is the case in this study. Nonetheless, market dominance is not an absolute prerequisite, and in many industries, small firms have been observed to develop such a capability as to wield a much higher level of influence in setting market demand relative to their size, often leading to them becoming market-leaders.

between firms and universities), open seminars (open to any parties) and external appointments (when members of the firm are appointed positions within influential organisations in the market). There is a continuous in- and out-flow of information between the firm and the market, facilitated by two specific mechanisms: the process of *cognitive search* is also present here as an inflow of information where the firm actively detects changes in the marketplace, and the outflow consists of the process of *experiential learning,* whereby the firm sends information learned through the response of the market to their offerings back into the marketplace, as well as the process of *firm lobbying,* whereby the firm tries to increase its influence by aligning with external stakeholders and thus shaping the market conditions. Stubbs and Cocklin (2008) also emphasise the importance of the firm's ability to lobby with stakeholders, such as policy makers, opinion makers and authorities, with a focus on the environment and society as a whole. This finding has strong strategic implications, entailing that firms, instead of simply responding to market conditions and matching their offerings correspondingly (the role of a *market taker*), can actively help to shape that demand through clearly directed and well-defined internal activities (the role of a *market maker*). This is especially true in industries in which market conditions have not been clearly defined, offering firms a greater potential and efficiency to shape that demand (even with low allocated resources, the firms may appropriate large gains), with one such industry being the architectural industry concerning sustainability.

One interesting finding which came to light from the empirical material is that of the relationship between ownership structure and BMI. The author could not find any previous research addressing ownership structure and BMI; therefore, this finding could be unique to the field. Previous pivotal research, such as that by Demsetz and Villalonga (2001), for example, showed that ownership structure does not have any significant effect on corporate performance. Nonetheless, the empirics suggest that a shared ownership structure may have a positive effect on SBMI. Alpha, which is partner-owned by practicing architects who spend their days engaging in architectural projects, has experienced significantly larger changes to their BM compared to their competitor Beta. The mechanism behind this, I argue, is that leadership at Alpha, who hold the decision-making power on matters concerning SBMI, are situated much closer to the core business: the architectural processes, offerings and value propositions and importantly, the external clients and partners. These are architects who often attend external seminars on developments in the architectural field, in which knowledge is shared across the field. Having this closeness allows them to have a much more astute perspective on the architectural field and the changes within, such as changing customer demand. From this point of view, a partner-owned firm may have an advantage in SBMI compared to other ownership structures.

Regarding strategy, previous literature such as Zott and Amit (2008) and Chesbrough (2010) point out that strategy and BMI are closely intertwined, and that BMI coupled with differentiation, cost leadership, or early market entry strategies, can enhance firm performance. In the empirical material, one can see evidence of a correlation between

SBMI and a strategy of early market entry (i.e. Alpha's early experiences with sustainability) and increased firm performance. The question of whether this increased firm performance is directly caused by the firm's BMI is, however, difficult to ascertain. One relationship that is put forth by the empirical material is the link between a strategy of early market entry and SBMI, insomuch that developing a new service or product to enter into a new market early can bring about changes within the firm's BM. This is exemplified by Alpha's early initiatives into sustainability and how those actions precipitated Alpha's SBMI. It is worth pointing out that Alpha's corporate strategy is not defined by financial targets but rather on value-driven objectives (i.e. "ownership directive"), which are decided collectively within the firm.

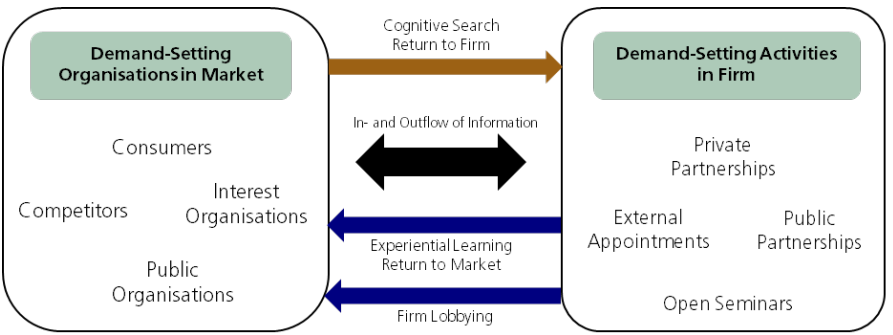

Figure 8: Stakeholder Alignment

7.1.3 Transforming Capabilities

During the previous two dimensions of sensing and seizing, firms engaging in SBMI identify potential opportunities and define means (i.e. new sustainable business models) to capitalise on those opportunities. The last and third dimension is that of transforming aspects of the organisation and culture and applying the changes needed to obtain a new sustainable business model which capitalises on the identified opportunities in an efficient manner and, more importantly, allows for the identification of further opportunities (Teece, 2010).

Mezger (2014) argues that this aspect is akin to the meta-capability of 'resource fluidity' discussed in prior literature (Doz & Kosonen, 2010). For incumbents who start with an already established resource base, the necessity of reconfiguring this base is especially high (e.g. Zahra et al., 2006; Teece, 2007), which is the case for the case companies in this study. Indeed, SBMI requires firms to rethink their activity systems of how they create and deliver value (e.g. Kumar et al., 2000; Zott & Amit, 2010).

One aspect of this is focusing on the adaptation of activities constituting the value chain. Incorporation of cross-disciplinary knowledge and competencies is an issue as important to the firm as it is complex. A big challenge for firms developing new sustainable business models and value chains is to ascertain which elements are the most valuable and which resources and competencies are needed in order to build competitive advantages based on the new sustainable business model (Amit & Shoemaker, 1993), especially as investments in new technological skills are high.

The second capability, as identified in this study, is that of cultural and organisational change, detailing the process through which the firm implements meaningful change in the firm culture allowing for widespread organisational changes, reducing opposition to sustainability, and setting the stage for SBMI. Indeed, as Bock et al. (2012) argue, creativity may support adaptation through improvisation (Vera & Crossan, 2004), and a creative culture represents an important prerequisite capability to innovate (Nadkarni & Narayanan, 2007; Plambeck & Weber, 2009). Furthermore, Gulati and Puranam (2009) argued that a strong informal organisation helps create stability during fundamental reorganisation, and since sustainable business model innovation may realign activities, firms with a culture that encourages creativity are more likely to embrace structural change and resource reconfiguration.

The final capability of transforming refers to integration of stakeholders and partners with sustainability or other competencies needed to implement the new sustainable business model. As Capron and Mitchell (2009) outline, firms need to carefully choose between internal and external modes of capability development. An example of this is integrating partners with complementary sustainability competencies directly into the new business model (Chesbrough, 2006). For new sustainable business models, it is neither possible nor necessary for the focal firm to own all resources and competencies (Amit & Zott, 2001). In fact, as new sustainable business models crucially depend on the application of new technologies, there is a high technological uncertainty, and firms mitigate investment by collaborating with partners.

The operational capabilities behind the incorporation of cross-disciplinary knowledge and competence include the following:

1) Establishment of dedicated sustainability resources, who contribute to the development of internal sustainability competencies and training of existing employees, exemplified empirically by the various sustainability roles and appointments within both case companies.
2) Knowledge dissemination by the sustainability team by carrying out training sessions within the fields of building certification (LEED, BREEAM, Miljöbyggnad), technical environmental expertise (such as Passive House, i.e. low energy housing), sustainable landscape architectural and holistic planning expertise and expertise within sociology and social sustainability. There is also a focus on recruitment efforts to acquire employees with competencies within digitalisation and sustainability to complement existing competencies,

exemplified empirically by the focus at both case companies on hiring employees and consultants with specific knowledge and experience base.

3) Recurrent cross-disciplinary collaboration between departments and business areas is also an operational capability, with the goal of spreading technological know-how and sustainability thinking throughout the organisation and avoid working in "silos", exemplified empirically by the Alpha Innovation Process and the earlier Sustainable Integrated Design process.
4) Sustainability requirement, which guides investment in potential projects. All investments are reviewed by the management team and only approved if a sustainability requirement is fulfilled, exemplified empirically by the Green Bid and the Ownership Directive, which state value-driven objectives at Alpha such as only accepting projects that meet certain sustainability requirements.
5) Use of models to map the level of sustainability in a given project and to match existing competencies against desired ones, exemplified empirically by the Sustainability Analysis.

The operational capabilities within cultural and organisational change are the following:

1) Transformation of existing risk-averse attitude to ones that promote increased risk-proneness to encourage riskier and more innovative thinking in projects and organisational changes, exemplified empirically by the case companies' internal initiatives to change norms and instil sustainability thinking.
2) Incorporation of sustainability values into firm culture and minimisation of ideological opposition to SBMI by transforming existing culture and values to being predominantly sustainability-based.
3) Addressing change-aversion in the firm to not impede change management efforts undertaken as part of SBMI, both capabilities exemplified empirically by the Ownership Directive and Sustainability Analysis
4) Shift from a conventional "architectural" leadership culture to a strategic leadership which prioritises SBMI, exemplified empirically by the value-driven objectives and intrinsic goals set by senior management at both case companies.

Cultural change may also be a part of this transformation in which the firm adopts a business culture that promotes risk-taking as well as embedding new values and thinking, which fully enables the firm to develop sustainability capabilities. A shift is indeed necessary from the conventional manner of managing architectural practices to one which prioritises the firm's long-term strategies. In previous literature, it has been emphasised that the business rules, guidelines, behavioural norms and performance metrics prevail the mindset of firms and inhibit the introduction of new business models (Boons & Lüdeke-Freund, 2013; Johnson et al., 2008; Yu & Hang, 2010; Christensen, 1997; Christensen & Raynor, 2003; Prahalad & Bettis, 1986; Bettis & Prahalad, 1995). From the empirical material, we can see that this predicted pattern is very much valid. It is most clear at Beta, where the sustainability champions received

very little support from senior management in the early stages, and it was considered a personal interest to attempt to apply sustainability into the architectural designs. Early efforts to lobby senior management led to little change, with the prevailing rules and ways of working remaining in place. It is observable even at Alpha, where SBMI has gone further, leading to larger changes in the offerings, value chains, revenue models and internal and external resources; however, signs of opposition stemming from the dominant business logic are still evident. The empirical material contributes to previous research by identifying a new element to the oppositional mindset, that of ideological opposition. These ideological conflicts within both firms have implications for how the firms engage in SBMI. This can lead to difficulties in devising new strategies and implementing those strategies across different levels within the firm. Initiatives such as creating new processes to enhance capabilities in sustainability are strengthened by, amongst other things, ensuring that a minimum of sustainability features are included in the offering, which can be met with tension and be challenged by colleagues. In Beta, this phenomenon has been experienced to a greater extent. Nonetheless, despite their early history of sustainability, Alpha also considers this a significant challenge. To encourage adoption of sustainability thinking in the standard business processes, one measure implemented was to have cross-disciplinary teams who can work to reduce the opposition. This collaborative, cross-disciplinary approach also supports the findings from past research, suggesting that leadership needs to be united in their commitment to BMI, and that this unity is often achieved through collaborative activities (Doz & Kosonen, 2010).

Another example of how the empirical material strongly disagrees with theory concerns Schaltegger et al.'s (2012) claim that a SBM (a business model for sustainability as they phrase it) needs to include voluntary or mainly voluntary activities with the intention of contributing to the solution for societal or environmental problems. They argue that these intended activities must not just be a reaction to regulations and legal enforcement, or which would be expected for economic reasons as part of conventional business behaviour. However, the empirical material does not support this claim. A number of sustainable activities are undertaken by the case companies in architectural projects (for example, activities related to energy efficiency, low emissions, environmental and behavioural psychology, amongst others). Notably, not all of these activities are voluntary. In this case, the empirics suggest that the client must actively demand these particular features and be willing to pay for them as standard business practice. Nonetheless, both client demand and the case firms' advocating for sustainability to the clients, encouraging them to increase their demand for sustainability, have been shown to be major drivers of SBMI. Thus, this demonstrates that voluntary activities with the intention of contributing solutions for societal or environmental problems are not necessarily a requirement for successful SBMI. Secondly, Schaltegger et al. (2012) argue that the activity must result in a positive business effect or a positive economic contribution to corporate success, which can be measured or argued for in a convincing way. As explained previously, once again, the empirical material disagrees with this claim. It shows that architectural projects which

may not result in profit (a fact known to the firm from the beginning) are still accepted. This is due to the value created from these projects, which, although not financial, is obtained through a learning process. During this process, the firm gains new experiences and knowledge, articulates and tests new sustainable ideas and offerings, and then incorporates that knowledge into the SBMI process (Zollo & Winter, 2002). Schaltegger et al. (2012) state that these positive business effects should not be speculative and must be measured or argued for in a convincing manner, neither of which applies to the empirical observations. Instead, the case company Alpha engages in non-profitable projects with unclear and speculative business effects, but which, nonetheless, contributes to SBMI. This disagreement between the empirical material and Schaltegger et al.'s (2012) two previous points further leads to a contradiction of their final claim. They argue that a clear and convincing argumentation must exist to show that a certain management activity has led or will lead to both the intended societal or environmental effects and the economic effect. Thus, in this case, SBMI is not characterised by creating economic success through (and not just along with) a certain environmental or social activity.

The operational capabilities of integration of stakeholder and partners with sustainability or other SBMI-related competencies apply to other private and public partners. This integration occurs through:

1) Co-owned and co-funded research collaborations, exemplified empirically by initiatives such as HSB Living Space and the Alpha Foundation.
2) "Coopetition" and integration of partner firm and competitor into a separately founded organisation, exemplified empirically by the "Alpha Beta Team", which even included another architect company.
3) Integration of external feedback into existing business processes through open discussions and forums on ongoing and completed projects, exemplified empirically by the Breakfast meetings and the Beta talks.

It is essential for companies to engage in relations with external parties to ensure SBMI (Bocken et al., 2014). The literature suggests that this often requires significant resources and efforts beyond what a firm normally allocates (Boons & Lüdeke-Freund, 2013; Stubbs & Cocklin, 2008; Vladimirova, 2012). Empirically, this holds true for both case companies, as exemplified by their greater focus on external relations and the allocation of increased internal resources to allow for deeper external partnerships. Not only have the relationships with customers changed to include much more interactive and collaborative discussions, but the relationships with partners have also been strengthened. Both firms engage in increased research projects with external partners, such as universities and consultancies. However, what is particularly surprising in the empirical material is the evidence of intense cooperation with competitors, even between the case companies. Knowledge is shared openly, even proprietary knowledge, in forums where multiple architect firms and other industry organisations are present, and the latest developments and ideas are debated, leading to new ideas for sustainable architecture. This empirical phenomenon of idea co-creation, I argue, is part of the

novel stakeholder integration capability within SBMI, which a firm needs to invest in and create by allocating resources to external relations. Another source of competitive advantage for the architecture firms is to compete on the basis of their business model. In order to do so, they must engage in SBMI and significantly transform their existing business model into one that provides superior value propositions, for example, an open business model.

One possible integration is a strategic alliance, which represents an extreme version of integration with another firm, such as one operating in the construction sector. This could contribute significantly to the architect firm's competitive advantage by enabling, for example, the development of unique and competitive sustainability and relation-specific assets through knowledge-sharing, complementary resources and capabilities, and less costly governance mechanisms (Dyer & Singh, 1998). Moreover, such alliances could even strengthen the ever-weakening role of the architect in the market.

