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Towards a Business Model that promotes Sustainable Solutions

- A multiple case study of architecture firms in the Nordic countries -

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ABSTRACT

Title: Towards a Business Model that promotes Sustainable Solutions.

Key words: The offensive sustainability approach, Business models, Business model transformation, Architecture firms, Sustainable construction.

Purpose: The purpose of this study is to increase the understanding of how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction. This by identifying what characterizes the business model in an architecture firm that actively works with sustainable construction. When relevant, the study will also provide insights about the transformation process the firm needs to go through in order to adapt its business model.

Methodology: The starting point for the study was to review existing theory within the research domains; the offensive sustainability approach, business models, and architecture firms. This phase was deductive and resulted in a preliminary theoretical framework. Thereafter a multiple case study was conducted with the purpose to develop theory by complementing, rejecting and positioning the suggestions offered by the preliminary theoretical framework in an empirical context. Lastly, we analyzed the collected data and came up with a final framework using a pattern matching approach. Thus, the study is argued to be of semi-deductive character.

Theoretical perspectives: The theoretical review concerns the three research domains; the offensive sustainability approach, business models, and architecture firms.

Empirical foundation: The multiple case study consists of ten cases. Each case represents an architecture firm that operates within one or more of the Nordic countries. All architecture firms are considered to be in the forefront when it comes to offering sustainable constructions.

Conclusion: The answer to our purpose is the final framework, which in our view offers a robust, rigorous and relevant perspective on what the business model of an architecture firm entails in order to successfully offer sustainable construction. The framework is structured into four different levels of analysis, which explain different relationships that a firm has to consider to successfully transform. Key at the market level is to start with defining the customer and its needs in order to build a personalized relationship and thus gain revenue in the long run. At the organizational level an organizational structure that facilitates engagement among employees and enables efficient distribution and development of knowledge is vital. At the industry level collaboration with other actors is argued to be necessary in order to realize a sustainable design. Finally, the society level considers the relationship an architecture firm needs to have with external actors in order drive the question and consequently influence the level of demand.

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1. INTRODUCTION

1.1. EMPIRICAL AND THEORETICAL BACKGROUND AND PROBLEMATIZATION

1.1.1. Importance of working with sustainable development in the construction industry

In recent years, sustainability¹ aspects have gained increased attention on both a global, national and local scale. Governments, businesses and individuals have become more concerned about the environmental, social, and economical challenges that are facing them (Barkemeyer, Holt, Preuss & Tsang, 2014; United Nations General Assembly [UN], 2014). Some of these challenges include; climate change, urbanization and population growth, and consumption of non-renewable resources (Barkemeyer et al., 2014; UN, 1987, 2000, 2014). Scholars have long argued that our unsustainable way of living will have devastating consequences for future generations. To some extent these consequences are already present and they will continuously intensify by time. Consequently, actions towards creating a sustainable future are called for (UN, 1987, 2000, 2014).

The human being is the most important actor when it comes to achieving fundamental change towards sustainable development (UN, 2014), but there is also an increased emphasis on businesses as key actors in reaching sustainability goals (Barkemeyer et al., 2014; Rudawska, Renko & Bilan, 2013; UN, 2014). It is not just that businesses are to be held partly responsible for many of the sustainability issues, they are also claimed to have the capacity needed to change the ground rules for sustainability work for the better (Barkemeyer et al., 2014; Moon, 2007). Hence, it can be argued that both individuals and companies are just as much the reason as a part of the solution in the quest for sustainable development.

Exogenous change, such as the increasing need for sustainability, determines the context within which companies do business. Usually, exogenous change cannot be controlled by the companies themselves, rather it imposes change on them (Sommer, 2012). The need for companies to work in a sustainable manner has increased during the latest decades (Danciu, 2013) as the sustainability issues of climate change, urbanization and population growth, and consumption of non-renewable resources, have gotten more serious (Barkemeyer et al., 2014; UN, 1987, 2000, 2014). There is both a pressure-driven and demand-driven aspect concerning companies' work with sustainability (Ketata, Sofka & Grimpe, 2015). Governments, NGOs and individuals are putting pressure on companies to work with sustainability both environmentally, socially, and economically (Danciu, 2013), as well as media, lobby groups and other stakeholders (Galpin & Whittington, 2012). In the same time, customer demand for more sustainable solutions has increased dramatically (Danciu, 2013). Even if working with

¹ *Sustainability*, in this study equated with *sustainable development*, is defined in accordance with the *Brundtland definition*; “*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (United Nations General Assembly [UN], 1987, 41), and is often discussed in terms of both environmental, social, and economical aspects (UN, 1987).

sustainability in most cases is voluntary, many businesses have because of the increased pressure and demand realized that it is essential to work with sustainability for continuous survival and profitability in the long run (UN, 2014).

Addressing sustainable development is no longer seen as merely a challenge, it also represents great opportunities for those companies who are ready to do so (Mysen, 2012; Porter & Kramer, 2006, 2011; Sommer, 2012; Unruh & Ettenson, 2010). To work with sustainability can imply large investments (Ketata et al., 2015; Shrivastava, 1995), but at the same time it can be used as a revenue driver and a way to gain competitive advantage (Mysen, 2012; Porter & Kramer, 2006, 2011; Sommer, 2012; Unruh & Ettenson, 2010). These opportunities are argued to be huge, however not well understood (Sommer, 2012). Consequently, progress in companies work with sustainability has been slower than expected (Baumgartner & Korhonen, 2010), for example; green start-ups have so far been limited and most established firms only do incremental changes in their business (Sommer, 2012).

It seems clear that business as usual is no longer an option in reaching a sustainable future, fundamental change is needed (Bocken, Short, Rana & Evans, 2014; UN, 2014). We have identified two alternatives for companies that want to incorporate sustainability in their business. These alternatives have no defined names in current research and we will therefore refer to them as the defensive and offensive approach. The *defensive approach* includes changes in operations towards a more sustainable way of doing business (Porter & Kramer, 2011; Stubbs & Cocklin, 2008). For example, this may include changing transportation policies or shifting to renewable energy in production while offering the same products or services (Stubbs & Cocklin, 2008). The *offensive approach*, on the other hand, includes offering more sustainable products or services to customers (Maxwell & van der Vorst, 2003; Porter & Kramer, 2011). The defensive approach is mainly associated with cost minimization, and the offensive with revenue generation (Porter & Kramer, 2011). As companies have the capacity to impact not just their own operations but also the lives of the customers through their offerings (Sommer, 2012), the offensive approach might be argued to be more appealing for sustainable development in society. In addition to this, as the offensive approach also offers an opportunity to gain revenue and a more competitive position in the market (Maxwell & van der Vorst, 2003; Porter & Kramer, 2011), the offensive approach might be more appealing to companies as well. Thus, this study will focus on companies' incorporation of sustainability through the *offensive approach*.

To provide new sustainable products, services and innovations is not an automatic process. For most organizations, it requires changes in their existing business models² (Johnson, Christensen & Kagermann, 2008). This view is shared by many, for example Bocken et al. (2014) claim that a holistic approach is required where changes in the offering will have consequences for almost every aspect of how business is conducted. Sommer (2012) claims

² A company's *business model* is in this study defined in accordance with Osterwalder (2004); "A *business model* is a conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money. It is a description of the value a company offers to one or several segments of customers and the architecture of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams." (Osterwalder, 2004, 15).

that thinking out of a business model perspective when offering sustainable solutions might help to distinguish the real opportunities as well as helping to scale these opportunities while avoiding some of the general pitfalls in business transformation. Thus, through applying a business models perspective when deciding to offer sustainable solutions, the chance of sustainability becoming a revenue driver and a way to gain competitive advantage increases (Sommer, 2012).

Among all the industries that are facing this opportunity - to provide and earn money on sustainable solutions - the construction industry serves as a prominent example, along with the IT and energy industries. The UN (1987, 2000, 2014) claims that contribution and collaboration between all parts of society, including all industries and businesses, is needed in the creation of a more sustainable future. However, to investigate the business of all relevant industries is a too wide approach in our attempts to gain knowledge about companies' that offer sustainable solutions. Also, it might contribute to no real value as there are a lot of differences between industries. As the construction industry has proven to have significant environmental, social and economic impacts on society (Zuo & Zhao, 2014), and as it has already proven to take large steps towards sustainable development compared to other industries (Mokhlesian & Holmén, 2012; Zuo & Zhao, 2014), this study will focus on companies' incorporation of sustainability through the offensive approach in the *construction industry*. As much as this industry differs from others, some aspects of the study might prove to be valid also for companies in other industries.

The issues regarding sustainability have affected how companies in the construction industry plan, design and build, now emphasizing more sustainability aspects in terms of energy and resource use (Knudstrup, Ring Hansen & Brunsgaard, 2009). Due to the long lifetime of buildings, sustainable development in this industry becomes vital to reach the goals of a sustainable future (Kibert, Sendzimir & Guy, 2000; Zuo & Zhao, 2014). For example, buildings account for about 40% of the global energy consumption, about 40% of global material deployment, and about 25% of global waste annually (Mokhlesian & Holmén, 2012; Zuo & Zhao, 2014). This puts significant responsibility on the construction industry. Mokhlesian and Holmén (2012) and Revell and Blackburn (2007) claim that through the clients' demand, it is the architects that are pushing the rest of the industry towards offering more sustainable solutions. Altomonte, Rutherford and Wilson (2014) further add that sustainability today is considered a core concern for architects since they set the grounds for the whole building project, from its inception to its completion. As architects are an essential actor when it comes to whether the construction industry offers sustainable solutions or not, *architecture firms* will be the object to study in this research.

Architecture firms that aim to incorporate sustainability through the offensive approach - offering sustainable constructions³ - may also have to do changes in their business models

³ Sustainable construction is in this study defined in accordance with Vanags and Mote (2011); "*Sustainable construction is the process of designing, placement, production and demolition of a construction product, which ensures conformity of the finished product to the criteria of sustainable development, technical documentation and other laws and regulations with regard to safety and harmlessness of the production process and the finished product, high efficiency of using resources at one's disposal, a possibly minimal impact on the environment*" (Vanags & Mote, 2011, 93).

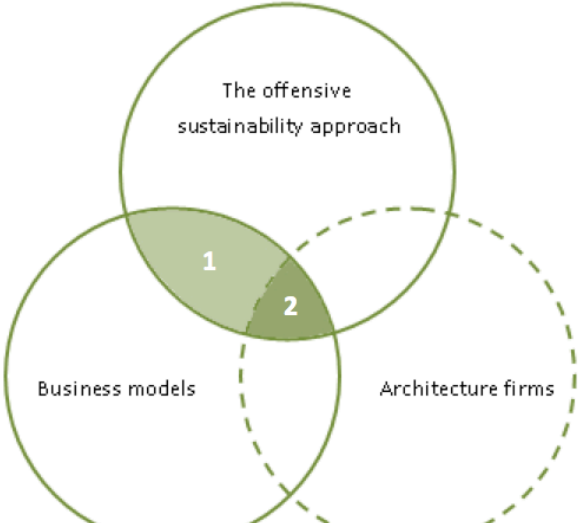
(Chesbrough & Rosenbloom, 2002; Mokhlesian & Holmén, 2012). However, knowledge about how to transform business in order to offer sustainable solutions is highly demanded (Barkemyer et al., 2014). To come up with sustainable offerings is not the main problem, it is rather about adapting all other aspects of a company’s business model to fit the offering. This is vital for companies in order to also deliver on what is promised (Barkemyer et al., 2014).