Since the architect firms are involved in and benefit from both cooperation and competition simultaneously, one can describe the relationship as one of "coopetition" (Bengtsson & Kock, 2000; Walley, 2007). The driving force behind this behaviour, they argue, is the heterogeneity of resources, as each competitor holds unique resources that may sometimes confer a competitive advantage and sometimes are best utilised in combination with other competitors' resources. Thus, R&D activities are, in practice, conducted in partnership with the architect firm's direct competitor. However, in contrast, the results of this joint R&D efforts are then marketed as each firm's own offering, being in direct competition with other architectural firms. Most interestingly, we can notice very high levels of cooperation, specifically with regard to R&D efforts in sustainability. However, other areas, such as those concerned with improving the aesthetic offerings, are in strict competition. One reason behind this could be the small pool of resources available to each architect firm, and the large pool of resources needed to enable meaningful innovation in sustainability. Consequently, it leads to the aggregation of common resources to allow for innovation, which can then be applied individually to each architect firm's designs and offerings. This study also strengthens Bengtsson and Kock's (2000) claim that firms tend to cooperate more frequently in activities carried out at a greater distance from buyers and compete in activities closer to buyers. Specifically, the architect firms cooperate in R&D activities, especially concerning sustainability, but are very focused on presenting an offering and brand which is clearly separated from the competitors. One can go even further to distinguish different strategies depending on the different business areas. For instance, the R&D business area of the architect firms often involves cooperation with competitors, whereas the sales business area remains exclusively competitive. Thus, there are three main benefits which can explain this coopetition among the architect firms: the cost for developing new sustainability products is divided among the cooperating companies, the lead times are shortened, and each company can contribute with its own specific sustainability competence and experience. Thus, this strongly impacted the development of sustainable business model innovation in this case.

As the empirical material was analysed, a major finding was identified. This was that an aspect of business model innovation, specifically a transforming capability, is *open innovation* (Chesbrough, 2003; 2006; 2010). This paradigm 'assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology'. It is clear from the empirical data that the knowledge flows into and out of the firms have two purposes: first, to accelerate internal sustainability and sustainable innovation by providing valuable insights into product development and second, to expand external markets for future sustainability innovations, in agreement with Chesbrough (2006). The case companies do, in fact, engage in the arduous process of converting research and development into products and services that meet customers' needs (so-called internal innovation). Subsequently, they integrate their results, ideas and expertise with persons and organisations outside the firm in order to commercialise the product or service in question, leveraging on internal and well as external sources of ideas. This process has already started to see the light in the business models of the architecture industry. This point also clearly contradicts the argument that value is theorised to originate very much within the boundaries of the firm (Barney, 1991). Instead, it places the creation of value within the architectural business model much closer to the network (Tapscott et al., 2000), compared to other traditional business models where value is created more internally (Casadesus-Masanell & Ricart, 2010). Indeed, value is increasingly being created in collaboration with multiple business partners to the point where we can even reconceptualise the notion of value creation beyond the traditional views of Schumpeterian innovation (Schumpeter, 1934), the reconfiguration of the value chain according to Porter (1985), strategic networks and alliances between firms (Dyer & Singh, 1998), or the development of firm-specific core competencies (Prahalad & Hamel, 1990). This view is mirrored in the sustainable business model literature, such as by Bocken et al. (2014), who also clearly accentuate the importance of partnerships and relationships with external stakeholders. They argue that much greater potential in sustainable solutions can be achieved by partnering with other organisations. The analysis of the empirical material regarding the value created by sustainable architecture strongly affirms the view that it is necessary for architecture firms to develop radically new forms of business models to succeed in the so-called 'age of revolution' (where competitive advantage can no longer only be created by value creation within the firm's strict boundaries) (Hamel, 2000). Thus, these companies must adopt radical and new innovation agendas, as value creation and capture from sustainable solutions take place in a value network that extends the company's resources (which can include business partners, suppliers, distribution channels and coalitions).

Thus, the nature of the partnerships forged by both case firms becomes clear. These partnerships, which are predominantly concerned with activities of research and development, are constituted of parties from different organisations (both private and public) collaborating openly, often even in public forums. I argue that these relationships are governed by soft rules and social norms that promote open access to information, transparency, joint development, and, most notably, the sharing of

intellectual property, akin to Boudreau and Lakhani's (2009) concept of *Collaborative Communities* or Saebi and Foss' (2015) description of a *collaborative innovation strategy*. Moreover, these soft rules and social norms originate and are shaped by individual, corporate and societal notions of sustainability. Indeed, Boudreau and Lakhani (2009) argue that these collaborative communities are essentially motivated by *intrinsic* values, such as a desire to be part of a larger cause. The origins of these values, which have led to the mainstreaming of these transparent collaborative practices, I argue, can be traced back to the historical development of the architecture sector in Sweden, with Alpha playing a large role: the firm was founded on strong societal values, and as it dominated the Swedish architecture industry for much of the second half of the 20th century, its external relationships characterised by openness and information-sharing became standard practice. Despite the leadership of other firms, such as Beta, placing less importance on values of openness (possessing stronger *extrinsic* motivations, placing more value on, for example, financial gain), it adopted these practices, nonetheless, as they became the industry standard. The link with sustainability can be argued as such: as societal and environmental issues are complex and encompass many different aspects of society (business, consumers, governments, amongst others) as well as different scientific traditions and professions, there is an understanding that reaching long-lasting solutions requires many different parties to work together whilst sharing their expertise and developments. This claim is further strengthened by Boudreau and Lakhani's (2009) assertion that if the external partnerships were not dominated by collaborative practices, we would see multiple competing varieties of complementary goods, components or services in a fiercely competitive environment, with little to no cooperation. However, this is clearly not the case. The nature of these partnerships is also reflected in research by Miles, Miles and Snow (2006), who express a similar idea of collaborative entrepreneurship, which they define as the 'creation of something of economic value based on new jointly generated ideas that emerge from the sharing of information and knowledge'.

However, Boudreau and Lakhani's (2009) concept of *Collaborative Communities* is underdeveloped and only partially applicable in this case. They define a collaborative community as a group of people who often work for free, and are loosely governed by soft rules and social norms that promote open access to information, transparency, joint development and sharing of intellectual property. Even though they refer to open-source communities working within software development, it becomes immediately clear that this definition does not apply in its entirety to the nature of collaboration observed in the architecture industry. Instead of collaborating with external individuals, the architecture firms are predominantly collaborating amongst themselves. The empirical material demonstrates, thus, a new form of collaborative community in which the large firms instigate the collaborative efforts among a number of separate actors based on intrinsic values, with a high level of knowledge sharing, whilst competing amongst themselves and other firms for extrinsic values, i.e. financial gain (and is more similar to Porter and Kramer's (2006) concept of local clusters, rather than collaborative communities).

Nonetheless, although the external network of the case companies is distinguished by openness and information-sharing, the firms' business models still predominantly develop solutions and create value for the customers internally. Thus, the current business models of both firms can be described as only presenting aspects of *open business models* (Chesbrough, 2007b). This implies that different external players collaborate in the co-creation of the business model, by utilising internal resources more efficiently than the firm can. To take this point further, it is likely that architecture firms would benefit greatly from pursuing even more open business models, thereby unlocking efficiency gains by 'opening their business models by actively searching for and exploiting outside ideas and by allowing unused internal technologies to flow to the outside, where other firms can unlock their latent economic potential' (Chesbrough, 2007b).

Moreover, I argue that it is clear from the empirical material that knowledge sharing facilitates collaboration in three key ways: establishing a communication platform, knowledge-channelling, and supporting effective governance (Köhler et al., 2022; Borland et al., 2016; Dyer & Singh, 1998; Teece, 2020). The communication processes between the case companies and partners ensured that they were aware of each other's capabilities, facilitating proactive responses to dynamic changes (Dyer et al., 2018). The project effectively shared knowledge through open innovation mechanisms, and understanding partners played a crucial role in effective network governance (Dyer & Singh, 1998). The exchange of complementary capabilities in collaborative projects served as an incentive for knowledge sharing, generating mutual benefits and furthering SBMI in general.

This study's findings contradict those of Velter et al. (2020), who claim that organisations change their boundaries of identity, competence and efficiency through normative, strategic and instrumental alignment, relating to dimensions known in SBMI literature (Breuer & Lüdeke-Freund, 2017; Stubbs & Cocklin, 2008). Velter et al. (2020) state that changes in the boundaries of network actors provide the opportunity to leverage or impede value creation as actors maintain, create and adapt organisational boundaries throughout the process. However, this study did not observe empirically any significant changes in boundaries within the case companies undergoing transformation or in SBMI in general. Indeed, the case companies largely retained their original boundaries as architecture firms providing architectural services, despite large ongoing changes both internally and externally to the firm, notably integrating external stakeholders within SBMI. One might claim nonetheless that the sale of sustainability consultancy services and the extra revenue stream generated by one of the case companies could constitute a form of boundary change. However, as the sustainability consultancy services are of a predominantly architectural nature, I argue that this change is not sufficiently large to constitute a change in boundaries.

The operational capabilities that constitute the second-order transforming dynamic capability are represented in Table 12.

Second-order Dynamic Capability	TRANSFORMING		
First-order Dynamic Capabilities	Incorporation of cross-disciplinary knowledge	Cultural and Organisational Change	Stakeholder Integration
Operational Capabilities	Dedicated sustainability resources Knowledge dissemination Cross-disciplinary collaboration Sustainability requirement Integration of sustainability into ways of working	Risk-proneness Sustainable-based culture Change-proneness Strategic leadership	Integration of external partners Coopetition Inclusion of external feedback

Table 12: The Capabilities of Transforming

7.1.4 SBMI Process

The empirical material has shed light on how the sensing, seizing and transforming capabilities are managed practically and managerially in the process of SBMI. Geissdoerfer et al. (2016) present a model of the BMI process, named the Cambridge Business Model Innovation Process, which is composed of three main stages: concept design, detail design and implementation. This model was mostly useful in explaining the SBMI process observed in the empirical material; however, it did prove to be underdeveloped for the following reason. The empirical material repeatedly brought to light the importance of external stakeholders and their impact on BMI, which is lacking in Geissdoerfer et al.'s (2016) model. Therefore, this study proposes a new SBMI process model, including many relevant elements from Geissdoerfer et al. (2016) that match the empirical material, but with the added external dimension. The process, as demonstrated in Figure 9, builds upon Geissdoerfer et al.'s (2016) model and consists of the firm engaging in the ideation, concept design, experimenting, detail design and implementation of the new SBM. In the ideation stage, the purpose of business model innovation as well as key stakeholders are defined, and the value proposition, along with initial conceptual ideas, is generated. This stage includes, for example, activities such as the formulation of the vision, stakeholder definition, value mapping, sustainable value analysis and the evaluation and selection of ideas, emanating mostly from the firm's sensing capability. The next stage of concept design includes activities relating to integration of ideas, discussion of trends, definition of value creation, delivery, and capture and BM design. The third stage is that of experimenting, which is characterised by a reorganisation of BM elements, with an analysis of the results, mostly connected

to the firm's seizing capabilities. There is a iterative learning process where the results of the experimentation are fed back into the concept design, akin to the organisational learning process proposed by Winter (2003), composed of *Experience Accumulation, Knowledge Articulation* and *Knowledge Codification*). The next stage is implementation, where the innovated business model is launched internally, monitored and adjusted, relating to the transforming capabilities of the firm. The final stage is that of stakeholder integration, which allows external stakeholders to be integrated into the business model. These stakeholders can be, for example, private and public partners brought into co-owned and co-funded sustainability research collaborations, coopetitive knowledge-sharing collaborations with competitors or the testing of sustainability initiatives in public forums. During this phase, we observe the capability of stakeholder alignment, whose success determines the scale of stakeholder integration and feeds back ideas into the ideation phase of BMI.

This process of designing a new SBM, implementing and acquiring new resources and testing it in the SBM is an iterative leaning process that can be repeated a number of times. There is a continuous in- and out-flow of information between the firm and the market, as specified in stakeholder alignment, with two specific mechanisms: the process of cognitive search, as an inflow of information where the firm actively detects changes in the marketplace, and the outflow consists of the process of experiential learning, whereby the firm sends information acquired through the response of the market to their SBMI, back to the marketplace. Zahra (2008) states that there is a linkage between discovery and creation of opportunities, and this case study does indeed bring to light a strong interaction and iteration between sensing and seizing activities. As Mezger (2014) argues, BMI, and even SBMI, I argue, rely on a firm's ability to discover an opportunity and design an adequate business model. Iterative processes between sensing and seizing, as discussed by Teece (2010), are means to test the alignment of a new business model configuration with technological potential, customer needs, and market considerations.

Sensing, seizing and transforming are key parts of the SBMI process, exemplified by the firm being able to obtain and internalise external knowledge or newly generated internal knowledge through the means of experimentation. We can see this in the empirical material, where the firms strive to expand internalised knowledge and even encourage cross-disciplinary learning. Cognition was also identified as being a key element of the SBMI process, exemplified most importantly in the constant exercise of abandonment, and challenging the architecture firm's heuristic and dominant logic (Drucker, 1994). This can be broken down into the alignment of existing capabilities to changing market conditions, and the constant exercise of abandonment, referring to how firms should constantly challenge their sustainability products, services, policies and routines to deduce whether they are best suited to the current market environment. I consider the concept of abandonment to be closely linked to consistently evaluating and challenging the architecture firm's heuristic and dominant logic, ensuring that potential opportunities in sustainability are not missed by the firm's sensing capability.

An interesting example of this is the Ownership Directive, where value-driven sustainability objectives are prioritised over financial performance.

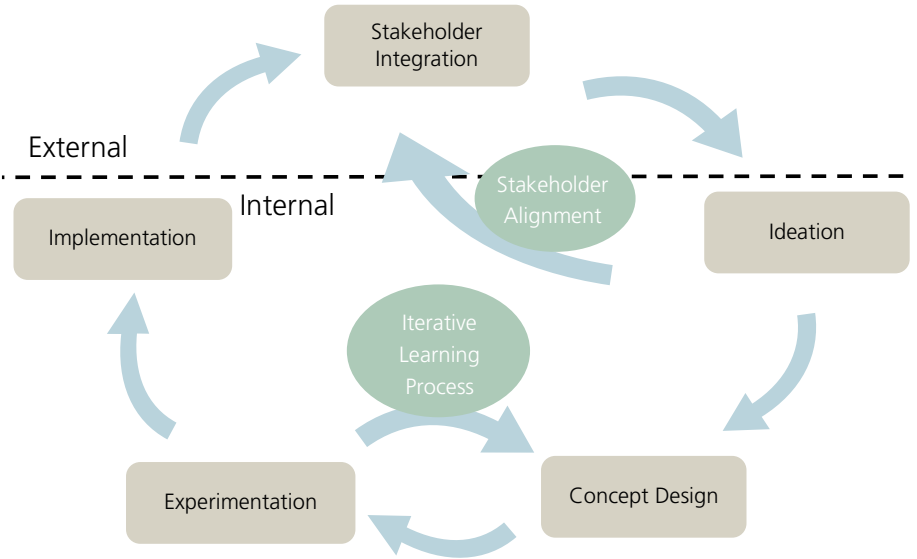

Figure 9: A Dynamic Capabilities process view of SBMI

Finally, leadership is a necessary component of the SBMI process, as employees will need to formally accept changes in large parts of the resources, structure and processes of the firm. This study has identified two different leadership approaches to SBMI from the empirical material: a managerial-led approach and an employee-led approach.

Managerial-led SBMI

The first leadership approach to SBMI deduced from the empirical material can be described as a top-down (i.e. led by senior management) and unified method (i.e. coordinated centrally), with senior management leading the process, enabling SBMI and giving the mandate to sustainability champions (employees who push for sustainability changes internally due to intrinsic values) to implement SBMI within the firm. For example, deciding on several crucial sustainability initiatives, such as

implementing changes in certain business model components, such as the resource base, offerings and value proposition, and external relations with clients and partners.