Transforming business models has shown to be hard for companies to do. Sommer (2012) argues that a company is often either one of the first in its industry to do so, thus there is nobody to learn from, or, the company is learning from others but is in the same time confronted with challenges unique to the company. Sommer (2012) further claims that the lack of consensus regarding what is needed in terms of transformation is problematic. This as it leaves companies not adapting their business models enough in order to deliver the sustainable solution that they have offered. For example, some companies pay more attention to communicate their sustainable offerings, than they do to actually making sure that they are also able to deliver sustainable products or services (Bolis, Morioka & Szelwar, 2014; Hopwood, Mellor & O’Brien, 2005). This highlights the importance of knowledge about how to adapt a business model in order to deliver sustainable solutions, hence create real change towards sustainable development.

1.1.2. Current research

There is high accessibility on research about how businesses and individuals influence environmental, social and economical aspects, and about what they can do to work in a more sustainable manner (Cole, 2004). However, the main lack in research is defined as knowledge about going from theory to practice, thus the concept of sustainable development has for businesses mainly stayed as an idea or a conceptual framework (International Institute for Sustainable Development [IISD], 2010). Consequently, the question about what and how companies can adapt their business models in order to deliver sustainable solutions is today highly relevant, and in the same time poorly understood (Sommer, 2012). Since businesses have not been viewed as central actors in the sustainability debate until recent years, relatively little research can be found about this (IISD, 2010). This lack can be seen as the combined intersection between the research domains; *the offensive sustainability approach* and *business models* (see section 1 in figure 1).

Figure 1: Research domains of this study.



Furthermore, it is argued that little research today about the construction industry, even less regarding architecture firms, explains the impact on business model components when a company decides to offer sustainable constructions (Magretta, 2002; Makhlesian & Holmén, 2012; Teece, 2010). This can be seen as the combined intersection between the research domains; *the offensive sustainability approach*, *business models*, and *architecture firms* (see section 2 in *figure 1*).

To reach a sustainable future, research that combines the domains of *the offensive sustainability approach* with the domain of *business models*, is needed. To conduct this kind of research, we believe that combining the domains with a study of *architecture firms* that offer sustainable constructions will provide important insights. To further investigate this relationship is vital since the need for sustainability will continue to impose fundamental change to businesses (Sommer, 2012).

1.2. PURPOSE

The aim of this study is to increase the understanding of how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction. This by identifying what characterizes the business model in an architecture firm that actively works with sustainable construction. When relevant, the study will also provide insights about the transformation process the firm needs to go through in order to adapt its business model.

1.3. DISPOSITION OF THE ESSAY

The report consists of six chapters, this chapter, *introduction*, being the first. In the next chapter, *theory*, a literature review of the research domains; *the offensive sustainability approach*, *business models*, and *architecture firms* is provided. This results in a preliminary theoretical framework. In the third chapter, *methodology*, research approach, research design, data collection, method for presentation of empirical findings, method for analysis together with trustworthiness is discussed. In chapter four, *empirical findings*, the outcomes of the empirical study are presented. Chapter five, *analysis*, represents a comparison of theoretical and empirical findings, resulting in a final framework, which provides an informed answer to the purpose of this study. In chapter six, *conclusion*, the trustworthiness of or findings together with a discussion about future research is provided.

2. THEORY

2.1. BUSINESS MODELS

2.1.1. Business models as the unit of analysis

During recent years, business models have gained increased attention as the core structure of analytic work within business research (Baden-Fuller & Morgan, 2010). Instead of applying a narrow view on products and processes, business is through the model considered more broadly (Sommer, 2012). Thus, when studying what impact offering sustainable solutions has to other areas of a business, the business model structure will provide a good base for analysis. Also, the high practical relevance makes business models an ideal unit of analysis for empirical studies. It provides enough details to highlight specific opportunities and threats, yet it is not too detailed to obscure the larger picture (Sommer, 2012).

2.1.2. Business model frameworks

The business model concept has no long-established theoretical roots in business research (Teece, 2010), and thus no universally accepted theory has this far been reached (Lambert, 2006; Sommer, 2012). However, there is a huge amount of concepts and frameworks, all of which have merit, and all of which are relevant to value creation (Amit & Zott, 2001). The majority of them also share most of their characteristics (Baden-Fuller & Morgan, 2010). It would be of little use to outline the whole discussion of what a business model should contain of, instead reviews can be seen in for example; Baden-Fuller and Morgan (2010), Hedman and Kalling (2003), Lambert (2006), Normann (1977), Sommer (2012), or Teece (2010).

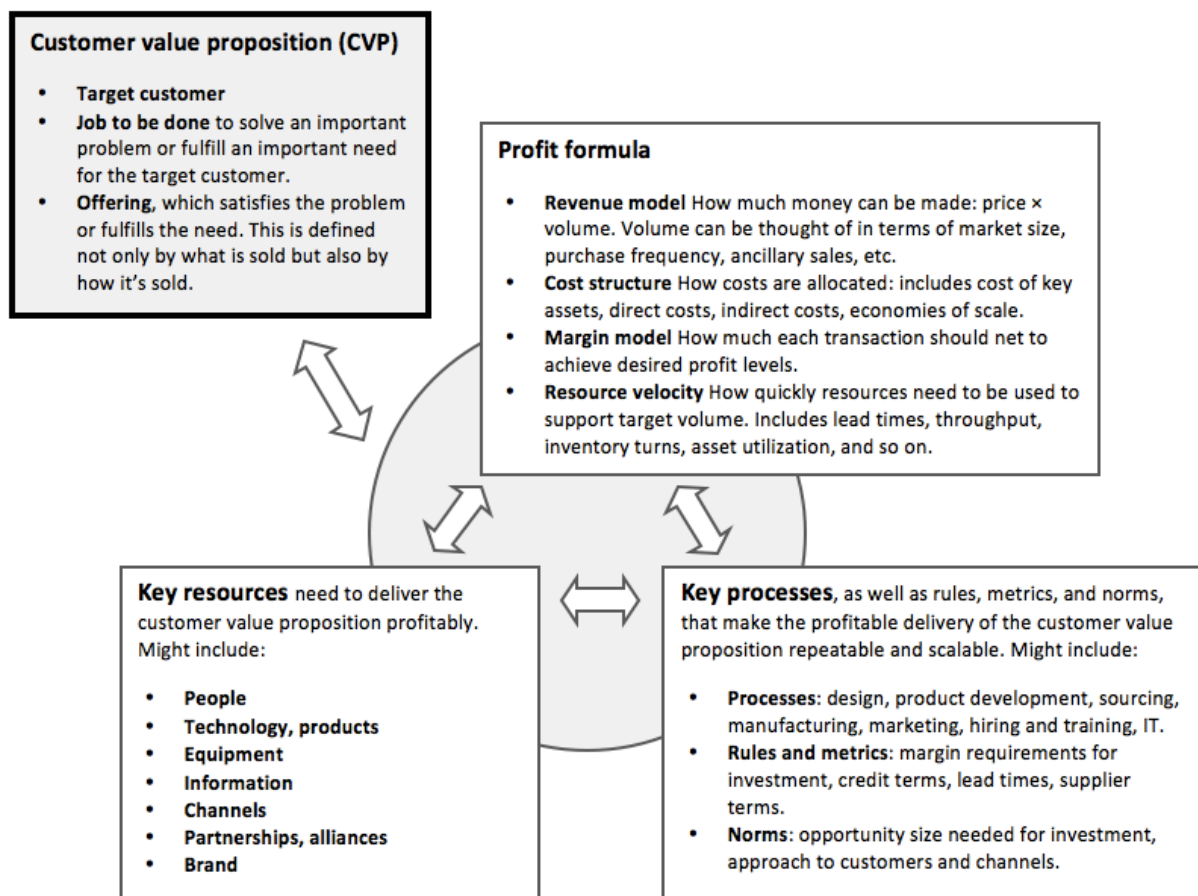
The most recognized scholars in business model research are Osterwalder (2004) and Johnson, Christensen and Kagermann (2008), and their comprehensive works have become widespread (Sommer, 2012). Osterwalder (2004) proposes nine business model building blocks, grouped into four pillars (see *table 1*).

Table 1: Osterwalder’s business model pillars and building blocks (adapted from Osterwalder, 2004, 43).

Pillar	Building block of business model	Description
Product	Value proposition	A value proposition is an overall view of a company's bundle of products and services that are of value to the customer.
Customer interface	Target customer	The target customer is a segment of customers a company wants to offer value to.
	Distribution channel	A distribution channel is a means of getting in touch with the customer.
	Relationship	The relationship describes the kind of link a company establishes between itself and the customer.
Infrastructure management	Value configuration	The value configuration describes the arrangement of activities and resources that are necessary to create value for the customer.
	Capability	A capability is the ability to execute a repeatable pattern of actions that is necessary in order to create value for the customer.
	Partnership	A partnership is a voluntarily initiated cooperative agreement between two or more companies in order to create value for the customer.
Financial aspects	Cost structure	The cost structure is the representation in money of all the means employed in the business model.
	Revenue model	The revenue model describes the way a company makes money through a variety of revenue flows.

Johnson et al. (2008) provide another configuration of components. The proposed components are similar to those of Osterwalder, but grouped, expressed and combined differently (see *figure 2*).

Figure 2: Johnson et al.'s business model components (adapted from Johnson et al., 2008, 54).



Although the components used in both Osterwalder's (2004) and Johnson et al.'s (2008) models are largely the same, in detail there are differences explained by the different backgrounds and purposes of their works. Osterwalder base his business model on the e-business industry, and Johnson et al. aim to use their business model to illustrate if and how an established company can change its existing model. The approach by Johnson et al. may due to this background provide a good fit for our study since our study aims to increase the understanding of how a business model in an architecture firm needs to adapt when deciding to offer sustainable construction, thus it includes a transformational dimension. However, while Johnson et al. cover a larger scope, and thus their business model can be adapted by any company, Osterwalder discusses each of his components and their interrelations in a much greater depth. Also, Osterwalder has taken the works of many other researchers providing alternative frameworks into consideration when developing his framework, thus it can be applied in businesses beyond e-business. Consequently, both frameworks of Osterwalder (2004) and Johnson et al. (2008) will provide the theoretical starting point of our study. In the next chapter, we will based on a comparison of the works of these scholars, discuss, develop and present the business model framework that will be used in this study.

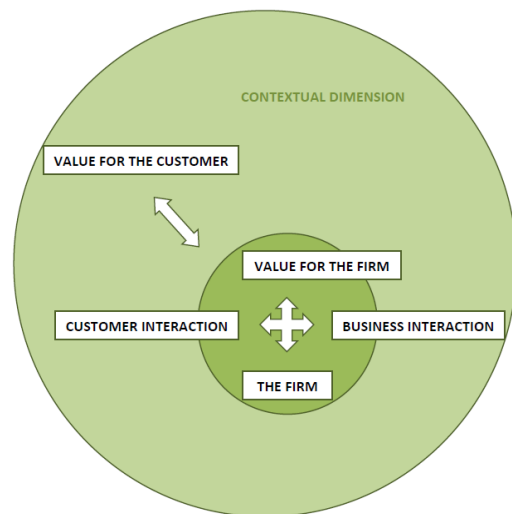
2.1.3. The business model framework used in this study

When analyzing what characterizes a business model in a company that offers sustainable solutions, the business model framework presented in this chapter will be used. The framework consists of five head-components representing a categorization of ten sub-components which in turn are the core of the business model framework. As the content of the components can differ not only due to the choices a company makes but also due to external factors, a contextual dimension that encompasses all components is added. A discussion about each head-component, sub-component, the contextual dimension and their interrelations will follow.