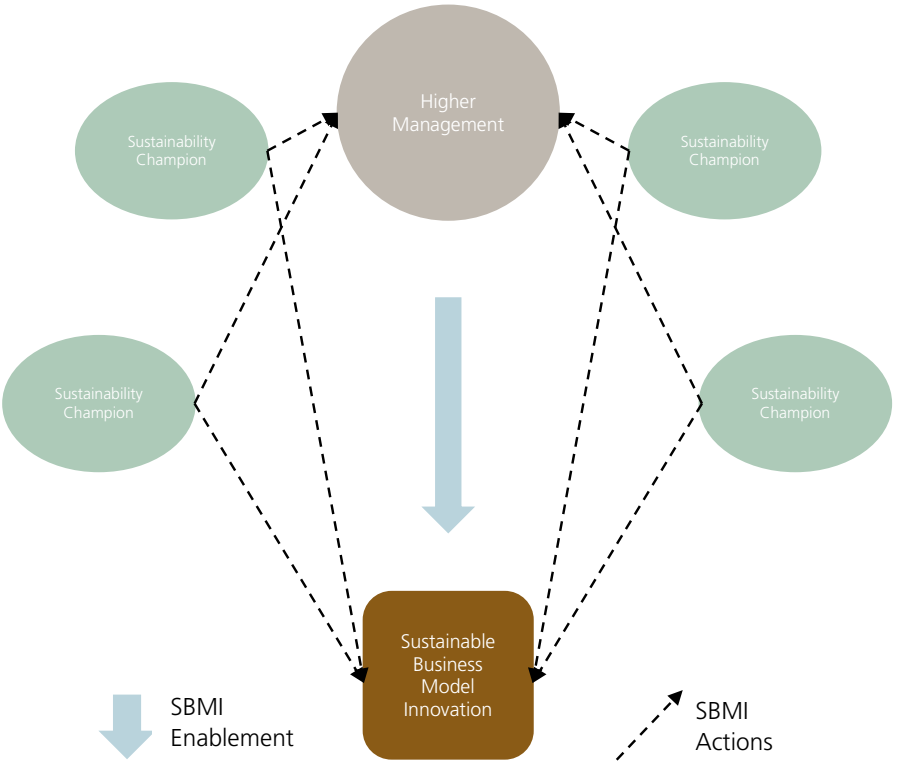

Figure 10: The "Managerial-led" Leadership Approach to SBMI

This approach requires a clear vision and agenda from senior management, with well-defined objectives and actions, which are implemented in the governance and management of the company. By doing so, senior management enables SBMI by allocating internal resources to it. Once resources are allocated, appointed employees, referred to as sustainability champions, are given the mandate to execute the actions leading to SBMI.

Empirically speaking, this was possible at Alpha due to a clear sustainability vision and mission that has been developed continuously over the past twenty years. Alpha has been able to adopt a unified approach, with senior management owning and governing the SBMI process and giving a mandate to sustainability champions to execute and

implement the actions leading to SBMI within their company and in its offerings. The combination of a history of strong values within sustainability, present since the founding of the company, and a clear vision and mission, including the ownership directive that allowed senior management to incorporate sustainability into their business plan, allowed Alpha to apply a unified approach in developing BMI. Furthermore, the creation of research and development initiatives, as well as a sound organisational structure, involving a Sustainability Director and sustainability experts spread out across different offices, strengthened this approach.

Empirically speaking, this was brought to light by Alpha's early identification of opportunities within sustainability. In response, they assembled, in practice, a taskforce (a capability) to conduct an intensive market and internal study to propose how different sustainability components could be integrated into their existing BM. This approach supports the findings of previous research suggesting that BMI is due in large part to managerial intervention (Teece, 2010; Heubeck & Meckl, 2021).

Employee-led SBMI

The second leadership approach to SBMI deduced from the empirical material is employee-led, as exemplified by Beta. In this approach, SBMI has not been considered as strategic of a business concern or priority by senior management, which leads to a reduced investment and commitment, from their behalf, to sustainability capabilities. This approach can be explained in part by its staggered approach to achieving sustainability capabilities, meaning that sustainability initiatives took place sporadically and through the efforts of sustainability champions (employees who push for sustainability changes internally due to intrinsic values), without significant support from senior management. An empirical example of this is the sporadic nature of sustainability initiatives prior to the establishment of the sustainability network at Beta.

With this approach, awareness of SBMI and the incorporation of sustainability practices into operations can be described as being developed more in a bottom-up manner, that is, originating in large part from the sustainability champions themselves. Sustainability is pushed forward within the organisation mostly through the private initiatives of individual employees, who having discovered others with the same interest, created a group to further these questions. It is due to pressure from these sustainability champions that senior management eventually agrees to actively support the sustainability efforts through funding, legitimising the group, and implementing sustainability in the business practices and model. This was empirically demonstrated by the official formation of the sustainability network, with allocated resources from senior management.

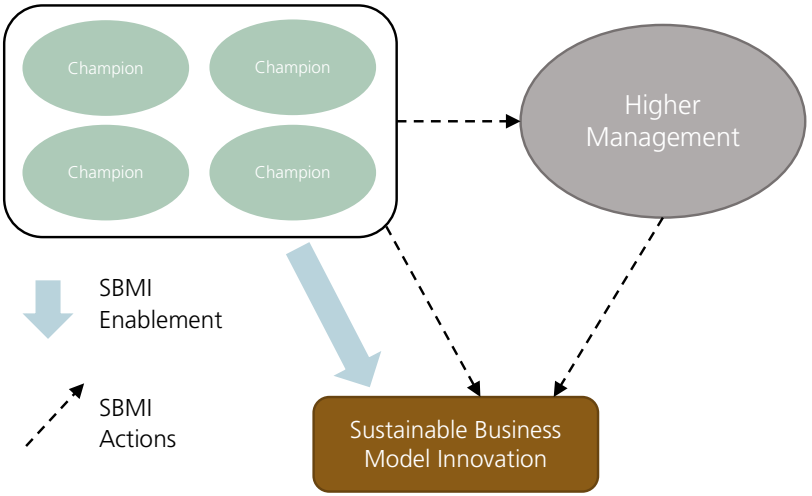

Figure 11: The "Employee-led" Leadership Approach to SBMI

Due to a large number of structural changes within the company, as well as the sale of the majority of the company to an investment firm, Beta had experienced a large number of structural and managerial changes. This impacted their approach to developing SBMI in a significant manner. A low focus on SBMI by senior management, in their vision and mission, had led to minimal measures being taken during that period. It was mainly in the last few years that sustainability efforts can be observed within the firm, and these efforts were led, in large part, by sustainability enthusiasts or champions who were normal employees with a strong passion for sustainability. The combination of a historical lack of a common vision, lukewarm commitment to promoting sustainability values and a mostly bottom-up method has seen Beta experience a staggered approach to developing SBMI.

This employee-driven approach contradicts the prevailing view in the field of managerial action as the fundamental determinant of BMI (Teece, 2010; Heubeck & Meckl, 2021), and instead puts focus on the employees as having a significant role in driving BMI both vertically and horizontally within the firm. Heubeck and Meckl (2021) claim in their research that a firm's resource portfolio and composition, as well as corporate and competitive strategy decisions, emanate solely from dynamic managerial capabilities. However, this study contradicts that theory and shows that this is not necessarily the case. In practice, employee (dynamic) actions have been shown to impact the process. Employees were able to identify opportunities from sustainability through the sensing capabilities described previously. Due to a leadership vacuum during the acquisition and organisational changes at Beta, leadership did not act upon

these opportunities. Instead, due to mostly intrinsic values, employees started considering sustainability in their work tasks, factoring it in their decisions, and pressuring managers for support. This finally led to management accepting the demands and allocating dedicated resources to SBMI.

7.2 Factors of SBMI

After the analysis of the factors, a categorisation came to light. Namely, that the factors could be categorised as either opportunities or threats, originating either internally or externally, building upon Bucherer et al. (2012). A selection of factors which have previously not been covered in large detail is further elaborated in this chapter. They have been shown empirically to affect SBMI either positively or negatively.

Several factors concerning SBMI came to light during the analysis of the empirical material, which are presented in Table 13. The identification of these factors, or antecedents to SBMI, aims to contribute to the theoretical gap addressed by Foss and Saebi (2017), who reiterate the clear lack of systematic study of antecedents of BMI. Some of these factors constitute opportunities for growth and increased profits, while others pose threats that the firms must respond too to avoid decreased performance and profits. These factors originate either internally within the firm or externally. This validates previous literature that differentiates between the origins of SBMI along the lines of perceived opportunities or threats (Bucherer et al., 2012; Saebi et al., 2017), as well as demonstrating external or internal stimuli for innovation (Giesen et al., 2010). These factors were formulated by the managers, either directly or indirectly, as perceived opportunities or threats.

	Factors of SBMI	
Opportunity	Digitalisation and technological developments (Teece, 2018) Acquiring new resources (Bocken et al., 2014) Sustainability gains and value capture (Porter & Kramer, 2011)	New laws and regulations Maximising customer value (Baldassarre et al., 2017) Open knowledge-sharing (Chesbrough, 2007b) Changes in competitive environment (de Reuver et al., 2009) Integration with external stakeholders
Threat	Ideological opposition (Nadkarni & Narayanan, 2007; Plambeck & Weber, 2009) Heuristic logic (Chesbrough & Rosenbloom, 2002) Dominant logic trap (Prahalad & Bettis, 1986)	Changing demands of stakeholders and customers (Ferreira et al., 2013) Increasing dominance of construction firms Sharing of internal or proprietary information (Peteraf, 1993)
	Internal	External

Table 13: Factors of SBMI

7.2.1 Internal Opportunities

The first factors that are internal opportunities pertain to technological developments and the push towards digitalisation. Firms, in response to the sensing capability, can detect novel technologies that can improve parts of their business model or respond to a new demand from the customer. In this case, the technological developments are exemplified by sustainability-specific innovations within, for example, materials, waste management, energy efficiency. Other innovations are also important, such as CAD/CAM and BIM, which are software typically used together in the architectural field to create models and simulations of the built environment, saving time and increasing accuracy for the architects, and ultimately changing the way they work in a fundamental manner. The second internal opportunity involves identifying and managing the potential to acquire new sustainability resources, which could provide the firm with a competitive advantage (Barney, 1991). Changes in market demand, in this case, sustainability, imply that firms need to invest in extra resources to meet that demand. In this case, these resources are both new competences and expertise but also access to architectural methods and processes, material databases and so forth, which would allow the firm to provide a superior offering.

The findings partially support Bocken and Geradts' (2020) conclusions insofar that drivers such as ring-fenced resources for SBMI, enabling innovation structure, people capability development, patient investments, strategic focus on SBMI and collaborative innovation are all evident in the empirical materials. However, this study contradicts their findings in several aspects: the factor of performance metrics for sustainability is observably absent in the empirical material. Indeed, the case companies did not include specific sustainability targets in their quarterly or yearly plans. Even measuring sustainability performance was not undertaken by the case companies. This observation can also partially be explained by the complexity of measuring sustainability (Toman, 2010). Furthermore, there is no evidence of incentive schemes for sustainability in the empirical material. Neither of the case companies offers any financial remuneration or compensation of any other kind for incentivising sustainability or champions of SBMI initiatives. Rather, the case companies rely on intrinsic motivations and reputational gains, both internally within the firm and externally towards partners, potential clients and other actors, to encourage sustainability work.

Considering a business model as 'articulating the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value' (Teece, 2010), one idea came to light repeatedly in the analysis of the empirical material: namely that both firms have attempted, to varying degrees, to innovate their business models in response to the perceived benefits from sustainability, confirming that sustainability gains serve, in this

case, as a driver of SBMI.[9] These gains can be summarised as economic and non-economic. Certain aspects of sustainability are, of course, much easier to implement and to monetise for clients, such as energy-saving measures, whereas others, such as human well-being and profiling, are much more challenging. However, a major driver for demand within sustainable architecture is that of the economic benefits to the clients. These economic benefits are often experienced in the long-term. They may take the form of cost-savings, in the case of technological solutions relating to reduced energy consumption, such as electricity and water, for example, or reduced costs in the disposal of waste. As mentioned, these benefits are often long-term, with a return on investment that is recuperated over several years. Another direct economic benefit that pushes the demand for sustainable design is that the sustainable building itself creates extra value. This may be in the form of being able to charge higher rents for the building if it is a certified sustainable building and increases the resale value in the case of the building being sold to another owner. As is increasingly understood within the field, the built environment can have huge effects on human well-being (Van Kamp et al., 2003). This is especially relevant within corporate built environments, where low well-being among employees can lead to significant losses in terms of reduced productivity and sick leave (Loftness et al., 2003). The importance of this issue emerged during the 1990s, but has only been considered seriously recently. A type of non-economic gain behind sustainability is that of companies wanting to improve their public relations by profiling themselves as green, sustainable, and aware of environmental challenges, as well as wanting to contribute to these initiatives. Using a sustainable building, which is highly certified or has advanced sustainability features, can, on the one hand, strengthen the company's image as a leader within sustainability in their field if that indeed is considered to be a core focus of theirs but, also, even if sustainability does not enter into their main offering, it still contributes to the company's image as an aware company that wants to contribute to the quest for higher sustainability.

7.2.2 External Opportunities

The second group of factors are those of external opportunities. The first is new laws and regulations that pressure firms to apply more sustainability in their business models. This pressure may be at the level of the case company or with their own clients or partners. New regulations within sustainability lead architectural firms to change aspects of their business to comply with those regulations. This may be done either ex-ante, meaning in response to the regulations coming into validity or ex-post, as a pre-emptive response due to predicted future regulations. Indeed, different forms of

[9] There is one instance of a substantial change, identified in the industry's business model, and it relates to how innovation is enabled outside of the barriers of the firm. This will be argued at a later point.

regulations are a large determinant of sustainable architecture. These forms of regulation can vary from public, municipal regulation ("Kommunala Särkrav") to European directives. Previously, the municipalities in Sweden could determine their own regulations, and certain municipalities sought to profile themselves as having a strong focus on sustainability, for example, Malmö and Växjö. However, the central government has now standardised the requirements across all municipalities, with modifications only possible through discussion with the central government in Stockholm. Government regulations are perceived by certain architects as being the only effective method to achieve higher levels of sustainability within the industry and society as a whole.

Another external opportunity that is a factor in SBMI is that of maximising customer value. As sustainability can lead to greater benefits for the client and end-user, investing and innovating their existing business model would allow the firms to provide that extra value, leading to a larger market share or increased revenues. Open knowledge-sharing was also identified as a factor in SBMI. Instead of safe-guarding intellectual property, the architecture firms, in this case, openly share intellectual property; by doing so, they engage in open innovation and pursue research and development activities together with external actors. Often, the open sharing of intellectual property leads architecture firms to collaborate with direct competitors, leading to a situation of coopetition, where firms cooperate in certain areas (such as research and development) whilst directly competing in securing architectural projects. I also argue that the nature of innovation has been a strong driver in this case. The apparent sharing of proprietary information, which is prevalent in the architecture industry, is in clear opposition to business model and strategy theory (Peteraf, 1993; Hedman & Kalling, 2003). The relevant theories identified within the field stress the absolute importance for firms to protect proprietary information[10] to ensure that their innovative solutions lead to the longest competitive advantage in relation to their competitors (such as in the case of, for example, a first-mover advantage). Thus, the major difference in relation to RBV theory (Wernerfelt, 1984; Dierickx & Cool, 1989; Barney, 1991; Peteraf, 1993) is that instead of creating value and a competitive advantage out of unique resources, by internalising and using mechanisms to protect proprietary knowledge and building upon that knowledge to develop further innovations internally, this information is publicly shared and accessible to any firm. Other firms then internalise this knowledge, and build their innovations based upon that information, leading to a faster pace of innovation in the market, and hence increased value for the customer. Thus, value is created not only by internalising and protecting proprietary information within firms but also through externalising and sharing certain knowledge (Hallberg & Brattström, 2018). The last external opportunity identified was that of the second mover. Alpha, having already pursued SBMI, prompted Beta, whose sensing capability led to the identification of the

[10] See Teece's (1986) and Liebeskind's (1996) discussion on the risks of leaking proprietary information due to outsourcing activities.

opportunity to catch-up and start developing their own capabilities within sustainability.

Another, albeit slightly less influential, factor perhaps, is that of the ideological propensity to request sustainable architecture. Many companies have official sustainability programmes that employees are forced to abide by; however, there are also a number of sustainability enthusiasts or champions who are ready to go beyond the minimum requirements in sustainability. This can lead to a demand for sustainable architecture not for any specific benefit or due to an obligation, but rather due to the ideological beliefs of the firm or individual in question. Society itself can also be a significant driver of sustainability. With the increased awareness of consumers of the importance of sustainability in the marketplace, there is a rising demand for products that are not detrimental to the environment and have been produced in an ethical manner. This demand is equally observed for sustainable architecture. Furthermore, as recipients and users of public goods, the externalities of sustainability that fall into the public realm are also highly demanded by society. These factors strongly impact the quality of life and living standards in society. Thus, one could even argue that the growing awareness of sustainability in society is starting to lead to a change in lifestyle and living preferences among consumers, which, in turn, leads to a change in demand for architectural services. A significant driver of sustainability comes from the industry itself, as a large number of firms have committed to ambitious sustainability targets, at times even more strict than government legislation, such as aiming to cut the energy demand in buildings by 50% by 2025. For many clients, one can argue that sustainability has become less of a marketing fad but taken more of a strategic importance.

7.2.3 Internal Threats

The internal threats identified in this study include ideological opposition (Nadkarni & Narayanan, 2007; Plambeck & Weber, 2009), heuristic logic (Chesbrough & Rosenbloom, 2002) and the dominant logic trap (Prahalad & Bettis, 1986), all of which have been discussed previously. These findings contradict Bucherer et al. (2012) in that they did not identify resources that become too costly or unnecessary over time and enforce a change in the business model. Indeed, there was a clear commitment to acquiring and developing resources within SBMI. One of the main obstacles to SBMI is the *heuristic logic* present in the firms (Chesbrough & Rosenbloom, 2002), which affects the perception of business ideas by filtering valuable information from non-valuable information. Within incumbent and long-established firms, such as the case companies, this filtering process is likely to ignore business model developments and innovations that differ greatly from the firm's existing business model. This *heuristic*

logic is further emphasised by the *dominant logic*[11] (Prahalad & Bettis, 1986) present in the firms, which is 'prevailing wisdom about how the world works and how the firm competes in this world'. This dominant logic can also act as a manner of filtering information, which may potentially prevent managers from considering certain opportunities when they fall outside of the prevailing logic. As architects who have developed their ways of working and thinking within the field and with the same logic became the managers and made executive decisions within these architectural firms, this created a *dominant logic trap* (Chesbrough, 2003; Prahalad & Bettis, 1986). In this trap, conventional practices were increasingly unlikely to be questioned, and business model developments and innovations that differed greatly from the firm's existing business model were ignored. A key difference to highlight between the two case firms and their BMI is related to their business logic and the building up of capabilities within BMI and sustainability. Alpha differentiates itself strongly as it developed a more astute heuristic logic earlier on as part of its sensing capability, which was a strong driver to its SBMI, and led it to invest resources into sustainability capabilities before demand for such offerings became significant. On the other hand, Beta invested in sustainability capabilities only after it became clear that this was something that was demanded by the market, suggesting that their sensing and business logic failed to grasp the emergence of the demand for sustainability. It is clear that the process of continuous re-evaluation of the business model (Drucker, 1994) is something that is, nonetheless, lacking in the sector of architecture. The first stage of this process is that of *abandonment*, wherein companies should consistently challenge every one of their products and services, as well as their policies and routines, to assess whether they are relevant for the current business environment, or whether they should be abandoned. It becomes apparent that this stage is one that has not been implemented on a sufficient scale within the case companies.

7.2.4 External Threats

The last group of factors are the external threats. The first among these is the changing demands of stakeholders and customers. As market demand changes, the firm needs to adapt to those changes. The architecture firm, in this case, actively seeks to identify and understand the interpretation of sustainability by buyers in the market as well as demand for sustainability, and how the firm may respond to that demand in the market. In this case, there is an increased demand for sustainable architecture, implying changes to the architect firm's BM. The last external threat is regarding the increasing dominance of construction firms. This has led to a weakened position for the architect in the construction project. Traditionally, architects led the entire project, but now they are often considered as specialist consultants brought in on an as needed-basis. This shift has pushed Alpha to innovate its business model by engaging itself in building

[11] As *Heuristic Logic* and *Dominant Logic* are considered by the author to be sufficiently similar, I refer to both as *"Business Logic"*.

their projects. They conducted these projects from start to finish, including the architectural tasks but also managing the construction phase, which is normally undertaken by the larger construction companies (Alpha, 2012). This fundamental change in how Alpha delivers and implements its services has been a reaction to the developments in the industry, often detrimental to the architectural firms.

This analysis of factors in this study contributes to the understanding of factors as discussed by the likes of Sabatier et al. (2012) and Berman et al. (2012). It suggests that new technologies can lead to disruptive business models that challenge dominant industry logics and reshape established processes of value-creation. Furthermore, it shows that the internet and all its possible applications do indeed have an impact on the emergence of new sustainable business models and SBMI (Wirtz et al., 2010). However, despite having identified new regulations and external stakeholders as drivers of SBMI, this study contradicts the findings of De Reuver et al. (2009), who argue that regulatory forces are more relevant than technological and market-related forces in facilitating BMI. Moreover, it downplays Ferreira et al.'s (2013) findings regarding the importance of external stakeholders. In this particular study, the technological advancements in sustainability, and to a lesser extent digitalisation, especially the growing demand from market-related forces, such as changing demands, are significantly larger factors than regulation or external stakeholders. I argue that the previously existing business models originated in an organic, incidental and ad-hoc manner, with the main drivers being artistic aspirations (Skaates, 2001), organisational facility and path dependence (de Reuver et al., 2013), which have strongly guided their development rather than an overarching strategy or direction (Mintzberg, 1989). This is due to the evolution of the architecture industry in general, in which most practices are founded and managed by architects who focus almost exclusively on conceiving and delivering architecture projects, as opposed to developing innovative business practices. This supports findings by researchers such as Skaates (2001) and Styhre and Gluch (2009), who claim that architects are first and foremost creative before anything else. In essence, the architect tends to remain an *architect* as opposed to becoming a *manager*.[12] Certain other changes in the external environment have also been identified as forces driving SBMI in the field.

One finding that became immediately clear from the empirical data was that, despite the literature pointing towards firm strategy being a driver of SBMI, the empirical material shows the opposite, Moreover, despite the repeated claim that architecture firms do not compete on price but on differentiated products, neither of the case companies had devised a clear strategy to differentiate their offerings from competitors. This is particularly surprising considering that previous research (Li & Ling, 2012) has shown that the architectural industry is one of the few that lacks a low-cost or focused approach (Porter, 1980), leading us to believe that competition should rely solely on differentiation.

[12] Despite a push towards corporatisation within the architecture industry, which is discussed at later point.

Although no clear strategies have been identified in terms of differentiating their offerings, we observe from the empirical materials that, in practice, a firm can differentiate parts of its offering up to a certain extent. These initiatives were driven in large part by the attempt to include sustainability into the offerings. This, it can be argued, has translated to a slight competitive advantage due to a first-mover advantage (Lieberman & Montgomery, 1988), which is also supported by Alpha's increased sales, apparent in historical financial ratios. Indeed, this supports research such as Schaltegger et al. (2012), which shows that sustainability can serve as a means to differentiate offerings to clients, leading to value-creating opportunities for pioneering firms through a first-mover advantage. This is especially true as they also demonstrate that competitive advantages through sustainability are subject to time compression diseconomies. Thus, investment in sustainability capabilities requires longstanding investments. Despite Beta's current investment in this field, its offering is not considered to be characterised by a strong sustainability focus and led to a loss of market share relative to Alpha.

Nonetheless, there are still strong similarities in business model development between architecture firms and, indeed, between the two case companies specifically. One commonality can be argued to be the focus, first by the architects themselves, to prioritise the aesthetic (Styhre & Gluch, 2009; Winch & Scheider, 1993),[13] and second by management, who have traditionally concentrated on the operational, day-to-day aspects of providing an architectural solution, as opposed to long-term SBMI. This emphasis goes a long way in explaining this phenomenon. The empirical material suggests that the architect firms sought stability by maintaining, in large part, their existing business model compositions and ways of working. However, this strive for stability can be argued to have led to rigidity, that is, developing organisational resistance to change, which is demonstrated in the literature as being an impediment to developing new capabilities (Nelson & Winter, 1982) or a sustainable business model (Bocken et al., 2014). Becoming more aware of external strategic developments, having a more unified leadership with a clear mandate, and, most importantly, allowing for strong resource fluidity and great ease in redeploying resources could act as a catalyst for business model change (Doz & Kosonen, 2010). Thus, this lack of external and managerial competence can largely explain the limited scope of innovation or disruption as far as architectural business models go.

Research on performance and business models has demonstrated that firms can increasingly compete solely on the basis of their business model and its application (Casadesus-Masanell & Ricart, 2010). The business model itself can become a source of competitive advantage, resulting in superior value creation (Morris et al., 2005) or even changing the entire dynamics of an industry (Magretta, 2002). However, this author argues that this SBMI has much more potential, and competition solely on the basis of business models could bring even further sustained competitive advantage if SBMI initiatives continue. Indeed, as the sector progresses, the unparalleled

[13] Explained more in detail at a later point.

cooperation needed to respond to the growing need for novel sustainable solutions can be expected to lead to significant changes in business models and BMI, thus enabling proactive firms with a competitive advantage due to their innovative business models.

The empirical material shows that financial performance metrics; incentive system focused on short-term; standard innovation processes and procedures; lack of awareness, skills and understanding of SBMI; prioritisation of short-term growth; dominant focus on exploiting existing capabilities; and siloed strategic thinking can be barriers to SBMI. However, these findings contradict Bocken and Geradts' (2020) study to the extent that fixed resource planning and allocation are threats to SBMI in this case. Indeed, both case companies allocated financial, organisational and informational resources towards SBMI work by creating competence groups, knowledge sharing and sourcing of specific sustainability resources within the firms. Explicitly allocating time per employee to work on SBMI initiatives is another example of this.

Now follows a brief mention of the issue of outcomes of SBMI. The outcome in this case has been identified in the empirical material as, simply, a new and innovative, more sustainable business model. This implies a business model whose components have been recombined and changed to allow sustainability into their concepts, principles and goals and/or to integrate sustainability into their value proposition, creation and capture activities. Additionally, in encompasses other general BM gains such as competitive advantage, higher profitability and innovativeness, reducing cost, optimising processes, developing new products/services and entering new markets. The literature portrays BM and BMI as methods of obtaining higher firm performance (Dunford et al., 2010). Thus, Foss and Saebi (2017) argue that certain value propositions addressed at specific customer segments may be associated with a particularly high willingness to pay; value chain organisation and other aspects of organisation may contribute to low costs; and particular revenue models may mean that the firm is in a position to appropriate a sizable portion of the created value. Such combinations of value creation, delivery and appropriation mechanisms may be thought of as valuable resources in that they give the firm the potential to create and appropriate more value than the competition, which leads to a competitive advantage (Peteraf & Barney, 2003). This is especially true in the RBV, as the social complexity and path dependence associated with a BM/BMI may lead to a sustainable competitive advantage due to the difficulty for competitors to imitate it. However, our findings align with the literature, namely that because of the inherent complexity of any SBM and SBMI, it is difficult to forecast the true performance implications of the various BM components and BMI changes (Rivkin, 2000).

7.3 Proposed Theoretical Framework

This section will provide the reader with a brief reminder of the study's initial purpose and research question, as well as explaining the proposed theoretical framework, as a result of the analysis. The research question that guided this study was: "Which capabilities contribute to sustainable business model innovation and how?" This study identified the different capabilities affecting SBMI and shed light on how they contribute to SBMI. In doing so, the study also identified insights into the interactions of SBMI with external actors, the SBMI process, its factors and, finally, proposes a capability-based conceptualisation of SBMI. The proposed theoretical framework presented in this section is thus an answer to the research question. The theoretical choice of study stems from the limited research on SBMIs and its lack of theoretical and empirical robustness.

The level of a firm's sustainable business model and sustainable business model innovation as distinct units of analysis (Amit & Zott, 2020) has been neglected so far in capability research. In recent years, dynamic capability research has developed a framework outlining how firms adapt their physical, human, and organisational resource bases when facing situations of technological or market change (Teece et al., 1997; Eisenhardt & Martin, 2000; Zahra et al., 2006). Previous research has identified dynamic capabilities regarding, for example, product innovation, acquisitions and alliance management (Eisenhardt & Martin, 2000); organisational learning (e.g. Zahra & George, 2002; Todorova & Durisin, 2007); and capabilities related to a firm's market orientation (e.g. Day, 1994; Menguc & Auh, 2006). This study seeks to address that theoretical gap by strengthening the theoretical foundation of SBMI by embedding it in the context of dynamic capabilities.

First, the capability-based conceptualisation defines SBMI as a distinct dynamic capability. As Mezger (2014) argues that, in contrast to previously identified dynamic capabilities regarding product innovation (Danneels, 2002, 2008; Helfat & Raubitschek, 2000), BMI enables a firm to renew not only its core offering (product or service) but also its entire logic of 'doing business', including value creation and delivery aspects. Furthermore, this study also validates the findings of Jantunen et al. (2012), by indicating that firms vary in the extent to which they possess this higher order capability. Indeed, these findings indicate that this variation affects firms' ability to pursue SBMI systematically and purposefully. For example, firms that present a low level of distinct sensing, seizing and transforming capabilities will lack the competence to effectively apply SBMI and will face difficulties engaging in this transformational change. This notion is akin to Danneels' (2002) suggestion that 'the absence of second-order competences may constrain the renewal options that firms pursue', as accentuated by Mezger (2014). Second, there is currently no clear identification and definition of the core elements and constituting organisational capabilities of SBMI within the field (Bucherer et al., 2012; Schneider & Spieth, 2013). Third, this study also addressed the lack of factors affecting SBMI. Past research suggests that there can be a large number

of potential and different factors influencing BMI, placed at different levels, and either internal or external to the firm. Studies on changing BMI highlight changes in the external environment, such as changing demands of stakeholders (e.g. Ferreira et al., 2013), changes in the competitive environment (e.g. de Reuver et al., 2009) and opportunities brought about by new information and communication technologies (e.g. Pateli & Giaglis, 2005; Wirtz et al., 2010).

Based on the findings from the previous analysis, the following theoretical framework of the dynamic capability SBMI is proposed as an answer to the research question.

The first dimension of SBMI, sensing, denotes the identification of opportunities and threats for new business models. I argue that this is composed of cross-disciplinary sensing (such as identifying innovative technology, methods and tools from the combination and cross-fertilisation of multiple separate competencies and expertise), organisational sensing (such as identifying organisational practices, processes and other organisational changes) and stakeholder sensing (such as identifying sustainability-related knowledge, changes in market demand and trends).