Table 2 and Figure 3: Overview of the business model framework used in this study.

Component	Sub-component
Value for the customer	Job-to-be-done
	Offering
Value for the firm	Revenue model
	Cost structure
Customer interaction	Target customer
	Customer relationship
The firm	Internal conditions
	Resources
	Processes
Business interaction	Partnerships

Contextual dimension



Value for the customer

It is by selling products and services that create value for the customers, that a company can also create value for itself, mainly in the terms of profit (Johnson et al., 2008; Osterwalder, 2004; Sommer, 2012). Thus value creation for customers is recognized by Johnson et al. as one of the most fundamental components of a business model. In accordance with this argument, the first head-component of our business model framework is named; *value for the customer*.

Osterwalder (2004) incorporates customer value creation in his business model framework through his product pillar and his value proposition building block. This block consists of an overview of the company's products and services that the customers find valuable. While Osterwalder is emphasizing the offering, Johnson et al. (2008) decompose their customer value proposition into three different elements; the target customer, the job-to-be-done, and the offering. Johnson et al. mean that value is created for the customer when the company through its offering of products and services can solve an important problem or meet an important need of the customers it targets, thus getting an important job done. As a job-to-be-done can be solved by more than one offering, we believe that separating the job-to-be-done from the offering might generate a deeper understanding of the business model component

that concerns customer value creation. However, as the target customer element can incorporate many aspects that do not have to do purely with the creation of value, but also with the process of delivering this value, the target customer will not be handled under this head-component, instead it will be handled under the head-component, *customer interaction*. Hence in our business model framework, the sub-components of the head-component *value for the customer* are 1) *job-to-be-done*, and 2) *offering*. Based on the definitions by Johnson et al. (2008), the following definitions are used:

Job-to-be-done: The problem the company solves or the need it answers to.

Offering: The product or service that solves the problem or answers to the need.

Johnson et al. (2008) argue that the most important thing with customer value creation is how precisely the job-to-be-done is defined and understood by the company. The scholars mean that many companies often tend to have a too broad definition, thus trying to solve more than one problem with their offering. Doing so, Johnson et al. argue that the companies might solve no problem really well. It is only when the company fully understands the job-to-be-done, as well as the process of how to get it done, that the offering should be designed.

Value for the firm

Value for the firm is often discussed in financial terms, how the company can make money out of the value it creates for its customers (Johnson et al., 2008; Osterwalder, 2004; Sommer, 2012). As this is argued to be the aim of companies (Friedman, 1970), *value for the firm* is the next head-component in our business model framework.

Both Osterwalder (2004) in his financial aspects pillar and Johnson et al. (2008) in their profit formula, discuss the financials in terms of a company's revenue model and cost structure. While Osterwalder argues that these two business model building blocks together determine a firm's margin and thus its profit, Johnson et al. add an element called margin model describing their relationship. However, for the easy use of this business model framework, we are in accordance with the arguments of Osterwalder only considering 1) *revenue model* and 2) *cost structure* to be sub-components of the head-component *value for the firm*. Johnsons et al. also add the element resource velocity as part of the financials, however we consider resource velocity to be handled in the business model components that concern the firm's resources and processes.

The sub-component *revenue model* explains the revenue streams generated from a company's offering, and how the price of its offering is determined (Osterwalder, 2004). A revenue stream can be understood in terms of what kind of economic activity that is associated with the offering, as for example; selling, lending, or licensing (Osterwalder, 2004). How prices are determined is often discussed in terms of "price \times volume", where volume is discussed in relation to market size or purchase frequency (Johnson et al., 2008). Osterwalder (2004) also adds that a company's pricing strategy needs to take customers' willingness to pay into consideration since it will determine the actual sales. Based on the works of both Osterwalder (2004) and Johnson et al. (2008) the following definition of the *revenue model* is used:

Revenue model: How the company translates the value it offers to its customers into revenue streams, and how the price of its offering is determined.

The *cost structure* sub-component explains the monetary costs incurred by a company in order to create and deliver value to its customers (Osterwalder, 2004). It also explains how these costs are allocated between different activities or different assets (Johnson et al., 2008). The cost structure is primarily determined by the key resources required, and they are frequently being discussed in terms of direct costs, indirect costs, or economies of scale and scope (Johnson et al., 2008). Based on the works of both Osterwalder (2004) and Johnson et al. (2008) the following definition of the *cost structure* is used:

Cost structure: The equivalent value in money of all the means employed by the company in order to offer value to its customers, and how these means are allocated.

Customer interaction

As companies require customers to do business (Osterwalder, 2004), the third head-component of our business model framework concerns *customer interaction*. Knowing who to target and how to interact enhance value creation (Osterwalder, 2004; Sommer, 2012).

Osterwalder (2004) and Johnson et al. (2008) have incorporated aspects of customer interaction very differently in their business model frameworks. While Johnson et al. have integrated aspects of customer interaction in all business model elements, Osterwalder has dedicated customer interaction a separate pillar named customer interface. This pillar consists of the three building blocks; target customer, distribution channel, and relationship. In our framework, we will only incorporate the sub-components 1) *target customer* and 2) *customer relationship*. This since we believe that aspects of distribution, defined by Osterwalder (2004) as means of getting in contact with the customer, can be incorporated both in the customer relationship component, and as an activity concerning logistics within the business model sub-component named *processes*.

The sub-component *target customer* is a question of segmentation strategy. It is about defining the customers that will be most attracted to the company's offering (Osterwalder, 2004). Distinguishing a target group of customers enables the company to focus its work on what creates the most value (Osterwalder, 2004). Based on the definition by Osterwalder (2004), the following definition of the *target customer* is used:

Target customer: The customer segment that the company wants to address.

The *customer relationship* sub-component describes the link a company establishes with its target customer, and how the company reaches and interacts with the customer (Osterwalder, 2004). The strength of the relationship is influenced by all kinds of communication and contact that takes place between the two parties, thus the relationship can evolve in either a positive or negative direction (Osterwalder, 2004). Based on the definition by Osterwalder (2004), the following definition of the *customer relationship* is used:

Customer relationship: The link the company establishes with its target customer, including all kinds of communication.

Osterwalder (2004) also claims that how to address customer relationships should evolve during the customer lifecycle in order to heighten customer value. For example, while the beginning of a relationship might be characterized by advertising and promotions, it will then evolve to negotiation and collaboration, before it ends with maintenance and monitoring activities. However, it is important to decide how much the company wants to interact with its customers as interactions also imply costs (Osterwalder, 2004).

The firm

The first three head-components, *value for the customer*, *value for the company*, and *customer interaction*, mainly concern the definition of the value created both for the customer and the company, as well as the link between these actors. Our fourth business model head-component, named *the firm*, will focus more on how this value is delivered and what is needed in order to deliver it.

Osterwalder (2004) incorporates this in his business model pillar named infrastructure management, consisting of the three building blocks; value configuration, capability, and partnership. The first two building blocks both concern the resources and activities required to deliver the offering, and the third considers what external relations the company needs to have in order to do so. Johnson et al. (2008) incorporate the same aspects as Osterwalder but divide them into what they name key resources and key processes. As we find resources and processes to be two separate areas in practice, and as we find it valuable to separate internal and external elements of a company in order to get a deeper understanding, we are in accordance with Johnson et al. (2008) only considering 1) *resources*, and 2) *processes*, to be sub-components of *the firm*. External relations such as partnerships will instead be discussed under the head-component *business interaction*. Moreover, it is reasonable to say that the works of Osterwalder (2004) and Johnson et al. (2008) cover the large picture of developed business model frameworks in current business research, but some aspects can be argued to have been left out. We are in our framework adding a sub-component of the firm, 3) *internal conditions*, as we believe that aspects such as organizational structure or company culture can affect what resources a company have or what kind of processes it carries out.

Not many scholars have incorporated organizational structure as an aspect of their business model frameworks, but among those who have we find Hedman and Kalling (2003), and Normann (1977). Hedman and Kalling (2003) argue that an effective value creation process requires an organizational structure that supports efficient communication. Alvesson and Sveningsson (2012) define organizational structure as the distribution, coordination, and control of work and authority. The scholars also claim that the organizational structure of a company will impact the realization of the firm's goals, thus the structure of an organization will differ depending on what aims it wish to accomplish.

Umbeck (2009) adds company culture as an aspect of his business model framework with the argument that the human behavior will play a vital role for the success of a business. Other

scholars such as Hedman and Kalling (2003) and Sommer (2012) emphasize cultural aspects as well, and claim that it can impact many of the other business model components. Company culture is a social construction that is highly dependent on history and thus hard to change, nevertheless some scholars argue that one can put effort into shaping the culture that dominates a company (Alvesson & Sveningsson, 2012). Alvesson and Sveningsson (2012) define company culture as the beliefs, perceptions, and values that are shared by people in a company, and which guide these persons in how they interact with their working environment. The scholars further claim that company culture can impact the strategy of a company, priorities within work, and engagement of employees. In addition to this, Hedman and Kalling (2003) highlight the importance of managing culture in order to accomplish the goals of the company.

Organizational structure and company culture are examples of internal conditions in a company that can affect how work is conducted. Other internal conditions exist, but these are the conditions that most frequently have occurred when studying business model research (e.g. Hedman & Kalling, 2003; Normann, 1977; Sommer, 2012; Umbeck, 2009). Our definition of *internal conditions* is:

Internal conditions: The prerequisites that determine how work is conducted, such as organizational structure and company culture.

The *resources* sub-component concerns the key inputs required to compose the offering and deliver it to the target customer (Johnson et al., 2008; Osterwalder, 2004). Johnson et al. (2008) highlight that the resources evaluated in a business model should only be the most important inputs that the firm cannot be without.

Since the term resources incorporates a lot of different things, Grant (1991) has classified resources into three main categories; tangibles, intangibles, and human. The scholars describe the categories as follows; tangible resources are resources that are mainly physical and are traditionally shown in a company's balance sheet, such as facilities or equipment. Intangible resources are harder to put on the balance sheet as they are non-physical assets and thus harder to determine the value of. Examples of intangible resources are brands, patents, copyrights and reputation. Human resources concern the people and knowledge needed in order to create customer and company value. However, financial resources such as cash reserves have shown to be hard to classify according to this system. Grant (1991) claims that they should be incorporated in to the category of tangible resources, however, for the easy use of this business model framework, we will handle the financials as a fourth category of resources. Thus, based on the definitions by Johnson et al. (2008) and Grant (1991) the following definition of *resources* is used:

Resources: Key inputs that are needed in terms of tangible, intangible, human and financial assets to deliver the offering.

The sub-component *processes* explains the configuration of activities that enables value creation and its delivery (Osterwalder, 2004), including both managerial and operational

activities (Johnson et al., 2008). Johnson et al. (2008) also add that processes incorporate the rules, metrics and norms of a company.