The first capability of seizing identified is that of cross-disciplinary consensus building. The second capability involves reorganising the BMI process, according to the opportunities identified in organisational sensing. The third capability is stakeholder alignment and can be described by the firm's efforts to align its interests with those of external stakeholders and shape existing market conditions.

The transformation dynamic capability has also been clarified. It is composed of three separate first-order capabilities. The first of these being the incorporation of relevant cross-disciplinary knowledge identified and aligned with the firm's business model. The second capability is that of cultural and organisational change, which translates into implementing changes in the company's culture and values, as well as in the organisational structure and processes of the firm. The final capability relates to stakeholder integration, during which external stakeholders are partially or fully integrated into the firm's business practices, model and value chain.

Second-order Dynamic Capability	Sensing	Seizing	Transforming
Cross-disciplinary First-order Dynamic SBMI Capabilities	Cross-disciplinary sensing	Cross-disciplinary consensus building	Incorporation of cross-disciplinary knowledge
Cross-disciplinary Operational Capabilities	Cross-disciplinary teams Cross-sector-based recruitment Technology-based recruitment	Incorporation of latest developments into offering Feedback on experimentation of sustainable business model components Integration of cross-disciplinary competences Multi-level feedback Private-public partnerships SBM experimentation Sustainability reporting	Dedicated sustainability resources Knowledge dissemination Cross-disciplinary collaboration Sustainability requirement Integration of sustainability into ways of working
Organisational First-order Dynamic SBMI Capabilities	Organisational sensing	Reorganisation of BMI	Cultural and organisational change
Organisational Operational Capabilities	Cross-industry relationship building Sustainable business model sensing No-profit strategy for innovative projects Selectivity of projects	SBMI as primary focus Value proposition experimentation Review of BM components Deconstruction of sustainability Development of sustainable processes Board-level sustainability representation	Risk-proneness Sustainable-based culture Change-proneness Strategic leadership
Stakeholder First-order Dynamic SBMI Capabilities	Stakeholder sensing	Stakeholder alignment	Stakeholder integration
Stakeholder Operational Capabilities	Joint R&D activities External collaboration Informal knowledge sharing	Cross-industry involvement Shaping of demand Co-formulation of standards	Integration of external partners Coopetition Inclusion of external review

Table 14: Proposed Theoretical Framework - A capability-based conceptualisation of sustainable business model innovation

7.4 Sustainability Findings

In this section, I include additional empirical descriptions and findings generally relating to sustainability.

7.4.1 The Nature of the Offering of Sustainable Architecture

What is actually implied with sustainable architecture is multifaceted. This is emphasised by the fact that, when environmental sustainability started gaining importance in the 1990s, no one within the construction field in Sweden could seem to agree on what it meant. Today, there seems to be a clearer definition of environmental sustainability; however, economic and social sustainability seem to be in the similar situation, with many architects meaning different things. Nonetheless, there seems to be agreement regarding the need to combine the different aspects of sustainability, namely environmental, economic and social, and create architectural projects that address the intersection of these concepts. Despite the lack of agreement, one may break down the concept into four separate components: environmental sustainability, social sustainability, economic sustainability and architectural design. Represented in Figure 12 below are elements identified from the empirical material which further seeks to define sustainable architecture. As shown by the empirics, a number of the identified elements are found in Williams and Dair's sustainability objectives (2007). However, this study contributes to the field by identifying further elements within social sustainability, such as environmental psychology, behavioural psychology and social politics.

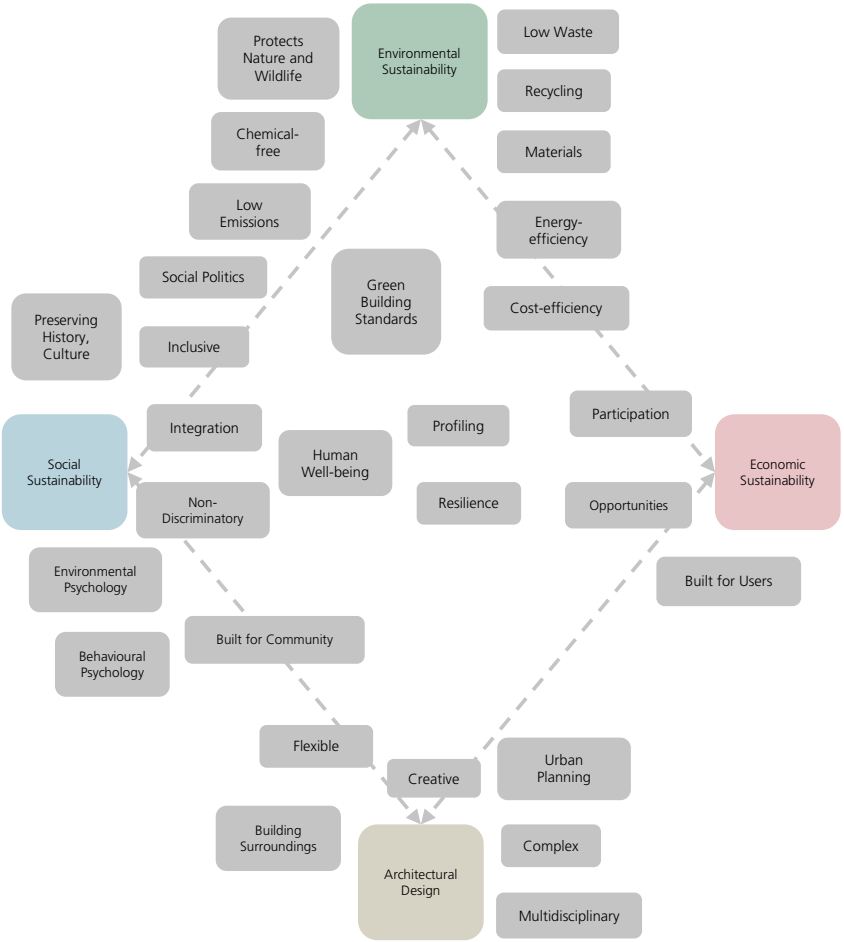

Figure 12: Components of a Sustainable Architecture offering (as deduced from the empirical material)

7.4.2 Stakeholders in Sustainable Architecture Projects

The typical stakeholders involved in sustainable architecture projects in Sweden are as follows: the architect, the client, the government official, the consultant and the citizen. Of particular note is that the client (the property developer) is almost always the project manager and employs both the architect and consultant based on how much those competencies are needed. This is quite unique to Sweden, with the majority of architecture projects in Europe being managed by the architects themselves, rather than

the client. This finding is in line with Bocken et al. (2014), who argue that much higher potential for sustainable solutions can be achieved when partnering with other organisations outside of the focal firm.

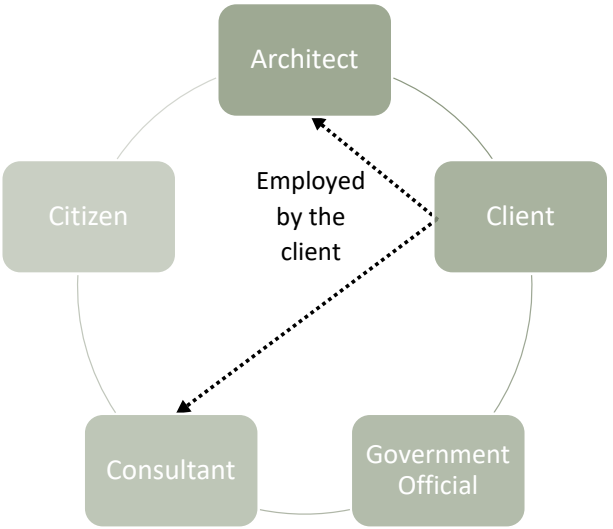

Figure 13: Typical Stakeholders in Architecture Project

7.4.3 Elements of a Sustainability Strategy

The empirical material points towards the following elements being of importance in a sustainability strategy: Performance Monitoring; Make or buy; Long-term perspective; Clear Value Proposition; Pricing Model; Standardisation; (Trust-based) Relationship with client (see Figure 14). This strategy is composed of the following elements: performance monitoring (decoupling sustainability from the rest of the organisation, and actively measuring the performance of sustainability resources and the success of sustainability-focused architectural projects); make-or-buy (which refers to the key decision for the firm to either develop sustainability expertise and capability in-house or to obtain sustainability know-how from the market); long-term perspective (gains from sustainability require large initial investments with expected returns only occurring further in time); defining a clear value proposition (due to the unclear demand for sustainability, it is of paramount importance for the architecture firms to develop a clear value proposition of their sustainability offerings to the client, considering environmental, social and economic aspects of sustainability); pricing model (developing a new pricing logic and mechanism to include the novel sustainability offerings and solutions); standardisation (making strategic choices on

how to manage sustainability standards and certifications); and building and maintaining trust (due to the innovative and thus uncertain nature of sustainability solutions, trust is a crucial condition for the key clients to accept to buy those risky solutions from the architecture firm).

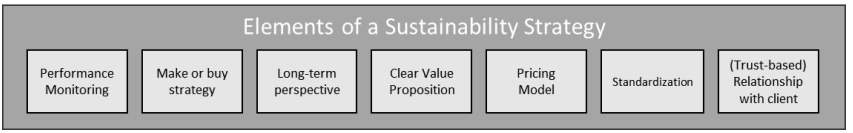

Figure 14: Elements of a sustainability strategy

7.4.4 Gains from Sustainable Solutions

Practically speaking, it is observed that many of the benefits derived from these efforts within sustainability translate mostly into increased profits, along with communication, marketing and/or public relations gains. However, most of the time, there tends to be a low number of real sustainability gains for either the client firm or the environment. This is explained by their low willingness to pay for highly innovative solutions (Schaltegger et al., 2012). Nonetheless, there is a business case for the architecture firms, as consumers are willing and able to pay a premium for sustainable solutions. However, this premium is not sufficiently large at this point to justify the large investments required for firms to develop a truly sustainable business model archetype (Bocken et al., 2014). Indeed, sustainability offerings are predominantly tailored to client demand, allowing them to pick and choose elements, with few common elements between different offerings. Thus, sustainability often takes second place in such discussion, being exclusively tailored to the client's interests. These interests, which are often the sole sustainability gains, may be mostly within marketing and public relations for their firm, so that their firm is seen and identified in the marketplace as one that cares about these kinds of issues. Thus, it is more important for architectural projects to communicate a green image to their clients than it is to actually include sustainability gains for the environment or society at large. Other direct benefits for the client, such as lower operating costs, higher resale value and higher employee productivity, all take precedence over the purely environmental sustainability gains. In certain cases, this form of sustainability may even be viewed as more of a marketing exercise, as an add-on to the commissioning of a building. Another point deduced from the empirical material that supports this claim is that, despite there being a real willingness-to-pay for "low" sustainability, the willingness-to-pay from clients is relatively low when it comes to "highly" sustainable features (Williams & Dair, 2007).[14] Rare are those who are

[14] What is meant when referring to "low" sustainable solutions are conventional architectural solutions with minor sustainability features. In contrast, "highly" sustainable or "real" sustainability solutions are, in large part, novel and innovative architectural solutions whose main focus is sustainability.

willing to pay for a large number of supplementary hours to develop a new and untried sustainable solution, which does not have a guarantee of success. It is for this reason that not-for-profit initiatives by the firms, whose goal is to push and market immature innovative solutions, are so important in pushing the field forward, thereby enabling costly and risky product development. One of the main takeaways regarding sustainability, in clear disagreement with Bartlett and Howard (2000), is that sustainability features do increase the value of the building but, as of yet, not as drastically as argued. Other factors such as location, size, functionality and design are of greater importance in determining the final value. This is expected to have led to a more modest demand for sustainable solutions than if they had a drastic impact on the value received by the client.

In terms of internal gains and the profitability of sustainability for architectural firms, the empirical material is mostly in agreement with Boons and Lüdeke-Freund (2013). As mentioned previously, they argue that merely developing a sustainable solution, offering or product is often not enough to generate extra revenue. Other measures have to be taken, such as adapting the market positioning of the company (and the product) to align with the message of the offering, as well as adapting the internal operations of the firm, its processes, competencies and culture. Indeed, sustainable innovations are often not sufficiently anchored in a financial value-creation logic, and the level of business potential is not sufficient to motivate the development of any highly sustainable offerings. It is ultimately, the charitable or philanthropic aspirations that are currently the driving force behind the main real sustainability initiatives in the industry. However, as Boons and Lüdeke-Freund (2013) argue, this alone is not sufficient to reach any meaningful real sustainability gains. This sheds light on the very issue at the heart of the matter, namely that due to the current lack of a meaningful business case for developing "real" sustainable solutions, there have been no substantial sustainability gains for either the client or society at all (although a business case for "low" sustainable solutions is clearly identified in the empirics: architectural solutions with minor sustainable features that command a premium, and for which consumers are willing to pay a higher price). Schaltegger et al. (2012) describe such a sustainable business case as characterised by three requirements: the firm must realise a voluntary activity with the intention of contributing with solutions to societal or environmental problems; the activity must create a positive business effect, for example, in the form of cost-savings or increased sales or profits; and finally, an argumentation and justification that a specific management activity has clearly led to both previous requirements. Unfortunately, it is still the case that sustainability initiatives within the architectural sector strive to offer positive societal or environmental solution. Although they do generate economic benefits for the firm, those sustainability gains are minimal. Thus, it is premature to speak of a real sustainable business case being present in the industry.

It is important to note that despite the previous point, there is a solid business case for "low" sustainability. Indeed, significant premiums can be achieved through sustainable architecture, especially as governments introduce stricter formal requirements and

societal demand in general is gravitating towards sustainable offerings. High-profile clients, in particular, tend to be very willing to pay for innovative architectural projects that incorporate sustainability and a high level of aestheticism. As sustainability becomes more and more of a focus in our societies, this demand can only grow, making it a clear opportunity for architectural firms to gain a competitive advantage by investing in sustainability capabilities.

Nonetheless, the sector is far from reaching a strategy where environmental or societal objectives are fully integrated into the core business logic of the firm, where the business processes, products and revenue logic are directed towards sustainability. That means to say a core business logic where the definitions of costs and risks are modified to social costs and risks (i.e. negative externalities), the pursuit of a strategy which entails that business and sustainability goals are completely aligned, and business leadership is one of outstanding sustainability performance. A strategy described by Schaltegger et al. (2012) as proactive (full integration).

However, this begs the question of why architecture firms have not been able to develop the business case for *real* sustainability. After careful analysis of the empirical material, one factor stood out more than others, and that is relating to the nature of intended sustainability gains. I believe the difficulty lies in the complications that arise when private firms (i.e. the architecture firms) pay to develop goods destined predominantly for the public realm. Essentially, while the entire cost of developing these solutions is borne by the architecture firm, only a portion of the value created is directly appropriated by the client, with the rest of the value being appropriated by the public at large. Due to this disparity in the appropriation of value, it can be argued that the client firm's willingness-to-pay only reflects the amount of value that is directly appropriated by their firm (assuming their firm prioritises profit-maximisation with limited charitable or philanthropic aspirations). The remainder of the value, which is appropriated by the public, goes essentially unremunerated. The cost of this public value or *public good* (even called a *positive externality)* is borne by the private architecture firm, but not paid for by the public realm (at least not directly in monetary terms. In terms of environmental gains, those gains can be argued to benefit the architecture firm in part). If this discrepancy remains unsolved,[15] and without explicit institutional arrangements for managing these public resources and the created public goods (by the architecture firms) (Ostrom, 1990), we can expect that the business case for *real* sustainability remains absent, and that the innovation of business models to sustainable ones cannot take place.

[15] Which can be argued to constitute an issue relevant to the *Economic Property Rights Theory* (Alchian, 1965; Barzel, 1997; Demsetz, 1974; Penrose, 1995).

7.4.5 Problematic Concept

The construction industry, within which architecture firms operate, inherently has a large environmental cost, but it is also an industry that has an unimpressive history of sustainability initiatives. However, the acceptance of both the importance as well as the definition of *real* sustainability is far from being widespread[16] (this is particularly true regarding the field of social sustainability, which is, by its nature, more prone to different definitions due to varying values and ideologies) (Marrewijk, 2003; Votaw & Sethi, 1973). Even with architectural firms, a number of partners and architects question the validity of the concept in their everyday work tasks, often prioritising other elements over sustainability. This is reflected more in certain groups, such as those who are more senior or those who are more ideological, and those who believe that sustainability impedes upon the creative process. There is also a misperception for some between the terms of sustainability (measures taken to minimise and counteract environmental and social externalities) and resilience (that which is durable and long-lasting). Of course, resilience can contribute to sustainability by reducing the need for future resource consumption, but it only achieves a fraction of the intended environmental and societal outcomes.

As I argue, the ad-hoc and incidental emergence of the case companies' business models is combined with a difficult, diverse and often changing definition of sustainability, both inside and outside the firm. This leads to the fundamentally complex and difficult task of integrating sustainability elements into their business models. Thus, the measures and routines implemented by both firms are based on unclear and sometimes even changing conceptualisations of sustainability[17] (Shafer, 2006; Kilbourne et al., 2002).

This, of course, directly affects the demand for sustainability. As the concept is not clearly understood by the general population and clients, it is expected that the demand for it will reflect this ambiguity. This provides an unprecedented strategic opportunity for the firm (both in terms of maximising its competitive advantage but also in terms of sustainability), namely shaping demand. This is supported by Boons and Lüdeke-Freund (2013), who advocate the firms should play a larger role in determining customer demand by educating their customers on sustainability matters. Nonetheless, a theoretical finding which is immediately clear from the empirical material is that the demand for sustainability is limited to the sustainability gains directly appropriated by

[16] Although the importance and definition of *low* sustainability is relatively widespread, leading to an increasing demand for low sustainability and a higher willingness-to-pay for such products and services.

[17] Examples of these changing foci are, for example, from building affordable and good quality accommodation for all (social sustainability) to building much more expensive and socially exclusive but energy-efficient buildings (environmentally sustainable but not socially sustainable). Another example is the shift in focus from prioritising energy-efficient buildings (most green building certifications) to reducing overall usage of resources (or use of more environmentally friendly resources) in construction (such as building with timber or sourcing environmental building materials).

the client (as opposed to the *real* sustainability gains which are essentially public goods and appropriated by the public realm). This aspect has not been reflected in the literature on sustainable business models, presenting a clear challenge: how to motivate private actors to pay for public goods (of which, they only appropriate a fraction)? Another challenge identified for the architecture firms regarding demand is that a push towards sustainability could make customers consume less, as the products and service they consume will meet their needs for a longer time (Stubbs & Cocklin, 2008). Indeed, it is often environmentally preferable to renovate existing buildings rather than building new (Retzlaff, 2009). This, of course, could contradict the interests of the architecture firm, which is interested in acquiring more sales and maximising its profits. One possible mitigating strategy to address this is for architecture firms to explore the possibility of shifting more focus towards designing and selling architectural solutions for the renovations or refurbishments of existing buildings, to make them more sustainable.

7.5 Architecture Findings

In this section, I include additional empirical descriptions and findings relating to architecture and the Swedish architectural industry in general.

7.5.1 Weakening Position

One of the major takeaways from the empirical material regarding the field of architecture is the diminishing role of the architect in the industry as a whole. This finding is in line with previous research such as that of Winch and Schneider (1993), but it strongly contradicts the finding that architects are still able to highly influence the outcome of such projects (Whitham, 2014). It has even been found that although they have the responsibility of submitting the first design and specifications of a planned building project, they have lost the prerogative of evaluating and applying any changes to the overall design, or administering the building contract, or generally supervising the construction process. Nonetheless, the data does show that the architect can still influence the building project by being the main interface with the client, and thus the intermediary between the client and the other involved stakeholders, in agreement with the findings of Whitham (2014) and Revell and Blackburn (2007). Therefore, the architect should seek to compensate for the lack of project overview by, for example, investing much more into the relationship with the client and relevant stakeholders, and devise strategies according to the stakeholder management perspective to regain influence, as argued by Freeman (1984).

The architect is increasingly side-lined as the larger, dominant construction companies seek to reduce costs and enhance profitability. At times, construction firms have even

completely removed the architect from the construction process, choosing to use a pre-defined and pre-fabricated building design instead. This trend, which is mostly due to the abnormally large construction firms present in Sweden and their power in the industry, has several consequences for the architects. The first of these is the reduced perceived importance of architects in the field. Considered more replaceable than before, the demand for architects decreases, leading to lower per-hour prices and squeezed profit margins. The architects, rather than assuming the position of project manager, as was the case previously, are now considered and employed more as consultants, having a much smaller say in the final outcome of the project. Consequently, as their voice is diminished, so too are their aspirations and ambitions, including those regarding sustainability. Nonetheless, this weakened position can offer a strategic opportunity: to form alliances and redefine their position in the market vis-à-vis the construction industry (Dyer & Singh, 1998).

7.5.2 Corporatisation

A clear discrepancy from the literature is that the architecture industry in Sweden is increasingly confronted by the choice of retaining their traditional management style, where practitioners assume leadership positions, or to recruit corporate expertise to assume senior management positions. This phenomenon is also reflected in previous research, which emphasises the transition of professional service firms, such as architecture practices, from partnerships to corporations and the resulting organisational change that this entails (Brock, 2006). This is of notable importance as it can lead to substantial changes not only in organisational structure but also in the company culture and business logic. This shift may be at the expense of creativity, with it taking a less prominent place and being replaced by efficiency and profitability as the firm's main objectives (Cohen et al., 2005). This development is a significant factor for change experienced in the industry at the moment, and one that has challenged the business logic of architectural firms, a business logic which has remained unchallenged for a long time. This shift may also have huge repercussions on the offerings and value propositions, and one may imagine that long-term societally beneficial features (such as increasingly considering the building lifecycle and pushing for high longevity and durability of buildings) would be sacrificed in favour of measures that increase sales (such as extensive cost-reduction and reducing the durability of buildings). This could potentially have serious implications for sustainability.

7.5.3 Nature of the Architectural Industry

The side-lining and the diminishing role of the architect can also be explained in large part by the nature of the architectural industry in Sweden. As Porter (1985) outlines, the industry structure is determined by five factors: the bargaining power of suppliers, the threat of substitutes, the bargaining power of buyers, the threat of new entrants,

and lastly, the industry rivalry. What is immediately clear from the empirical material is the strong predominance of certain factors within the architectural field. We could elaborate on Porter's (1985) concept of the bargaining power of suppliers by considering partners such as construction firms (whose role as project manager is vital in delivering the architect firm's offering to the customer) as a form of supplier. The construction firm is supplying its capabilities in production, project management, networking and general influence in the market to the architecture firms. Due to a dominance of certain factors in the architecture market, such as the very high level of bargaining power of the suppliers (i.e. the construction firms in this case), and industry rivalry (due to disproportionately large architecture firms operating in a relatively small market), the industry structure has been fundamentally impacted, leading to a weakened position for the architecture firm. The threat of substitutes (Winch & Schneider, 1993), resulting in an increasing number of other professionals within the construction industry taking on tasks which were traditionally regarded as the architect's work, further challenges the architect's role in the value chain. Indeed, architects were traditionally responsible for the entirety of the construction project, but now they are increasingly employed in a consultant role with reduced authority, needing to collaborate with many parties to reach decisions (Winch & Schneider, 1993). The effects of this are clearly visible, such as the reduced role of the architect in the construction process, from project-manager to consultant, and the diminishing profitability, to name a few.

7.5.4 Ambiguous Role

It came to light that many of the points observed in the empirical data relate to the tension experienced by architects between competing ideals, norms and values. This is reflected in previous research that supports this point, by claiming that architects primarily aims to promote aesthetic features in their work (Styhre & Gluch, 2009), while Winch and Schneider (1993) demonstrate that financial success can often conflict with the aesthetic dimension. The consensus that accounting, marketing, finance and technology can play an equal, if not larger, role than creativity (Cohen et al., 2005) is also consistent with the empirical findings, especially at Beta. Although this point is mentioned in the literature, it underestimates the degree to which the financial and corporate duties of architects are growing in importance. This is also related to the changing market expectations and demands placed on the role of the architect. Not only are architects expected to perform their conventional duties, but are also increasingly expected to lead projects, manage corporations, and provide innovative business proposals as well as, for example, funding and budget options to their clients. This ambiguity in the role of the architect, I argue, contributes to their overall weaking position.

8 Conclusion

Within this study, I propose a novel framework for SBMI based on dynamic capabilities. It includes a breakdown of capabilities into second-order capabilities ("learning-to-learn", meta-capabilities); first-order capabilities (affecting reconfiguration) and zero-order capabilities (operational) (Teece, 2018; 2007). The breakdown is built upon operational capabilities identified from the empirical material. The sensing second-order capability dimension is composed of the first-order capabilities of cross-disciplinary sensing (such as identifying innovative technology, methods and tools through the combination and cross-fertilisation of multiple separate competences and expertise), organisational sensing (such as identifying organisational practices, processes and other organisational changes) and stakeholder sensing (such as identifying sustainability-related knowledge, changes in market demand and trends). The seizing second-order capability is composed of the first-order capabilities of cross-disciplinary consensus building, reorganisation of BMI and stakeholder alignment. Finally, the transforming second-order capability is composed of the first-order capabilities of incorporation of cross-disciplinary knowledge, cultural and organisational change, and stakeholder integration of partners with complementary sustainability competences and resources.

As sustainability is a phenomenon which is becoming increasingly important for society as a whole and especially for firms, this study had the empirical goal of researching how firms manage this change. After research, the framework of SBMI proved the most relevant to study the empirical phenomenon.

This is due to certain factors: first, the SBMI perspective offers an elegant, comprehensive model of the firm, known for its effectiveness in mapping out both internal and external dimensions. In particular, it excels in elucidating the relationships between external and internal factors, making it a pertinent approach for analysing the phenomenon and facilitating a more clearly defined object of study. The concept of capabilities, as discussed by various scholars (Augier & Teece, 2008; Eisenhardt & Martin, 2000; Helfat & Peteraf, 2009; Teece, 2007; Teece & Pisano, 1994; Teece et al., 1997), has long been associated with business models. Several business model (BM) scholars have already incorporated this concept into their work (Afuah & Tucci, 2001; Applegate, 2001; Osterwalder, 2004; Teece, 2010). Seelos and Mair (2007) take this a

step further by defining a business model as a 'set of capabilities configured to enable value creation consistent with either economic or social strategic objectives'.

A comprehensive examination of literature concerning business model innovation (Chesbrough, 2010; Zott et al., 2011) and capability development (Teece et al., 1997; Teece, 2007; Winter, 2000, 2003; Zollo & Winter, 2002) lends support to the proposition that integrating the business model innovation (BMI) framework with a capability perspective enhances explanatory efficacy compared to using each perspective in isolation. Consequently, this study employed an integrated BMI and capabilities framework to scrutinise the empirical data: the Sensing, Seizing, Transforming framework (Teece, 2018). Having identified a scarcity of studies on Sustainable Business Model Innovation (SBMI), the primary objective of this research was to shed light on this phenomenon.

Regarding the choice of industry, the construction industry, encompassing fields such as architecture, exerts substantial environmental, social and economic influences on society, primarily through its principal output—buildings. On the positive side, the industry fulfils the essential human needs for living and working spaces, creating employment opportunities both directly within construction and indirectly through associated sectors. Emphasising its significance, the construction industry contributed 388 billion SEK, constituting 10% of the total Swedish Gross Domestic Product (GDP) in 2014. Furthermore, it played a crucial role in providing jobs, accounting for 311,000 positions, equivalent to 6.6% of all employment in Sweden that year (Sveriges Byggindustrier, 2015).

The built environment and construction activities are associated with well-documented negative impacts and substantial resource consumption, spanning from the initial construction phase to the ongoing effects of the completed structures. Building blocks alone contribute to 40% of the world's total energy consumption, generating carbon emissions projected to reach 42.4 tonnes by 2035—an increase of 43% from 2007 levels (Zuo & Zhao, 2014). Beyond the construction phase, the operational life, renovation, refurbishment and eventual disposal of buildings further contribute to resource depletion. Collectively, this results in a staggering 40% of global material deployment and 25% of global waste annually (Mokhlesian & Holmén, 2012; Zuo & Zhao, 2014). Given these statistics, the construction industry holds significant economic and environmental implications, underscoring the critical importance of pursuing sustainable development within this sector.

Despite the increasing importance of sustainability for firms, there has been limited focus on Sustainable Business Models (SBMs) within the architecture sector. More crucially, there is a lack of understanding regarding the capabilities that facilitate Sustainable Business Model Innovation (SBMI) within architecture firms, enabling

them to transform their existing business models into sustainable ones. Identifying these capabilities that contribute to a firm innovating its business model is paramount for establishing a sustained competitive advantage. The organisational change required for this transformation is inherently complex, demanding significant time and resources from firms, often without yielding a clear, established solution. Consequently, firms require a new kind of business model to effectively address sustainability challenges and navigate the associated changes. This study aims to address that gap.

Furthermore, there appears to be a noticeable gap in the existing literature concerning the specific capabilities that contribute to Sustainable Business Model Innovation (SBMI). Limited research has been conducted on the distinct capabilities that form the foundation of SBMI. Organisations, in general, encounter a significant challenge in innovating for sustainability, as indicated by prior research (Hart & Dowell, 2011; Inigo et al., 2017). The acknowledgment of the pivotal role of dynamic capabilities in Business Model Innovation (BMI) is gaining widespread acceptance. Dynamic capabilities, defined as an organisation's ability to adapt and reconfigure both internal and external competencies to address rapidly changing environments (Teece et al., 1997), are considered crucial for BMI (Teece, 2018). At a fundamental level, ordinary capabilities, characterised by repeatable patterns of action, allow companies to sustain their existing business models (Winter, 2003). On a more advanced level, dynamic capabilities encompass the capacities to sense (identifying and assessing opportunities), seize (mobilising resources to exploit opportunities and derive value from them), and transform (continuously renew the organisation). These dynamic capabilities empower corporations to adapt, recombine and create ordinary capabilities, as outlined by Teece (2018). Given their inherent focus on change, dynamic capabilities are of paramount importance for firms in crafting, refining and transforming their business models, as highlighted in previous research (Harreld et al., 2007; Teece, 2007). However, there remains limited research on the specific composition of these dynamic capabilities within the context of SBMI and how they contribute to the overall process of Sustainable Business Model Innovation.

Thus, this study identified the different capabilities affecting SBMI and shed light on how they contribute to SBMI. In doing so, the study also identified insights on the interactions of SBMI with external actors, the two separate processes of SBMI (managerial-drive and employee-driven), its factors and, finally, proposes a capability-based conceptualisation of SBMI.

8.1 Theoretical Implications

This study makes two distinct theoretical contributions. First, we dive into the relatively unexplored area between dynamic capabilities, BMI and sustainability. Indeed, the study has made a noteworthy contribution to the existing literature on SBMI and dynamic capabilities. While several studies have explored specifically the connection between SBMI and dynamic capabilities (Bocken & Geradts, 2020; Inigo et al., 2017), this study stands out as one of the initial investigations to identify and describe the specific dynamic capabilities at work within SBMI. We present an encompassing and integrated multi-dimensional framework that details capabilities influencing SBMI, including a discussion on the interaction of SBMI with external actors, the SBMI process and its determining factors. Furthermore, this study is believed by the author to be the first to analyse SBMI within the empirical context of architecture.