When defining the key processes in a company, one can use the value chain theory created by Porter (1985). The value chain is built up on the sequential activities a company needs to perform in order to deliver an offering, the main activities being; inbound logistics, operations, outbound logistics, marketing and sales, and service (Porter, 1985). In addition to this, Stabell and Fjeldstad (1998) argue that the processes for value creation in a service company differ from the processes within manufacturing. While manufacturing companies reproduce the same solution to nearly all customers, service companies have a higher level of personalization, thus emphasizing individual problem solving. Hence, the scholars argue that the main activities of a service provider are; problem-finding and acquisition, problem solving, choice, execution, control and evaluation (Stabell & Fjeldstad, 1998). Consequently, as employees are generally the key resources of a service company, the key processes are generally related to them concerning activities such as training and development (Johnson et al., 2008). Compared to a manufacturer, the key resources can be a strong brand or product patents, thus the key processes might be brand-building activities or research and development (Johnson et al., 2008).

Johnson et al. (2004) argue that it is only the most vital processes that should be defined in a company's business model. Hence, in our business model framework, the sub-component *processes* focuses on a company's primary activities, and based on the works of both Osterwalder (2004) and Johnson et al. (2008) the following definition is used:

Processes: The configuration of key activities that enables value creation and delivery of the offering.

Business interaction

In order for a company to create and deliver value, it might need to collaborate with other actors in the industry or society (Osterwalder, 2004; Sommer, 2012). Hummel, Slowinski, Mathews and Gilmont (2010) argue that it is of great importance for a company to understand not only its own business model but also its partners' and suppliers', since they can have an impact on the company's success. Sommer (2012) further claims that a business model should not solely focus on the internal organizational aspects but also include external interaction. Consequently, the last head-component of our business model framework is named *business interaction*.

Both Osterwalder (2004) and Johnson et al. (2008) incorporate business interaction in terms of partnerships in their business model frameworks. What kind of partnership employed depends on what interaction the company requires in order to create and deliver value to its customers (Osterwalder, 2004), thus the head-component *business interaction* will only have one sub-component in our framework; 1) *partnerships*. Based on the definition by Osterwalder (2004), the following definition is used:

Partnership: A voluntary cooperative agreement between the company and an external actor promoting the value creation in the company.

The partner network of a company explains what activities and what resources that are spread among the company's partners, and which are made in-house (Osterwalder, 2004). The relationship between what to do in-house or through the market is often explained by transaction cost economics (Coase, 1937; Williamson, 1979). The theory describes how financial decisions about activities or resources cannot solely be based on the production cost of the product or service, but the company also needs to compare it to the transaction cost if choosing to buy the product or service through the market. Hence, the theory implies that partnerships with other external actors will enable the ones involved to focus on their core competences (Coase, 1937; Williamson, 1979). The resource based view adds that partnerships contribute to making resources that the company does not possess available (Barney, 1991). Osterwalder (2004) concludes the reasoning by claiming that a company's motivation for engaging in partnerships can be divided into one of the three categories; 1) optimization of operations, for example through outsourcing activities, sharing infrastructure, profiting from partners knowledge or economies of scale, 2) reduction of risk and uncertainty, for example through cost sharing, or 3) acquisition of resources, for example the establishment of supplier relationships.

Contextual dimension

We believe it is reasonable to think that it is more than the company's active decisions that affect the content of the business model components. Consequently we add a *contextual dimension* to our business model framework including aspects that can influence the components and their interactions. These aspects are present in the company's external environment hence they will pursue influence no matter internal decisions. The following aspects are the ones we most frequently have come across when studying business model research (e.g. Mitchell, Agle & Wood, 1997; Osterwalder, 2004; Porter, 1991; Sommer, 2012; Umbeck, 2009), thus other aspect might exist.

The first aspect is the *political and economical environment* in which the company operates. Porter (1991) claims that governments play a vital role in shaping the business environment of a country. For example, a government's regulation of or investment in competition policies, factor markets, or support functions of the industry, may either promote or hinder a company's possibilities to value creation. Concerning the economy of a country, a boom or recession in the economy affects the level of business activities among the countries' firms, and consequently how the individual company conducts its business (Mokhova & Zinecker, 2014).

The second aspect is the *stakeholders* of a company. Stakeholders have a more distant role concerning the company's value creation and profit generation, however their opinions might have sufficient impact on a company's possibility to succeed (Mitchell et al., 1997; Osterwalder, 2004). For example, stakeholders such as media or other interest groups can influence what view potential customers or partners have of the company. Thus, they also put

pressure on companies to work in a specific manner in order to gain positive recognition (Mitchell et al., 1997).

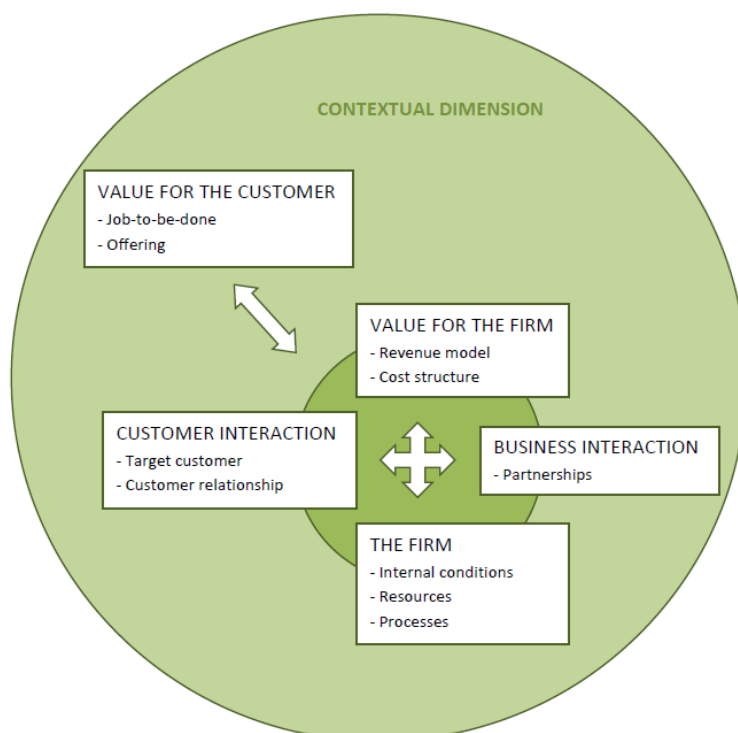
The last aspect concerns the *competitive elements* of the industry. One scholar that does consider elements such as competition barriers, inimitability, and uniqueness, is Umbeck (2009). Even though these elements may be important to a company's success, they can also be considered strategic outputs of the configuration of business model components (Sommer, 2012). Thus the competitive elements of the industry are something that a company needs to respond to in order to do business (Sommer, 2012).

Concluding the discussion about external influences, we are in our business model framework adding a *contextual dimension* to ease the understanding of what have influenced the content of individual components, influences that are not an active choice by the company. This dimension will include *potential impact by for example the political and economical environment, stakeholders, and competitive elements of the industry.*

Conclusion of the business model framework used in this study

Our business model framework contains of the five interrelated head-components; *value for the customer, value for the firm, customer interaction, the firm, and business interaction*, and their respective sub-components (see figure 4).

Figure 4: The business model framework used in this study.



The model aims at illustrating a very complex phenomenon, hence the power of the model lies in the interdependencies of its components. Fundamental changes to any of the five components affect the others and thus the value created. This is in line with the business model developed by Johnson et al. (2008). Johnson et al. (2008) further argue that a

successful business model has a relatively stable system of how these components relate to one another, both consistently and complementarily. This is also applicable in our model.

The *value for the customer* component is, as argued by Johnson et al. (2008), the most important component. This, since all other components need to encompass it on a very fundamental level. Thus, all kinds of content within the other components need to be based on the *value for the customer* component.

All five components are surrounded by a *contextual dimension*, including elements that can influence the content of individual components without it being an active choice by the company.

Below follows a summary that describes each of the components in our business model framework (see *table 3*).

Table 3: Descriptions of the business model components used in this study.

Component	Sub-component	Description
Value for the customer	Job-to-be-done	The problem the company solves or the need it answers to.
	Offering	The product or service that solves the problem or answers to the need.
Value for the firm	Revenue model	How the company translates the value it offers to its customers into revenue streams, and how the price of its offering is determined.
	Cost structure	The equivalent value in money of all the means employed by the company in order to offer value to its customers, and how these means are allocated.
Customer interaction	Target customer	The customer segment that the company wants to address.
	Customer relationship	The link the company establishes with its target customer, including all kinds of communication.
The firm	Internal conditions	The prerequisite that determines how work is conducted, such as organizational structure and company culture.
	Resources	Key inputs that are needed in terms of tangible, intangible, human and financial assets to deliver the offering.
	Processes	The configuration of key activities that enables value creation and delivery of the offering.
Business interaction	Partnerships	A voluntary cooperative agreement between the company and an external actor promoting the value creation in the company.
Contextual dimension		Potential impact by e.g. the political and economical environment, stakeholders, and competitive elements of the industry.

2.2. SUSTAINABLE DEVELOPMENT AND ARCHITECTURE FIRMS

2.2.1. The business model of an architecture firm offering sustainable construction

There are few frameworks of what characterizes a business model in a firm that provides sustainable products, services or innovation (Bocken et al., 2014). There are even less research concerning architecture firms. This implies that interpretation regarding the construction industry in general has been needed in order to identify the characteristics of a business model in an architecture firm that offers sustainable solutions. This has been done with guidance from the business model framework used in this study (see *chapter 2.1.3.*).

Value for the customer

Some scholars argue that it is the customers that are pushing architects towards offering sustainable construction since they have a desire to control their impact on sustainable development (Bossink, 2002; Mokhlesian & Holmén, 2012; Revell & Blackburn, 2007). Thus the *job-to-be-done* is not only involving the need for a physical building, but also the concern for a sustainable future. One common example of a job-to-be-done that concerns sustainability aspects is to decrease maintenance and operation costs through working with material selection and energy efficiency (Bossink, 2002, Mokhlesian & Holmén, 2012). However, Revell and Blackburn (2007) argue that customers are not interested in sustainable construction even if it implies cost savings in the long run since it also requires high initial investments. Similarly, Sayce, Ellison and Parnell (2007) argue that the value for an investor is too low since a sustainable building does not result in them being able to charge higher prices to their clients.

When providing a sustainable solution the *offering* does not necessarily have to represent a specific product or service (Boons & Lüdeke-Freund, 2013; Boons, Montalvo, Quist & Wagner, 2013). This is in line with Mokhlesian and Holmén's (2012) argument that part of the customer value of a sustainable construction is created in the processes underlying the actual building. This involves transforming the whole life cycle of constructions towards being more sustainable (Kibert et al., 2000; Mokhlesian & Holmen, 2012). Examples of aspects to incorporate are material selection, energy efficiency, waste management, and design for flexibility (Ngowi, 2001). Performing a life cycle analysis is one way of making sure that as many of these aspects as possible are concerned (Sterner, 2002). Furthermore, it is common that the offering incorporates different assessment tools for estimation of a building's performance, resulting in certification of the construction (Mokhlesian & Holmén, 2012). Two of the most well known tools are BREEAM⁴ and LEED⁵ (Mokhlesian & Holmén, 2012; Vijayan & Kumar, 2005).

⁴ Short for *Building Research Establishment Environmental Assessment Method*. BREEAM is an assessment tool used for estimation of lifecycle costs of a building. Emphasize is on environmental aspects while aspects such as management and construction methods are less focused (Mokhlesian & Holmén, 2012; Vijayan & Kumar, 2005).

⁵ Short for *Leadership in Energy and Environmental Design*. LEED is an assessment tool used for estimating technical information on site, focusing on the day-to-day environmental performance (Mokhlesian & Holmén, 2012; Vijayan & Kumar, 2005).

Value for the firm

Mokhlesian and Holmén (2012) claim that it is difficult to achieve higher *revenue* when working with sustainable constructions. However, concerning the culture of an architecture firm, Styhre and Gluck (2009) found that there is a mentality towards having to report and charge every hour of work. Consequently, as sustainable constructions are argued to imply more hours it will also imply higher revenue. Furthermore, Bocken et al. (2014) discuss two possible ways the revenue model of a company that offers sustainable solutions can be designed. Firstly, a firm can brand the sustainable solution as a premium high quality solution. This results in a revenue model emphasizing high price, quality, and a niche market segment. Secondly, a firm can make the sustainable solution affordable for a larger amount of customers, thus increasing the market segment. This is in line with other scholars arguing that customers' willingness to pay for sustainable buildings is low (Revell & Blackburn, 2007).

To offer sustainable solutions often requires a company to enhance their offerings. Concerning the *cost structure* of the firm, this can imply investments in additional resources and processes, thus resulting in an insecure income for the company before properly implemented (Boons & Lüdeke-Freund, 2013; Girotra & Netessine, 2013). However, after initial investments the difference in costs between designing a sustainable building and a non-sustainable building is often less than argued (Mokhlesian & Holmén, 2012). Consequently, Haanaes, Michael, Jurgens and Rangan (2013) claim that businesses need to think beyond short-term costs and revenues, and consider investments generating profits in the long run.

Customer interaction

The *target customer* in the construction industry is not always easy to determine (Mokhlesian & Holmén, 2012; Ofori, 2000). First and foremost, the customer can be argued to be the one ordering the solution, often a construction company or a real estate company, but considering the long lifetime of buildings there are several more customers to consider (Mokhlesian & Holmén, 2012; Ofori, 2000). Looking beyond the initial customer and focusing on the end user, scholars have identified three different kinds of customers; public clients, private corporate customers, and individuals (Mokhlesian & Holmén, 2012; Ofori, 2000). Moreover, one can separate between those customers who are conscious about sustainable development and those being motivated by a decrease in maintenance and operation costs (Bossink, 2002, 2011; Mokhlesian & Holmén, 2012).

Regarding *customer relationships*, Mokhlesian and Holmén (2012) argue that there is no huge difference between how a company interacts with customers demanding sustainable solutions compared to non-sustainable. However, Bocken et al. (2014) claim that when a company decides to deliver sustainable solutions, a close customer contact is wished for in order to better understand the customer's needs. Furthermore, creation of a close relationship can enhance the degree of responsibility the customer is willing to take (Boons & Lüdeke-Freund, 2013). Reasons for customers not demanding sustainable constructions can be explained by lack of knowledge and thus difficulties in formulating explicit preferences (Mokhlesian & Holmén, 2012). Clear communication and education about sustainable solutions is suggested in order to affect the customer's behavior (Stubbs & Cocklin, 2008). Furthermore, scholars

argue that there is a need for more systems making it possible for the customer to assess and compare different offerings (Sterner, 2002). This, since customers often value an offer with regard to its price (Mokhlesian & Holmén, 2012).

To notice, no research is found concerning how customer relationships evolve during the customer lifecycle.

The firm

Regarding *organizational structure*, the work of architecture firms is project based which includes limited timeframes and close interaction and coordination with other professions (Andreu & Oreszczyn, 2004; Styhre & Gluck, 2009) The general architecture firm is characterized by informal relationships, where coordination and control is practiced through personal contact between the employees (Ankrah & Langford, 2005). The power distribution is quite decentralized encouraging the individual architect to be part of decision-making. Tasks are often distributed depending on the knowledge of individual employees due to most projects being tailored, involving a lower possibility to standardize solutions (Ankrah & Langford, 2005). Moreover, scholars discuss work in the construction industry as being reactive and slow in adapting to new circumstances (Kibert et al., 2000; Mokhlesian & Holmén, 2012).

Concerning *company culture*, Cohen, Wilkinson, Arnold and Finn (2005) argue that architects perceive themselves to have three duties which involves; creativity, delivering high quality environments for the general public, and to coordinate processes and financial aspects. Thus, the architect is both being an artist, a public servant, and a business person. In addition to this, Styhre & Gluck (2009) argue that even though being aware of strict costs requirements within the construction industry, architects are generally trying to protect aesthetic qualities. Moreover, it seems to be a difference between newly graduated architects and those with more experience, where the former are being more optimistic about creative solutions, and the later more realistic (Styhre & Gluck, 2009). In addition to this, experience is highly valued and often used for convincing clients about quality aspects (Styhre & Gluck, 2009).

No findings have been made regarding architecture firms management of culture and efforts to shape their corporate culture.

Companies need to rearrange *resources* and processes in order to grasp the opportunities of offering sustainable solutions since sustainable solutions often require competencies beyond what the firm initially possess (Ketata et al., 2015; Shrivastava, 1995). One example of an intangible resource that may be vital for a company that offers sustainable solutions is a brand that is associated with sustainability (Stubbs & Cocklin, 2008). According to Stubbs and Cocklin (2008) a firm that wants to be in the forefront working with sustainable solutions needs to profile itself differently if not having a sustainability profile from start. Furthermore, before sustainability is being an integral part of the architecture firm, a visionary person is a useful human resource for convincing others of the importance of sustainability thinking (Stubbs & Cocklin, 2008). Another human resource that is needed in order for an architecture firm to successfully offer their customers sustainable constructions is knowledge about how to

design in a sustainable manner (Altomonte et al., 2014). However, the required knowledge has been hard to define in detail (Styhre & Gluck, 2009).

Although our business model framework also contains of tangible and financial resources, we have not found any theoretical evidence for such resources being important for an architecture firm working with sustainable construction.

One key *process* when working with sustainability is to increase the awareness and educate employees about sustainability in constructions (Cranz, Lindsay, Morhayim & Lin, 2014). Another important process is to bring sustainability thinking into the projects early on. This idea is supported by Ngowi (2001) arguing that most of the decisions about sustainability aspects in construction needs to be taken early in the design phase. In addition to this, it also becomes important to specify sustainability aspects in the building contract. When contracting, the sustainability aspects must be stated in such a way so that they cannot be scoped out later in the building process (Varnäs, Balfors & Faith-Ell, 2009).

In order to deliver a sustainable building to customers, the value for the customer is dependent on how the whole supply chain of actors performs together. Thus collaboration is a vital activity for being able to deliver a sustainable solution (Gann & Salter, 2000; Mokhlesian & Holmén, 2012). As part of collaboration the alignment of goals becomes important (Girotra & Netessine, 2013). This is something many see as quite hard to achieve since it often exists differences in knowledge, motivation and aspiration level among different actors (Bossink, 2007; Chong, Kumar, Haas, Beheiry, Coplen & Oey, 2009). Lack of knowledge about each other's work and expertise may be another barrier to effective collaboration (Bossink, 2007). Altomonte et al. (2014) argue that the different actors need to enhance their exchange of knowledge with each other to overcome this problem.

Business interaction

Styhre and Gluck (2009) found that architects recognize their capacity to influence as relatively small due to being a small actor among many others. Moreover, Rudawska et al. (2013) claim that close relationships with a variety of actors will be vital for the realization of sustainability strategies no matter industry. Examples of actors to engage in *partnerships* include suppliers, other businesses, and non-governmental organizations (Rudawska et al., 2013; UN, 2014). Furthermore, Stubbs and Cocklin (2008) argue that a stakeholder view should be adopted. The scholars further emphasizes on partnering with actors who share the goals of social and environmental improvements (Stubbs & Cocklin, 2008). Because of the need for collaboration, and because of the interdependencies among the actors in the construction industry, partnering entails creating a business model that will be hard for others to copy (Haanaes et al., 2013).

Furthermore, one way to handle the need for specific resources is through sharing resources among the firm and its partners (Stubbs & Cocklin, 2008). The research of Bossink (2007) shows that firms working with sustainability often trace, identify and develop knowledge by concentrating on acquiring knowledge and capabilities from others through cooperation. Accordingly, learning from peers and networking are discussed as effective means of gaining

knowledge (Chong et al., 2009; Mokhlesian & Holmén, 2012). However, knowledge about sustainability is today quite fragmented and spread among a variety of different actors within the construction industry (Chong et al., 2009).

Contextual dimension

In business model research, contextual aspects such as the political and economical environment, stakeholders, and competitive elements of the industry, can influence business model components. However, as these aspects differ depending on the individual company or individual country, there is no value of elaborating on the contextual dimension from a theoretical perspective. Consequently, we leave this to the empirical study.

2.3. BUSINESS MODEL TRANSFORMATION

2.3.1. The need for a transformational dimension in this study

Architecture firms that choose to incorporate sustainability through the offensive approach - offering sustainable construction - may also have to do changes in their existing business models (Chesbrough & Rosenbloom, 2002; Mokhlesian & Holmén, 2012). As our study aims to increase the understanding of how a business model needs to adapt, the study includes a transformational dimension. Consequently, knowledge about business model transformation will be of value for the purpose of this study.

2.3.2. The concept of business model transformation

Business models have most often been studied at a certain point in time (Hedman & Kalling, 2003; Osterwalder, Pigneur & Tucci 2005), thus the link between business models and time is little talked about in business model research (Johnson et al., 2008; Osterwalder et al., 2005; Sommer, 2012). However, scholars who have incorporated a longitudinal dimension in their research are for example Porter (1991), Linder and Cantrell (2000), Hedman and Kalling (2003), Osterwalder et al. (2005), Johnson et al. (2008), Sommer (2012), and Bocken et al. (2014).

In an attempt to gain understanding of what can be considered a business model transformation, most scholars explain business model transformation in relation to the degree of change that is required (Linder & Cantrell, 2000; Sommer, 2012). The scholars argue that a business model transformation needs to change the core logic of doing business, thus only doing incremental changes is not considered as transformation of the business model. Instead, Sommer (2012) claims that at least one of the business model components need to be changed considerably, thus value will be created in a fundamentally different way than before.

2.3.3. How to transform

Johnson et al. (2008) argue that the development of a new business model should always be based on how the company can create value for the customer. Consequently, all business model transformations should start with the identified job-to-be-done in mind, and only then

can the content of other business model components be determined (Johnson et al., 2008). However, Osterwalder et al. (2005) claim that no matter the content of the business model, it will accomplish nothing if it is not implemented in the company's operations. The scholars further state that a business model cannot be successful in itself. Thus a sound business model can be implemented and executed badly, just as an unsound business model may perform well because of strong execution. Consequently, the importance of implementation and execution is vital, thus business model transformation also relate to theory about organizational change (Sommer, 2012).

Osterwalder et al. (2005) describe a business model transformation process in terms of three phases; plan, change and implement. In the planning phase, it is not just important to decide what change to do, but also to think about the political and cultural aspects of the company when doing so. Thus, to involve all people that can affect or is affected by the change in order to convince them and thus reduce potential resistance (Lewin, 1951; Alvesson & Sveningsson, 2012; Sommer, 2012). This does not only apply to the employees of the company, other stakeholder should also be included as they might have the power, legitimacy and urgency to claim their interest (Mitchell et al. 1997). Furthermore, the changing phase includes all activities needed in order to realize the change that is planned for (Lewin, 1951; Alvesson & Sveningsson, 2012). This implies translating the new business model into concrete operations, hence understanding of both the current business model, the new business model, and the change process it requires becomes vital for a transformation process (Osterwalder, 2004; Osterwalder et al., 2005; Johnson et al., 2008; Sommer, 2012). Last, the implementation phase includes activities that help create a stable organization after the activities needed in order to realize the change have been executed in the previous phase (Lewin, 1951; Alvesson & Sveningsson, 2012). Johnson et al. (2008) highlight the importance of patience in a business model transformation process. Their research shows that most companies revise their model more than once in their aim for profitability. Thus learning and adjusting is argued to be just as important to focus on as execution.