Secondly, our aim is to enhance the literature on SBMI by addressing the call for more robust theoretical contributions and practical guidance. This study also provides a real-world case example of a dynamic capabilities approach to SBMI. The contribution of this study lies in providing profound insights into the role of organisational capabilities in SBMI. We integrate the sensing, seizing and transforming framework (Teece, 2007) into the SBMI context, breaking down the capabilities into different orders and providing empirical examples. While dynamic capabilities have gained theoretical prominence, empirical evidence is still lacking, and our study illustrates how sensing, seizing and transforming capabilities foster SBMI, facilitating systemic changes. Building on Mezger's BMI analysis, we explore the organisational routines, processes and capabilities crucial for SBMI, presenting new theoretical perspectives. This research demonstrates how businesses develop dynamic capabilities, combining internal and external sensing, seizing and transforming capabilities to create SBMI. Moreover, this study finds that many activities align with sustainability literature, underscoring the significance of these organisational capabilities for SBMI.

8.2 Practical implications

The study provides practical implications and underscores the framework's significance in both practical application and academic research. Initially, managers at architecture firms can employ this framework to pinpoint pertinent sustainability issues and generate ideas for SBMI. Subsequently, as SBMI concepts take shape, the framework becomes a valuable tool for managers to distribute resources effectively among the three core capability areas of SBMI—namely, sensing, seizing and transforming.

Furthermore, during strategic planning, managers within architecture can use this framework for a comprehensive assessment of their firm's SBM. It serves as a valuable tool for extending control mechanisms for sustainable business strategies. In this

context, the framework becomes a benchmarking tool for managers, helping them to identify significant sources of competitiveness which they may have overlooked. Additionally, managers can use the framework as a basis for self-evaluation of their sustainable innovation strategy.

8.3 Validity and Relevance

Regarding validity, the study utilised a theoretical framework derived from the fields of BMI and organisational capabilities. The purpose of the study was to strengthen our understanding of SBMI by shedding light on what capabilities are needed for firms to engage in SBMI.

Indeed, this study utilised the literature on business models to map and provide a holistic view of the firm, both the internal and external dimensions, as well as their offerings. This approach was chosen due to the unknown nature of sustainability and exactly which parts of the firm would be affected by it. The insights gained from adopting the business model perspective are thought to have led to a strong explanatory power in elucidating the strategic challenges and opportunities facing professional services and architecture firms. Insights such as the firm's role in determining the nature of demand and the shift from entirely internal forms of creating value and innovation to creating much more strategic partnerships are particularly relevant for firms today. Moreover, from a theoretical perspective, this study contributed significantly towards understanding how firms can develop BMI.

The phenomenon of sustainability holds great empirical importance: in general, to combat climate change, and in particular, firms are increasingly under pressure to implement sustainability into their organisations and business models, with limited understanding or guidance as to how. Sustainability also holds significant theoretical relevance: the definition and understanding of the concept is still problematic, leading to difficulties in further research in the field and its theoretical implications. Due to the empirical and theoretical relevance of sustainability, this study contributes substantially to that literature, as well as to the debates in society relating to these topics.

Thus, this study would be informative both to managers of firms who are experiencing change, practitioners of sustainability or firms attempting to implement sustainability (especially to professional services firms and architecture firms). It is also beneficial for researchers studying the theoretical impact of these concepts upon existing theories, or the development of organisational capabilities amidst uncertain market demand. There is clear potential for sustainability to enhance a firm's competitiveness, sparking interest in what managers and other stakeholders can do to actually derive benefits from sustainability initiatives. The findings were formulated from an empirical analysis of the architecture field but are expected to have some relevance for professional service firms at large. The findings relating to how to formulate the actual definition of

sustainability in a specific industry and how to translate that into a sustainable offering, for example, are considered highly relevant and applicable across other professional service industries.

8.4 Limitations and Future Research

This study strengthened our understanding of SBMI by shedding light on the key capabilities required for firms in the SBMI process. Nonetheless, this study and its findings are limited in certain respects. First, this study is limited in terms of the time period that it covers, a time period during which the phenomenon of sustainability had generated significant debate, especially in the architecture industry. Second, the study is limited also by the geographical and cultural context in which the data were collected and analysed, namely in Sweden, which may present substantial political and cultural differences from the world's major economies. This study also adopted a qualitative approach, applying a case-study methodology to generate findings. Being able to validate (or falsify) these findings through a quantitative methodology would contribute substantially towards a broader understanding of the dynamics at play.

Moreover, this study focused predominantly on architecture firms, with its findings relevant to the architecture industry, defined by its combination of three distinct types of expertise: construction and engineering, creative and artistic and the knowledge-intensive professional service element. Further research of the same phenomenon but in other industries, for example, other professional services industries, such as the legal or accounting sectors, or in industries such as construction or manufacturing, or more creative industries such as design, media, publishing, and film and video, could provide a deeper understanding of the dynamics at work. It would be interesting to deduce whether SBMI would be less problematic in such industries, which could significantly alter the findings about the strategic issues and opportunities faced by firms. It would be most interesting to establish whether the creation of value in such industries would occur mostly internally, or whether instances of *open innovation* or *open business models* would also be observed. Another interesting avenue for research would be problematising even more the concept of sustainability. As presented in this study, the very nature of the concept of sustainability is problematic and is idiosyncratic. Exploring exactly what the term signifies as well as how that meaning fluctuates between industries would be particularly revealing, and shed light on how industry and society at large can work together to achieve gains in sustainability.

It is indeed important to point out that the factors identified in this study, which influence the case firms, are specific to the architectural industry. It is strongly expected, however, that these factors, as well as the meaning and implications of sustainability, may vary significantly from the architecture field to other industries. In fact, even within the architecture field, we observe contradictory principles regarding sustainability.

There were a number of key issues regarding sustainability that arose from the analysis, namely those regarding how the value created by sustainable solutions was appropriated (the client only appropriates a part of the value, whilst the rest is provided towards society as a positive externality), how these sustainability gains and their costs should be governed (if a private customer should be expected to pay for the positive externality, which he or she only benefits from in a minor way), and how to motivate the choice of customers paying for positive externalities. A number of concepts were identified that could provide a deeper understanding of these issues and complement the existing framework: the *Economic Property Rights* (Barzel, 1997; Demsetz, 1974) connected to these sustainable offerings, the *Institutional Regimes* (Ostrom, 1990) behind managing and maintaining shared resources, like that which sustainability efforts strive to maintain, and *Collective Action and Free-riding* (Olson, 1965) in motivating private customers to pay for sustainable solutions, even when they only appropriate a fraction of the value.

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10 Appendix

10.1 Empirical introduction to the Architecture Industry in Sweden

The architecture industry in Sweden presents several characteristics that I argue strengthen our understanding and interpretation of the empirical material relating to SBMI. I present those characteristics here.

10.1.1 Characteristics of the Industry

Marginalised Role of the Architect

One major development in the field over the past decades has been the changing role of the architect in construction projects. The architect's role has changed from being the project manager and, in principle, responsible for all project resources, to becoming a consultant or resource within the project team. This diminished role of the architect has had a crucial impact on the overall development of the architecture industry as a whole in Sweden. One of the main factors communicated by the interviewees regarding this development is the unusually strong influence of the major construction companies in the country.

> Strategic Advisor, Beta: 'We also compete when it comes to contractors because some of the contractors actually just bypass their architects and think they can do the architecture work themselves. I think that is one reason.

One major implication of this situation is that it is seldom the architects by themselves who are able to create new and innovative solutions, but rather a strong collaboration and dialogue is necessary, between them, and the rest of the industry, such as consultants, engineers, suppliers and so forth.

This marginalised role of architects in Sweden has also led to lower average salaries for them, which, in turn, makes it even more challenging to invest resources into change activities, seen as non-strategic, such as sustainability.

Independent Industry Expert & Former Manager, Beta: 'I will say that is the problem with the architecture companies, that they are not so profitable as enterprises; so in a way, the architecture goes on all the time, [so it leads to] architects working with sustainability and creative parts of their jobs on their own time. It could be like a brunch seminar or that extra curriculum activity'.

Type of Clients

As the following graph demonstrates, I argue that architecture firms are commissioned by four main clients, depending on their willingness to pay and their ability to pay. The clients most willing to pay are organisations that strongly relate to sustainability principles and feel a social responsibility to play their part in promoting sustainability (examples of these can be local Swedish municipalities, large corporations with a sustainability programme). This is counterbalanced by the client's ability to pay, that is, if the firms are ready to dedicate large resources towards commissioning sustainable architecture.

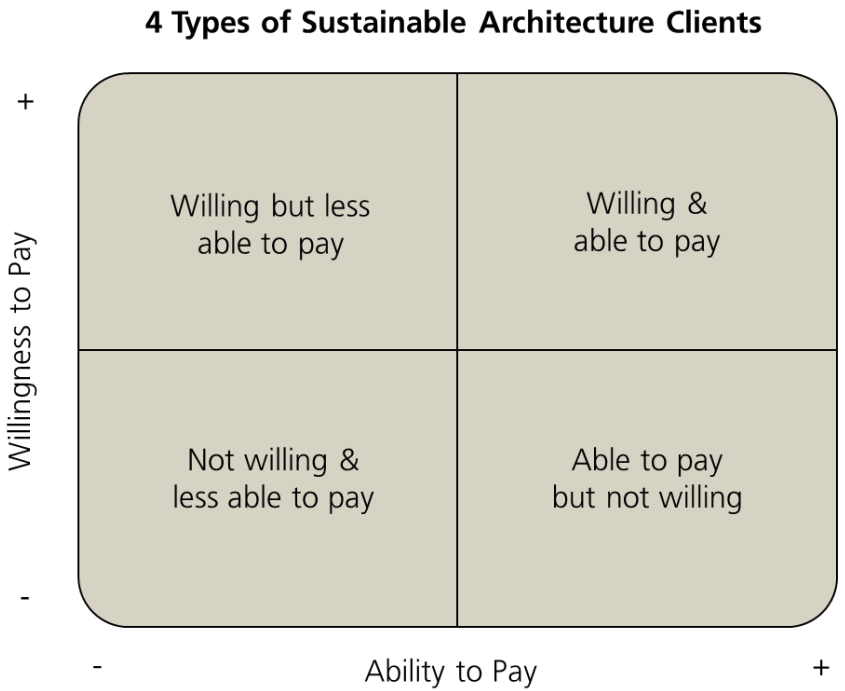

Figure 15: Categorisation of clients for Sustainable Architecture (deduced from empirical material)

Shortage of Architects

The architecture industry in Sweden has been characterised by high and low demand periods. Currently, there is a very high demand for architects, especially because of the strong economy and the housing crisis. However, there is still a shortage of architects, which has led to a higher average wage increase compared to other sectors, but heightened time pressure to perform projects quickly.

> Strategic Advisor, Beta: 'Of course, we have projects, but it's very low-skilled projects. So, we are depending on doing every hour of our work and the pricing has come down, which is very strange because there is a lack of architects which means that it should have gone up. So it's a very big discussion within architect circles today that we all have to demand more money for our knowledge, because otherwise we cannot create new knowledge, if we don't take money for real knowledge'.

Industrial Power of the Contracting Companies

The construction industry in Sweden is unusual, due to it being dominated by a few very large players, such as Skanska, NCC and PEAB. Firms like these have acquired a huge amount of decision-making power and influence within the construction field and are more often than not the main clients of architecture firms. As the main client and commissioner of architecture projects, these firms have the authority over the budget and the direction of the project. These firms have been described as exhibiting a strong risk-minimisation culture, favouring old technology and testing building methods, to newer, innovative techniques, strongly impeding BMI. Moreover, these firms have a distinctively different approach to architecture firms, with profitability as a much stronger focus. Consequently, they can often choose the cheapest and fastest methods of construction, despite their sustainability efforts. They also have a stake within the concrete industry, producing large amounts of concrete themselves (Skanska, 2016), which further deters their decision to switch to more sustainable materials, such as massive timber, for example. Moreover, the current business model of the main construction companies in Sweden is performing well, and leading to very high profits (Byggnadsarbetaren, 2016), thus reducing even further the incentive to change building materials or methods.

> Strategic Advisor, Beta: 'I also would say that the big contractors, of course, have more knowledge when it comes to sustainability. So, some of the big contractors are very well informed; they could do this in Denmark, but they also, because of the market where we're all talking about how to build cheaper and cheaper and faster and faster, the contractors have created change within their companies; how to have further and faster processes and how to go and buy cheaper materials and, of course, if the contractor comes and says that this is so good and so good, the low carbon footprint, but they have to go outside of those changes and differences… And I think that the only way of changing that is making laws that force you to do this'.

This is also connected to the general lack of expertise in the industry, in analysing the climate impact of different materials.

> Strategic Advisor, Beta: 'No one knows how to compare one material from another because this is how they do business [the construction companies]. They compare, if we have registered this material, they go home and they look at buying another material cheaper; they would buy from Poland or can they buy from China and they would go, this one is much cheaper that is this one. But then they don't have the knowledge or the processes in how to measure the materials that they will change from our design and will have the same conflict of interest. It's impossible to do that way. And that is pretty bad, I think. Then it doesn't matter how good we will be becoming, in designing in low carbon footprint buildings because in the end, the contractor doesn't know how to do that'.

Thus, even though architects can push for more sustainable building methods or materials, as the contracting companies often have control over the budget and the project, they often have the last say. One senior manager describes it as:

> Senior Manager, Alpha: 'There is a very, very industrialised building business in Sweden. And this is not always good, because it's more expensive to do it other ways than to order big quantities of pre-fabricated material, if you see what I mean'.

Furthermore, one example of the power of the construction industry is the collective lobbying efforts aimed at persuading the government to avoid any compulsory legislation on sustainability applying to construction companies. Instead, it was agreed that each company would be able to decide for themselves the level of sustainability efforts taken ("Frivillig åtagande").

Attitude to Risk

The attitude towards risk in the architecture industry, as well as in surrounding industries such as construction, is characterised by an overarching aversion to taking risks and a deliberate, unified initiative to minimise risk in projects. This risk-minimisation culture is a large impediment on innovation in the industry, according to the interviews, and the field is dominated by old and tested building techniques:

> Senior Architect, Alpha: 'I've been working in Germany and the States, and I feel the culture there is no risk, no gain. If you snooze, you lose. You know, if I'm the first, it's not a risk; it's an opportunity. And here in Sweden, we have, if you're the first, it's a risk; not an opportunity'.
>
> Ex-CEO, Alpha: 'On the other hand, there is the risk minimisation culture and people, both in the public sector and the private sector; they are risk aware, so they minimise the risks a lot'.

> University Professor & Manager, Alpha: 'Yeah, I think in architecture, we mainly use things that are accepted in the mainstream already. That's why this discipline is so difficult to train and innovate because when you build a building, you have such a big responsibility on your shoulders, and you are not willing to take the risk of having failure, you know. Or, for example, I don't know, trying new innovative material… [Vacuum Insulated Panels] … But it was not so much the cost, but the risk [with untested, internationally produced new materials] … then they don't even want to go further in discussing it because it's just too much risk involved, you know… And so, when you build a building, you invest that money; some, very often with public funds. You build a hospital, or you build a school. You cannot afford to fail, you know. Because the cost of building these buildings is several times your own business revenue. So that if you fail, you cannot ever pay for it, yourself. So, even if we, of course, we have insurance. But you have to understand the big business of construction; it's huge amounts of money. So, it is a very conservative branch because of that; because the risks are very big to fail and so, we only rely on things that we know works. And has been demonstrated in the past. So, it takes a long time to have innovation'.