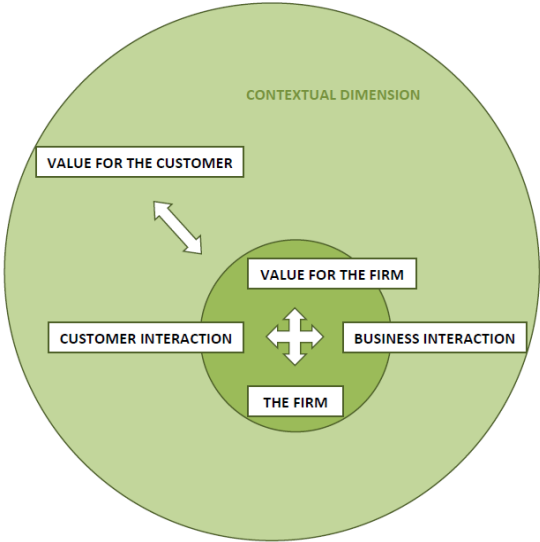
One aspect that has been argued to influence the implementation and execution of a new business model is a company's path dependency (de Reuver, Bouwman & Haaker, 2013). Prahalad and Bettis (1986) claim that there in all companies exists a dominant logic which can be viewed as the cognitive schemas that the company has developed through experience, and of which all decisions are based on. Porter (1991) adds that because of these schemas, it exists causality between all the decisions made in the past, and the opportunities the company will face in the future. Thus the decisions the company will have to make are limited by the decisions it has made in the past, no matter whether the circumstances that were present in the past no longer are relevant (de Reuver et al., 2013).

2.4. PRELIMINARY THEORETICAL FRAMEWORK

Concluding our theoretical review, the following preliminary theoretical framework will provide the grounds for our empirical study. Through testing this framework empirically, we will try to identify what characterizes a business model in an architecture firm that actively works with sustainable construction. Thus we believe that we can increase the understanding of how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction.

Our preliminary theoretical framework is built on the business model framework used in this study (see *chapter 2.1.3.*). It consists of five interlocking business model components; *value for the customer*, *value for the firm*, *customer interaction*, *the firm*, and *business interaction*, and their respectively sub-components. The power of the model lies in the interdependencies of its components. Fundamental changes to any of the five components affect the others and thus the value created by the business model. The *value for the customer* component is the most fundamental component. This, since all the other components need to embrace the offering that the company provides in order for the company to also deliver on the offering. The components are in addition to relationships also surrounded by a *contextual dimension*, including elements that can influence the content of individual components without it being an active choice by the company (See *figure 5* for an illustration of the components relationship).

Figure 5: The business model framework used in this study (For complete figure, see *chapter 2.1.3.*).



The components description and what, according to theory, characterizes them in an architecture firm that offers sustainable construction will follow (see *table 4*).

Table 4: Preliminary theoretical framework incorporating the research domains; the offensive sustainability approach, business models, and architecture firms.

Component	Sub-component	Description	Characteristics of an architecture firm offering sustainable construction
Value for the customer	Job-to-be-done	The problem the company solves or the need it answers to.	<ul style="list-style-type: none"> - The customer's desire to control its impact on sustainable development. - The customer's desire to decrease maintenance and operation costs. - Low existence of job-to-be-done due to high initial investments and customer's short term perspective.
	Offering	The product or service that solves the problem or answers to the need.	<ul style="list-style-type: none"> - Not necessarily a product or service, customer value is also created in the building process. - The offer depends on which phase in a building's lifecycle the customer desires to control, e.g. material selection, energy efficiency, waste handling, design for flexibility. - Assessment tools for estimation of a buildings performance, closely linked to certification systems, e.g. BREEM, LEED.
Value for the firm	Revenue model	How the company translates the value it offers to its customers into revenue streams, and how the price of its offering is determined.	<ul style="list-style-type: none"> - Hard to gain higher revenue streams for sustainable construction. - Charge per hour, charge more hours. - Depending on company strategy, either selling sustainable construction as a premium solution i.e. high price x niche segment, or selling an affordable solution i.e. low price x high volume of customers not willing to pay more for sustainability aspects.
	Cost structure	The equivalent value in money of all the means employed by the company in order to offer value to its customers, and how these means are allocated.	<ul style="list-style-type: none"> - Implies additional investments in order to gain resources and processes needed. Thus, there is a need to think beyond short term costs. - Not that big cost difference in design work between a sustainable and non-sustainable project.

Customer interaction	Target customer	The customer segment that the company wants to address.	<ul style="list-style-type: none"> - Problematic for architects to identify since the target customer can either be viewed as the ordering client or the end user of the building. - Different kinds of customers include; public clients, private corporate clients, and individuals. - Characteristics identified; either the client is conscious about sustainable development, or the client is driven by economic aspects.
	Customer relationship	The link the company establishes with its target customer, including all kinds of communication.	<ul style="list-style-type: none"> - No huge differences compared to interaction with customers demanding non-sustainable construction. - Close relationship to customers is wished for in order to understand and influence the customer. - Influence the customer through communication and education.
The firm (part 1)	Internal conditions	The prerequisites that determine how work is conducted, such as organizational structure and company culture.	<p><i>Organizational structure:</i></p> <ul style="list-style-type: none"> - Project based business with limited time frames. - Close interaction with other actors. - Decentralized organization, characterized by informal relationships among employees. - Tasks distributed depending on individual knowledge. - No standardized procedures. - Slow in adapting to new circumstances. <p><i>Culture:</i></p> <ul style="list-style-type: none"> - Architects perceive themselves as being both an artist, a public servant, and a business person. - Newly graduated architects tend to be more optimistic about <u>creativity</u>, experienced architects tend to be more realistic. - Valuing experience within sustainable construction.

<p>The firm (part 2)</p>	<p>Resources</p>	<p>Key inputs that are needed in terms of tangible, intangible, human and financial assets to deliver the offering.</p>	<p><i>Key intangible resources:</i></p> <ul style="list-style-type: none"> - Brand associated with sustainability. <p><i>Key human resources:</i></p> <ul style="list-style-type: none"> - Visionary persons. - Employees and their knowledge about sustainability matters.
	<p>Processes</p>	<p>The configuration of key activities that enables value creation and delivery of the offering.</p>	<ul style="list-style-type: none"> - Increase awareness and educate employees. - Incorporate sustainability early on in the project, and specify aspects in the contract. - Collaborate with other actors in the building process. Importance of align goals and exchange knowledge.
	<p>Business interaction</p>	<p>Partnerships</p>	<p>A voluntary cooperative agreement between the company and an external actor promoting the value creation in the company.</p>
<p>Contextual dimension</p>		<p>Potential impact by e.g. the political and economical environment, stakeholders, and competitive elements of the industry.</p>	<ul style="list-style-type: none"> - Depending on company and country.

In addition to this, our preliminary theoretical framework incorporates a transformational dimension since architecture firms that choose to incorporate sustainability through the offensive approach - offering sustainable construction - might have to do changes in their existing business models. Business model transformation should be based on the identified job-to-be-done before the content of other business model components are determined. However, no matter the content of the business model, it will accomplish nothing if it is not implemented in the company's operations. Consequently, business model transformation goes through three phases; plan, change, and implement, where influence of the people involved and the level of path dependency are two important aspects to manage.

3. METHODOLOGY

3.1. RESEARCH APPROACH

The purpose of this study is to increase the understanding of how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction. This by identifying what characterizes a business model in an architecture firm that actively works with sustainable construction and when relevant describing the transformation process for achieving that. The starting point for the study was to review existing theory within the domains of *the offensive sustainability approach*, *business models*, and *architecture firms*. Thereafter we conducted a pilot study to investigate whether the topics that we had identified were relevant to study and whether there was an interest for this within the industry. Concluding in a positive response we continued with our theoretical study. This phase was deductive and resulted in a preliminary theoretical framework. Lastly, a multiple case study was conducted with the purpose to generate data to develop the preliminary theoretical framework. Although the empirical findings were influenced by the preliminary framework more than in truly inductive studies, for example as in grounded theory (Glaser & Strauss, 1967), these steps of the working process were mainly inductive. Lastly, we analyzed the collected data and came up with a final framework using a pattern matching approach (Yin, 2014). Since sensitizing categories rather than static categories were used (Alvesson & Sköldbberg, 2008; Glaser & Strauss, 1967; Yin, 2014) we structured the final framework on other themes than the preliminary theoretical framework. The study can be argued to be a semi-deductive study, having both deductive and inductive characteristics (Stein, 1993), resulting in strengthening the preliminary theoretical framework, but also modification and advancement of the preliminary framework. The chosen approach is in line with Yin's (2014) suggestion that in order to develop the understanding and knowledge, which is the purpose of this study, a deep understanding of existing theory is vital.

3.2. RESEARCH DESIGN

3.2.1. Theoretical study

The reason for investigating the theoretical domains of *the offensive sustainability approach*, *business models*, and *architecture firms* and for creating a preliminary theoretical framework was closely connected to the purpose of the study (see argumentation in *chapter 1*). The aim of the study suggests that a close investigation, description and categorization of the existing theories was needed. The theoretical domains of *the offensive sustainability approach*, *business models*, and *architecture firms* have received great attention separately, but there are few findings where all three theoretical areas are studied together (Magretta, 2002; Mokhlesian & Holmén, 2012; Teece, 2010). Worth mentioning is that existing theory within the fields indicates that there are certain key aspects that need to change within a company when it decides to offer sustainable solutions to its customers (Chesbrough & Rosenbloom, 2002). Our theoretical study has contributed to the purpose of the study through assisting us in

investigating and integrating the knowledge of the theoretical domains into a more holistic picture, resulting in a preliminary theoretical framework. With assistance from this framework we were able to identify the characteristics of a business model in an architecture firm that offers sustainable architecture and what is needed in order to transform to such business model. Regarding the design of our theoretical study, we have actively and analytically chosen what literature to include and we have thus consciously biased the content of the study to match the purpose of the study. This has made it possible for us to describe theory in depth rather than focusing on a too broad theoretical field.

3.2.2. Case study

The purpose of our empirical study was to collect data that related to the preliminary theoretical framework. The object we wanted to study was the architecture industry. More specifically we wanted to identify the characteristics of a business model in an architecture firm that actively works with sustainable construction (argumentation can be seen in *chapter 1*). Both the business model concept and sustainability are difficult to define, thus it can imply many different interpretation. Furthermore, it is difficult to measure the performance of sustainability activities due to different interpretations and perceptions. In order to grasp this complexity, a case study design was chosen. The main reason for choosing a case study design was the study's complex and multi-aspect nature (Larsson, 1993). Case studies can scrutinize a whole system and can clarify unique characteristics (Bryman & Bell, 2013). It is appropriate when different interrelations and patterns are wanted (Yin, 2014). Through the use of a case study design the respondents can be interviewed in their natural environment and the study can grasp the complexity of a real phenomenon (Yin, 2014; Bryman & Bell, 2013), in our case the business model of an architecture firm offering sustainable solutions. This research design allowed us to use an interpretative approach, which involves paying attention to the experiences of people working within organizations (Bryman & Bell, 2013). We believe that changes in the offering require changes in other business model components. We believe that this is something that is created in interaction between individuals, continuously changing, in line with Bryman and Bell's (2013) discussion about constructionism. Furthermore, a case study is appropriate when the purpose is to generate theory and enhance the existing understanding of something constantly changing and when one wants to strengthen and deepen the existing knowledge within a field that is relatively unexplored (Jack & Kholief, 2007), being the case in our study. Thus sensitizing categories rather than static categories were used (Alvesson & Sköldberg, 2008; Glaser & Strauss, 1967; Yin, 2014). These categories worked as guidelines rather than operationalized and measurable concepts (Alvesson & Sköldberg, 2008).

Criticism against case studies as research design is often directed towards the ability to generalize the findings and the quality of the results (Bryman & Bell, 2013; Jacobsen, 2002). Worth mentioning, is that there is a difference between statistic generalizability and analytical generalizability (Yin, 2014). What we are aiming for is analytical generalizability towards existing theory, focusing on multiple aspects rather than frequency of observations (Yin, 2014). With the use of individual observations, we have been able to interpret theories, but also develop, refine and strengthen existing theory.

3.2.3. Case selection

The main criteria when selecting which case or cases to include was the likelihood of finding empirical data supporting the purpose of the study. Some may argue that the generic architecture firm is most representative to study, but we claim that there are variations in the content of the business models of those firms that have actively decided to offer sustainable solutions and those who have not. Thus, we argue that those firms that are in the forefront when it comes to sustainability provide a greater opportunity for identifying what characterizes a business model in an architecture firm that offers sustainable solutions. We have made an assumption that these firm have made an active decision to offer their customers sustainable solutions even though we are aware of that many strategic decisions are results of inadvertent efforts, pure luck or changes in the environment within where a firm operates (Barney, 1986). Furthermore, we argue that selecting those firms that have actively decided to offer its customers sustainable solutions is beneficial for the purpose of our study. Since many architecture firms within the Nordic countries have distinguished themselves for working actively with sustainable solutions (Scandinavian architecture, 2015) it became natural to study firms that operate within these countries. Choosing to study architecture firms within these countries was also suitable because of relatively similar contextual circumstances, such as political and economical environments, customer demand, competitive elements and climate, thus making it easier for us to recognize differences and similarities between the different countries. One risk with this kind of sample is that the countries can be too similar, and thus one might not understand the contextual impact. Through adding a contextual dimension in our preliminary theoretical framework it is our intention to mitigate this risk.

It can be relevant to study more than one company since comparison can assist in development of theory (Bryman & Bell, 2013). One single case may not have provided us with enough contextually and idiosyncrasy for identifying key characteristics of business models of architecture firms offering sustainable solutions, thus we conducted a multiple case study. Through a multiple case study it became easier to determine what is specific for the individual firm and what is common for all firms. This often has a positive effect on the end result and development of theory (Bryman & Bell, 2013). When deciding how many cases to include it was a tradeoff between the number of cases and the ability to go in-depth (Kalling, 1999). Taking this and the scope of the preliminary theoretical framework into account we found that 10 cases were appropriate, thus resulting in studying 10 architecture firms. With this amount of cases we were able to take advantage of the benefits of doing a multiple case study without hampering the ability to go in-depth. In order to find architecture firms being in the forefront of offering sustainable solutions we did extensive research both using the internet, getting advice from architects, together with using the internet site from the network Green Planet Architects to find out which companies to contact. We got very positive response from most of the companies we contacted, and we early on got a feeling of that this was highly interesting for the companies to take part of. The firms being part of the multiple case study are; White architects, Kjellgren Kaminsky Architecture, Vandkunsten, Gottlieb

Paludan Architects, Architectopia, Ratio architects, PES-Architects, L architects, ARKÍS architects, and BASALT architects.

3.3. DATA COLLECTION

3.3.1. Qualitative data

The comprehensive scope of our preliminary framework made it difficult to convert to a questionnaire. Thus, we conducted an interview guide structured around different business models components in order to operationalize our preliminary theoretical framework (see *appendix 1*). This resulted in a large amount of mainly qualitative data, although some aspects being quantitative. The qualitative data was useful for gaining a deeper understanding of the key characteristics of a business model in an architecture firm that offers sustainable construction, in line with Bryman and Bell's (2013) arguing that qualitative data often aid in understanding the underlying logic in relation to the specific context from where the data is collected.

Interpretation, expression and words are some of the main characteristics of qualitative data (Bryman & Bell, 2013). Since the purpose of this study was to develop existing theories this approach was more suitable than quantifying and standardizing, which are typical characteristics of a quantitative data (Bryman & Bell, 2013). A large amount of quantitative data may have resulted in a static picture of reality, excluding people's different interpretations (Bryman & Bell, 2013), while qualitative data can incorporate the three characteristics meaning, context and process (Backman, 2008). Meaning involves how the individual, depending on its previous experiences, interprets the external environment. Context involves observing the person in its natural environment and process incorporates the passage of events from a qualitative perspective rather than focusing on results and products. This is something highly relevant to our study since we have been interviewing the respondents in their natural environment, where the contextual circumstances have been very important. Since the research focus has been on companies that actively work with offering their customers sustainable solutions, the passage of events resulting in transformation of a company's business model becomes highly relevant. In contrast a quantitative research design may have provided a more objective view, but it would have been difficult to capture important aspects and the complexity existing (Larsson, 1993). Moreover, predefined answers are often needed in order to collect quantitative data (Bryman & Bell, 2013). Since we wanted the respondents to give us the answers rather than us telling them predefined answers to choose between, qualitative data became more relevant.

3.3.2. Semi-structured interviews

In both the pilot study and the multiple case study we have conducted semi-structured interviews as we evaluated this as the best method for collecting empirical data given the purpose of our study. The purpose of these kinds of in-depth interviews is to get a deep understanding of a phenomenon, through the help from the respondents' personal experiences

(Alvesson, 2011). Semi-structured interviews are built up on specific topics and involve a relatively open dialogue (Alvesson, 2011). It is a flexible approach that allows follow-up questions, specific examples, reflection and the possibility to adapt the interview depending on context and the respondent (Bryman & Bell, 2013). Moreover, one can benefit from that similar data can be collected from different respondents enabling comparison, which would not have been possible with unstructured interviews (Bryman & Bell, 2013).

Interview procedure

Before holding any interviews we created an interview guide with questions related to different topics. The interview guide is based on our preliminary theoretical framework and the topics thus consist of the different components being part of our preliminary theoretical framework (see *chapter 2.4.*). The use of topics is in line with Alvesson (2011) and Bryman and Bell (2013). The purpose was not to ask each question, but to use as inspiration depending on how the interview evolved. All interviews started with some open questions, letting the respondent speak freely, followed by some more specific questions in order to get the respondents to elaborate further. The interview guide assisted us in making sure that all our topics were covered, something being important for comparison between the different interviews. All the interviews were held at the interviewee's offices, thus in its natural work environment. Each interview lasted between 1 and 1,5 hour. We recorded the interviews, being in line with Silverman (2013) who argue that recording is necessary so that one can go back and listen afterwards. Although being a time consuming procedure we decided to transcribe all the interviews. This made it possible to capture valuable information and reasoning that otherwise could have been lost, something that often strengthens the trustworthiness of empirical findings (Bryman & Bell, 2013). We transcribed continuously instead of waiting until all interviews were finished, which made it possible to detect interesting patterns and details that we could follow-up on in other interviews. One drawback with transcription is that it results in a large amount of information to process (Bryman & Bell, 2013). Consequently it becomes vital to organize the collected data properly in order to facilitate and prepare for analysis of the material (Backman, 2008) (this is discussed further in *chapter 3.4.*). When necessary, we have had the opportunity to go back and ask follow-up questions in retrospect, which we did in some few occasions. Then we contacted the respondents through email, and got written responses back.

3.3.3. Selection of respondents

When conducting a pilot study, one should choose the specific cases to study independently of the sample in the case study (Yin, 2014). A pilot study aims at facilitating development and refinement of the initial plan for collecting data, and thus suitable respondents being able to contribute with valuable information can be handpicked (Yin, 2014). The purpose of doing the pilot study was to investigate whether the topics that we had identified were relevant to study and whether there was an interest for this within the architecture industry. We thus aimed for different respondents being able to give us an indication of this. Consequently, the pilot study included persons with different positions and backgrounds including both architects, professors within architecture and the city architect of Gothenburg (see *appendix 2*).

When choosing whom to interview in a case study, it is important to consider that different persons can contribute with different perspectives (Yin, 2014). This is a critical part of the research process (Jacobsen, 2002). When choosing the interviewees we explicitly asked for a minimum of two persons per company with different positions within the organization since we wanted to create a true and fair picture of the different cases. The reason for this was that we believed that different persons could contribute with different perspectives, together providing a comprehensive picture of the firm's business model. The respondents' positions consist of a mix of architects, CEOs, partners, sustainability experts and business developers (see *appendix 3*). At those companies where we got access to people that have great insight into the sustainability work and business development work at their firm a lower number of respondents were needed, and in other cases more respondents were required to give a full picture of a company's business model. However, we believe that the number of companies were more important than the number of respondents since many respondents at the same company could only provide us with answers concerning one business model. As discussed earlier (see *chapter 3.2.3.*), we believe that comparison is valuable for determining what is unique for one single business model and what all business models have in common. The respondents were chosen through help from our contact persons at each of the architecture firms. This can be argued to give the study a subjective character (Bryman & Bell, 2013). However, we believe that we have been able to grasp different perspectives resulting in valuable data, being an advantage with this kind of sample.

One important consideration when collecting data is when to stop collecting. Glaser and Strauss (1967) describe this dilemma as that one should stop collecting data when reaching the point of theoretical saturation. This means that the marginal utility of doing one more interview is either zero or too low. At a number of interviews of 18 we started to reach theoretical saturation, but we continued and held 23 interviews in total in order to be totally sure of that we had grasped all the important aspects.

3.4. METHOD FOR PRESENTATION OF EMPIRICAL FINDINGS

When performing the interviews our preliminary framework assisted as an effective tool for capturing valuable aspects. The framework's comprehensive character enabled multiple aspects and complex phenomenon to be captured. However, we soon learned that the framework was better suited for gathering empirical data, than for structuring our findings. The comprehensive preliminary theoretical framework complicated rather than facilitated for analysis of our findings. Moreover, we found that there was even closer interaction between the different sub-components than expected, making it unnecessary difficult to separate the findings into sub-components. As we have used sensitizing categories the plan has always been to structure the empirical findings and analysis in a way that gives the findings depth and relevance since it is the content rather than the labels that is important. Hence, reorganization of our framework avoided repetition of findings and having to disassemble discussions. With this said, we found it natural to restructure our empirical findings into four different levels of analysis which explain what kind of relationship that exists between the findings and the

companies. The levels are; *market level, organizational level, industry level* and *society level*. The four levels contain all findings gathered with the help from the preliminary theoretical framework only organized differently.

3.5. METHOD FOR ANALYSIS

The analysis of our empirical findings aimed at detecting patterns related to our preliminary theoretical framework, and thereby fulfilling the purpose of our study. This is what Yin (2014) discusses as pattern matching. Similarly, Alvesson and Sköldbberg (2008) discuss that theory can assist as inspiration in the process of analyzing empirical material. We tried to be aware of that the preliminary framework was not complete and that it was the purpose of the study that was suppose to drive the analysis. Through the use of sensitizing categories (Alvesson & Sköldbberg, 2008) we got a frame of reference without locking ourselves into definite concepts when analyzing, thus decreasing the risk of overlooking important findings. Furthermore, both similarities and dissimilarities between theory and practice have been emphasized. Through analysis of the empirical findings we could verify, reject and develop existing theory, resulting in a final framework.