Thus, it may be said that this risk-aversion greatly hinders innovation in the architecture field. One method of facilitating innovative solutions within architectural projects is for the government to sponsor risky, smaller-scale innovative projects to prove the reliability of a new product, before it's introduced into a large-scale project with potentially much larger losses. One successful example of this was the governmental sponsoring of research projects into low-energy houses called 'Passive Houses'.

> University Professor & Manager, Alpha: 'That's why it is important if government funds demonstration projects, smaller scale [projects]. These are very often financed by research funds. So, that the technology can be proved first on a small scale before we make the big mistake… It's like that, I mean, for example, 'Passive Houses' [low energy houses], you know, now they are pretty much mainstream. There could be, I don't know, years of demonstration projects before they were kind of considered to be safe… I think it's reasonable to do that because we are dealing with real construction and real money and real people; I mean, it's not just like developing a mobile phone. You are going to have really big funds invested in that, you know. So, that reality makes it more difficult for the same with all technology, to be, to come to life, you know, to like exist. It takes a long time because the whole process is long. So you can have a full demonstration for ten years and then you know, you need another ten years of acceptance, twenty years. And then you start building the first ones, you know. So, it's a slow process'.

Cooperation and Intellectual Property

This industry differs from many others in that there is a usually high amount of cooperation amongst competing architecture firms. The two largest firms in Sweden, Alpha and Beta, whilst being each other's strongest competitor, have actually formed

strong alliances and cooperation in many instances, with the latest example being the *Alpha Beta Team*, a joint effort in which 120 employees from both firms will create the design for the hospital project (Alpha, 2010). The nature of this cooperation in the industry has also had a strong impact on the attitudes towards intellectual property: to many firms, there are concerns about divulging proprietary information to competitors and the market at large, but rather it is the opposite. Information about novel designs, methods, technologies within architecture and sustainable design are voluntarily shared, sometime even sharing internal research conducted by the firm's own money. The reasons behind this are mostly to raise awareness of a firm's innovations and to develop the industry as a whole.

Nature of Competition

The architecture industry in Sweden predominantly competes on the basis of differentiation, that is, on the nature of the products and services themselves, and how they best create value and fulfil the clients' needs. Competing on the basis of price is an uncommon occurrence, especially amongst the larger architecture firms in Sweden.

Short-Term Mentality

The industry is characterised by a strong short-term focus in building projects, such as either evaluating costs and benefits until the building is sold to the final client, or else having a timeframe of approximately ten to fifteen years. This is a strong factor working against sustainability, as buildings are built with cheaper materials and methods, which are usually more unsustainable, and shorter lifespans, meaning that there will be a quicker need to demolish or refurbish the building in the near future. Many architecture firms' clients have tight budgets, where costs are squeezed and profits are of crucial importance, and which often cannot accommodate longer-term investments. Moreover, a great number of housing companies or property developers often ignore the question of sustainability, prioritising short-term profits over long-term sustainability gains.

> Former CEO, Alpha: 'I mean some companies – housing companies or property owners – they don't care; they just do the least that they can do to get away. And they have different relations with the long-term ownership. I mean, some of them are developers and they want to develop, and they want to make a profit as soon as possible; sell the property before it's even finished or completed – and they have one approach sometimes. [And then there are the long-term property owners, they have another approach, and they have more incentives to decrease operational costs]'.

Furthermore, once residential buildings are constructed, they are transferred to the housing cooperatives. After the building has been in their ownership for ten years, then the responsibility of the contractor ends completely, meaning that they are no longer

responsible for the operation of the building. This can encourage short-term thinking from the contractor, who has no real incentive to construct a building that will be high-performing for many decades to come.

> Sustainability Director & Partner, Beta: 'If you're coming to housing, then many of the apartment buildings that are constructed, they are handed over to [housing cooperatives] ("bostadsrätter") within two years; then after ten years, there is no possibility to hold the contractor responsible for what is happening in fifteen or twenty years; so then he is off the hook."

Price and Time Pressure

In the Swedish market, there is a very strong pressure for construction projects to be conducted in an as fast and as cheap manner as possible. This is in part due to the influence of the construction industry, and their business models. Furthermore, there is currently a big housing crisis in Sweden, which has the impact of prioritising speed and low price in housing. This understandably has a detrimental effect on sustainability, as these solutions often require longer timeframes and higher up-front investments.

> Sustainability Director & Partner, Alpha: 'But at the moment, I would say we are now a bit afraid of what is happening right now because there is this high demand of residential buildings, with a short timeframe. So, there is so much focus now on building fast, and building sort of everywhere that it is possible to build; we are a bit afraid that the quality will be lower and how much of that work will go to sustainable buildings in this situation. That is now and what will happen with the cities, the environment, environment around the buildings, like places for people to meet, children to play. What about green places in urban areas, what about daylight between residential buildings, with high density or high-rise buildings, etc.'

> Strategic Advisor, Beta: 'And today, we don't have enough architects, today we don't have enough contractors, and we don't have that much land to build on. The big issue today is how fast can we build, how cheap can we build, and can we build things that can be moved, and are you putting in ground that you will get something else in five or ten years? I would say that it's a bit of a sloppy discussion today, because we have to do things fast and then you don't do them properly. And that, of course, is a big obstacle; because we do things fast and then you don't have room for the sustainable issues. You don't have room for any quality issues at all. A lot of the projects being built today are really lousy quality, and that is not sustainability…It's not sustainability knowing that you probably have to tear something down in twenty years or if that you know, you have to renovate it because of the quality that is lousy. That is a big obstacle today. And also, lack of knowledge, I would say that because we need so many new architects in the businesses and because we need many new contractors as well'.

Growing Awareness of Sustainability

There is an increased awareness of the importance of sustainability in Sweden. The government has been instrumental in pursuing measures that encourage sustainable architecture and construction by implementing minimum government regulations on sustainability. However, society as a whole is also showing a higher understanding of the need for sustainability. Not only are companies adapting their products and services to be more sustainable, but consumers are increasingly demanding sustainable offerings from firms. This trend is equally true in the architecture field. One significant event that has really promoted sustainability thinking was the COP21 ("21st annual Conference of the Parties"), where the United Nations Framework Convention on Climate Change ("UNFCCC") was agreed upon. This event proved to be a strong driving force in raising awareness of sustainability globally. The head of the sustainability network at Beta describes the growing awareness of sustainability in Sweden.

> Head of Sustainability Network, Beta: 'I would say that the industry has understood that it's going to be a big market, so when it comes to projects, everybody is very keen on, when they're coming here showing the newest projects, it's always the greenest one that they are promoting, and very keen on selling. So, I have the feeling that it's a bigger understanding that they are issues, that we think that they are important, and that our customers, the ones that we are working for, are also interested in these questions. So, I'm positive to, I mean Sweden, building in wood, for example, is much more frequent. So, we can be better in drawing these solutions, and the more we collaborate with suppliers, so it seems that much more things need to be done, that it's going and coming up'.

Architecture firms themselves have also changed in a significant way, with the majority of them having invested in environmental sustainability resources.

> Former CEO, Alpha: 'Well, I think the greatest way [that architecture has changed] would be in the field of environmental sustainability in buildings. That is: passive housing, passive house programmes where architects have educated their employees to become certified passive house designers, so that they have specialised; and at Alpha, we did that too, and they have continued. And then we have environmental specialists, chemists, biologists and sustainability managers even, and sustainable environmental programme managers who lead all the programming and specifications of environmental issues or sustainability – yes, that's right, environmentally more specific. So, they are employed and educated specialists – so there's a wider range of specialists in architectural firms today than there were ten years ago'.

> University Professor & Manager, Alpha: 'But now every architect's office is obliged to have some form of sustainable specialist, in-house, in order to provide [expertise] because

> even the building code is very stringent in terms of energy-limits required for buildings and also, even the building has some daylight requirements. If you want the building to be accepted by the "municipality" ("Kommun") because they [the architects] have to get the permission to build. It has to go through the governmental agencies; it has to be approved and then, there is a new check whether you comply with the code in terms of energy use, with often requirements on daylighting and so you cannot, no longer ignore these aspects in your ordinary architectural practice.

Legacy of Sustainable Architecture

Sweden has a strong history of sustainable architecture, both in the sense of durable, resilient architecture but also building with good insulation and ventilation. This is partly due to the rough Swedish climate. This leads to many buildings that were not designed with an explicit sustainability focus, actually fulfilling many requirements of certification systems, without actually being awarded the certified label.

> Sustainability Director & Partner, Beta: 'So, there was an office building we recently constructed, and they found out they should try to get that certification when most of the decisions were already taken, and they find out it was LEED gold!'

And with projects such as the sustainable city project gaining international attention, Sweden has actually been successful in exporting consultancy services within eco-cities.

> Former Middle Manager, Beta: 'And I think that the government realised this and "Business Sweden" [Swedish Export Organisation] realised also that that was the case and they set up a special group, in fact, to, not market, but I think promote this Swedish form of [sustainable architecture] … And so, for Sweden, it's been, I think, a very important export'.

Sweden also tends to stand out in terms of knowledge and the historical importance placed on social sustainability.

> Strategic Advisor, Beta: 'And one thing also, if you want to broaden sustainability, when it comes to social sustainability, Sweden is very far ahead of a lot of other nations. I think we, the Swedish architects, can actually be quite attractive, when it comes to work for social sustainability. Which is what the people have in a good quality home, nice places to meet, places for kids and elderly. The equal rights of all people. I think that Sweden has been, in the last 100 years, Swedish housing projects have been very focused on giving everyone the right to have a good home, and I think that is good knowledge to also use abroad, the social sustainability ideas'.

Furthermore, knowledge and expertise within sustainability are not equally divided in the firms themselves, with certain specialty areas often possessing stronger capabilities within sustainability.

> Independent Industry Expert & Former Manager, Beta: 'Yes, I would say [architecture firms need] just to set some time and resources for internal education in sustainability, and sustainable systems. And I would say that Beta, as well as Alpha, and also other companies are divided into studios, let's say, for example, the studio of Town Planning; they are really at the forefront [of sustainability]. They cannot sell or do business if they are not in the forefront of sustainability, and I will also say that the Landscape studios, that they were knowledgeable, whereas other studios might have been less knowledgeable'.

10.1.2 Nature of the Architecture Firms

Size of Firms

Sweden is dominated by small, partner-owned architecture practices, many that which profile themselves as having a niche speciality within the field. Nonetheless, Sweden is also home to several very large players, which is unusual for a country of its size. Firms like Alpha and Beta, being two of the largest in Europe, have transitioned from being small to becoming large international players, and are managed in a much more corporate manner.

Changing Nature of Competences

Architects are renowned for their creative qualities, and historically have been considered more along the lines of an artist. Nowadays, however, the role of the architect has developed into a much more complex nature, with creativity playing a large role, but also expected to have strong engineering skills as well as being capable of economic analysis. Engineering skills are increasingly necessary as building projects become all the more complex, and technology is playing a large role in the final construction. As architecture firms are becoming larger and more corporate in nature, as opposed to smaller, partner-owned firms, and due to a high level of competition in Sweden, there is an increasing need for economic and business capabilities. This is to complement high-quality architecture with a sound business proposal and business plan. Across the industry, however, there is a sense that architecture firms lack these economic and business capabilities, which is a large determinant of the recent marginalised status of the architect within the building process.

This emphasis on the creative nature of architecture can also be an impediment to sustainability, as architects may feel that sustainability is a threat to high-quality architecture.

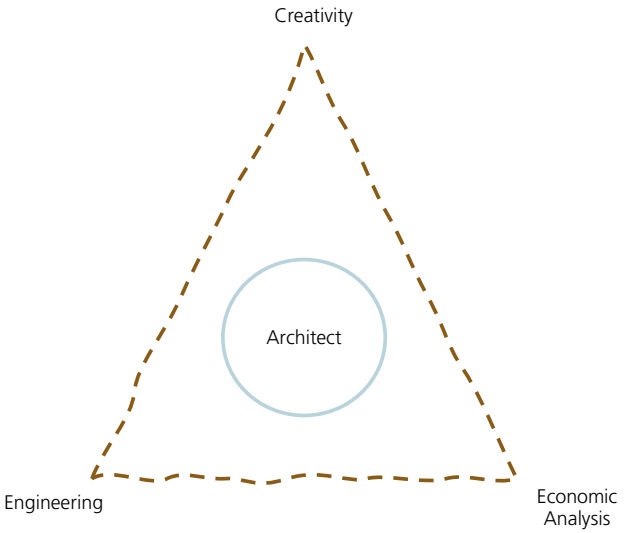

Figure 16: The Three Competencies of the Modern Architect

However, architectural practices are often characterised by a lack of economic analysis and business acumen, which has played a part in the development of the marginalised role of the architect.

> University Professor & Manager, Alpha: 'Yes, but to say that there are businesses models [on sustainability], I don't think so. It's more like it's, the building codes are quite effective and also the voluntary certification systems are big drivers but the business models like, they could be, they could be better known by the architect. I think there are lots of economic opportunities in this business, but nobody really knows how to use that. They never talk about money, you know, when they draw buildings, they just draw out of ideas. But they are not very good at looking at one idea versus another and comparing how it benefits in terms of lifecycles costs and payback and all of these issues. There is especially a lot to do there. I mean, I think we should have more business people working for us. In fact, like people who are specialising in those kinds of cross-calculations. You know, demonstrating to clients, for example, if he invests in technology, he will get so much pay back, instead of that and the other. It would be more profitable financially to do this instead of that'.

Pay-per-hour

Despite efforts to change the current billing method for architecture firms, they are still overwhelming charging their clients per hour. There is an initiative across the industry to push for more of a project-based pricing for assignments; however, the efforts of the

architecture firms have not so far been able to change the status quo. This is largely due to the power of the construction companies within the projects, and the increasing nature of architects as consultants, rather than project leaders.

Despite the shortage of architects currently in Sweden, architects still earn, on average, a lower price per hour than many other players within the construction industry, with the majority of profits going to the larger construction firms.

Standard Architectural Process

The following graph outlines the standard architectural process in a construction project (Sveriges Arkitekter, 2012). The process is composed of the Design process (where the pre-study and preliminary design take form), Managerial process (where the design is completed and resources allocated), Procurement process (involving the approval and procurement of necessary equipment and materials) and Production process (which is often carried out by the construction firms). Sustainability elements can be introduced in every process.

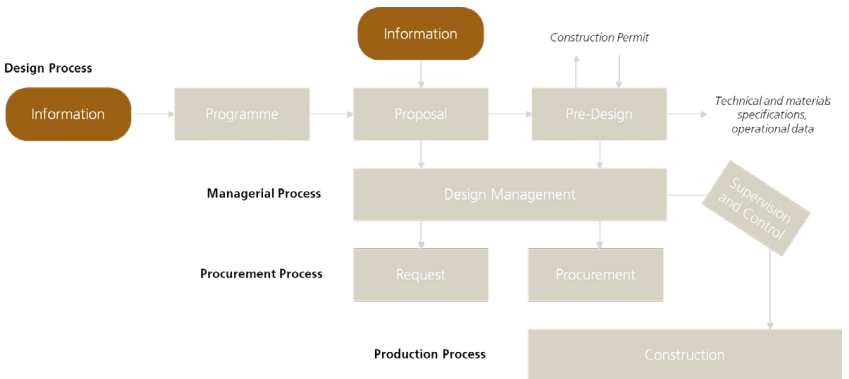

Figure 17: The standard architectural process (Sveriges Arkitekter, 2012)

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