We are aware of that the use of the components in our preliminary theoretical framework may have influenced us to have certain theoretical expectations. On the other hand, it has also helped us to look at perspectives being relevant, and not drifting away into areas irrelevant for the purpose of the study. Also it has facilitated similar analysis for all the cases, being important when performing a multiple case study (Yin, 2014). Our ambitions have all the time been to fulfill the purpose of the study, hence the purpose has naturally influenced both the theoretical, empirical and methodological considerations.

3.6. TRUSTWORTHINESS

It becomes vital to evaluate the quality of our study, but which evaluation criteria to use is disputed among different scholars (Bryman & Bell, 2013). Among those discussing this are Alvesson and Sköldbberg (2008), Bryman and Bell (2013), Lincoln and Guba (1985) and Silverman (2013). Some of these scholars argue that it is not correct to use validity and reliability as assessment criteria in qualitative studies because it puts too much emphasis on aspects not being of interest in qualitative studies, such as measurement (Bryman & Bell, 2013). Lincoln and Guba (1985) state that validity and reliability presuppose that there is one absolute truth describing reality, something they do not agree with. Instead, Lincoln and Guba emphasize the contextual circumstances and different interpretations. As the social context and different interpretations is of great importance in our study, we have chosen to evaluate our study in accordance with Lincoln and Guba's criteria trustworthiness.

Trustworthiness is divided into four sub-criteria consisting of credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985). *Credibility* is similar to what some scholars call internal validity, and concerns the reliability in the description of our empirical

findings, and whether others accept these descriptions. In order to strengthen the credibility of our study respondent validation and respondent crosschecking have been useful processes (Bryman & Bell, 2013). In cases where we wanted to clarify something we contacted the respondent again to get clarification and validate their answers. We also tried to investigate answers from previous respondents with other respondents when performing the interviews. This was possible due to the fact that we transcribed the interviews continuously, making it possible to summarize key findings and detect patterns and investigate those further. We made it clear to all respondents that they could not read the full manuscript before published, in line with that valuable information can be lost if the respondents may want to censure things afterwards (Bryman & Bell, 2013).

The second criteria is *transferability*, which can be compared to external validity (Bryman & Bell, 2013). Characteristics of a qualitative study is often closely linked to specific contextual circumstances, focusing on depth (Bryman & Bell, 2013). In order for a study to have high transferability, tick descriptions, meaning that the contextual circumstances are well described (Geertz, 1973), are important so as other persons have enough information to evaluate whether the study can be performed in other contextual circumstances (Bryman & Bell, 2013). In our study this is done through discussing the contextual dimensions of the architecture firms studied. Worth noting is that although the final theoretical framework is customized for the architecture industry, our business model framework is developed independently of industry, making it applicable to other industries.

The third criteria for trustworthiness is *dependability*, comparable to reliability. The dependability criteria is fulfilled through making sure that the research process is transparent with a complete description of the different stages (Bryman & Bell, 2013). We have tried to enhance the dependability through a careful description of our methodological considerations. Material, such as the interview guide and transcripts from interviews, are available for anyone to take part of. Also the fact that we have been part of the research project Sustainable Society⁶ may have had positive effect on the dependability, through getting others within the research team to review our work. This is in line with Lincoln and Guba (1985) and Bryman and Bell (2013) suggesting that per reviewing has a positive effect on a study's dependability.

Confirmability is the last criteria for trustworthiness, and this can be explained as objectivity (Bryman & Bell, 2013). There exists some kind of subjectivity in most studies (Bryman & Bell, 2013), and our study it is not a definite picture of reality. We are aware of this, and to enhance the confirmability of the study we have carefully assessed what sources to use and how information is interpreted, trying to not let our personal values appreciation affect the result of the study to the extent possible. All sources we have used are saved, making it possible for others to go back to the original source and confirm the objectivity of our study.

⁶ *Sustainable Society* is a research project at Lund University that aims to increase the understanding of the development of sustainable societies, including environmental, social and economical aspects. The assumption is made that a sustainable society will not emerge unless several different actors such as the governments, businesses, and individuals work together. Hence, research is conducted within many fields related to sustainable development (SuS, 2013).

4. EMPIRICAL STUDY

4.1. STRUCTURE OF EMPIRICAL FINDINGS

Our empirical findings are structured into four levels of analysis; market level, organizational level, industry level, and society level (see *chapter 3.4.*). The market level and the organizational level naturally represent a larger part of the findings since these levels incorporate a larger portion of aspects considered in a business model. It is important to note that we have consciously chosen to not separate the transformation element from the findings. Instead we have incorporated it when relevant. The findings about transformation are very intertwined with pure information about business model components and separating them would have meant a lot of repetition. Similarly, contextual dimensions are discussed were relevant.

4.2. MARKET LEVEL

The market level concerns all kinds of contact that the company has with its customers.

4.2.1. Customer perception

The overarching problem is articulated by respondents to be the need for a sustainable future. However, what this problem implies for the customer is more difficult to define. The respondents argue that the problem concerns a need for sustainability competence regarding constructions. This is in line with that the architects perceive themselves as service providers offering their customers knowledge.

“In many of the projects that are announced, environmental expertise and references are demanded.” *Sverre Svendsen, Ratio architects.*

“Whether it is knowledge written down, knowledge in an spreadsheet or knowledge on a drawing, we sell knowledge and I think that is why people come to us, because of the knowledge we have.” *Andrew Holt, Architectopia.*

However, sustainability competence regarding construction is a very broad need and scattered opinions about what the underlying need to be solved exists. We never got the opportunity to speak with any of the architecture firm’s clients, but from listening to how the architects perceived it we got the picture of that the customer not always knows what specifically to ask for. This confusion might have to do with the fact that the customers are generally the same ones as when delivering conventional architecture. It seems like the architecture firms have decided to provide the existing customers with a new offering before the customer has realized that it needs it.

Furthermore the respondents claim that the problem to solve differ depending on the individual customer and whom the customer is. In some cases the customer is the one that is going to use the building, and in other cases the customer is an intermediary. Public sector

clients and private sector clients including investors, private companies, property owners, and individuals are examples of whom the customer is. None of the architecture firms studied focus on one single kind of customer. Instead it depends on what projects that are requested. Moreover, after discussing the characteristics of the customers with the respondents it becomes clear that they have different time perspectives.

“Above all, I believe it is the time horizon they have. The public client has a longer horizon. A company that will build condominiums and just hope to sell them may have a shorter perspective because they will not own them in the future.” *Christer Fröberg, Kjellgren Kaminsky Architecture.*

The respondents claim that typical characteristics of customers with a short-term perspective are that they are more price sensitive and less conscious than those clients with a long-term perspective. The fact that customers with a long-term perspective see the effects of bad choices influences them towards concerning more about sustainability aspects than customers with a short-term perspective. Based on this discussion, we find that there is no clear defined target customer as the customer differs depending on whether it is the one that is going to use the building and whether it has a short or long-term perspective. Furthermore, as customers don't know what to demand within sustainability, the job-to-be-done has been defined by the architects themselves and is delivered to existing customers.

With these different customers in mind the respondents discussed five different problems to solve. Firstly, an architecture firm can help the customers with decreasing its costs. This is claimed to be achieved through for example designing a building that promotes low energy consumption. Secondly, an architecture firm can help their customers to increase the market value of their constructions. BREEAM and LEED certifications are discussed as means of doing so. The third problem to solve for the customer is the need for a building that gives them a profile as an actor concerning about sustainability. In relation to this type of customers sustainability was discussed as trendy. The fourth job-to-be-done is associated with that some clients want a design that supports wellbeing. One such example is a design that promotes people to take the stairs instead of the elevator, thus putting people in motion. Lastly, some customers need help to comply with building regulations concerning sustainability. Some respondents argue that regulations are forcing clients to demand sustainability competence from architects, while others are arguing that regulation is far behind the market, meaning that it is the market and not the regulation that is pushing this demand. They argue that regulations are too low, leading to customers only partially demanding sustainability to be part of the design. We have not been able to distinguish any clear differences between the different countries' regulations since there in some cases have been contradictory opinions between respondents working within the same country. This implies that the respondents may have evaluated this based on their own experience rather than objectively.

“There is a development regarding the environment and energy aspects of buildings being ahead of the regulations.” *Sverre Svendsen, Ratio architects (Norway).*

“It is moving and it's being pushed forward by regulation. Central to this are the building regulations.” *Andrew Holt, Architectopia (Norway).*

Based on above reasoning, we find that it is hard for the architecture firms to define one single job-to-be-done and consequently one single offering being valid for all projects. Furthermore, we find that building regulation in some occasions is having a controlling power of what is demanded.

The respondents expressed the demand as sometimes being low, more specifically this concerns the customers' willingness to pay for sustainable construction. Energy prices are claimed to be too low, resulting in lack of incentives to change behavior. Moreover, there is a gap between customers' knowledge and what architects can achieve within sustainable construction. In other words, the customer does not always know what to demand.

“The biggest thing is the customer's knowledge and demand. Planners and consultants are ready to make big changes quickly if the customer would ask for it.” *Daniela Grotenfelt, L architects.*

It is the common view that even though demand is still low, growth in demand has occurred during recent years. However, the respondents argue that the process is too slow. For example, it is only in the last couple of years that it has been possible to distinguish between those customers having a long-term and short-term perspective. Before focus has mainly been on reducing energy costs and customers have been very shortsighted, still being a fact in many cases. Climate reports and discussions in media are discussed as triggers. Furthermore the respondents claim that the fact that the public sector, in some occasions, started to demand sustainability competence was contributing to the growing demand.

“We see here in Norway that there is a reason for why everything started and why the products became so cheap also within sustainability. It is because the public took up the courage and said that they want this. They actually forced the market to readjust.” *Marta Eggertsen, Ratio architects.*

Another respondent is also discussing this, but in terms of that there is a lack of public interference.

“I would say that it is up to the state to be a role model, the state should turn around and say that we will make all of our buildings zero energy. I don't think it is down to regulation, I think it is down to providing an example of how it could be done.” *Tristan Hughes, PES-Architects.*

Consequently, we find that demand is low due to lack of economical incentives and due to customers' lack of knowledge about sustainability aspects in construction. We also find that media and public sector demanding sustainable solutions can be triggers, thus having a positive impact on customer demand.

4.2.2. Holistic design

In accordance with the job-to-be-done differing depending on the customers the respondents argue that it is difficult to define one single offering.

“There may be one solution that is sustainable for one client and one that would be sustainable for the neighbor.” *Jan Schipull Kauschen, Vandkunsten.*

“What makes something sustainable and what does not, it’s just sort of this constant trouble that we have to take out in all projects.” *Björn Guðbrandsson, ARKÍS architects.*

“We are offering to the client sort of a holistic design.” *Tristan Hughes, PES-Architects.*

Based on this discussion and the fact that architects perceive themselves as services providers the respondents claim that a more holistic perspective including various types of sustainability aspects is offered.

More specifically the respondents pinpoint the offering to be either a sustainability plan or concerning sustainability consulting.

“They quite often have a book with a program for the architect to achieve and then we are just a part of a team trying to create that.” *Tristan Hughes, PES-Architects.*

“People are also coming to us because of BREEAM, that's part of the consultancy part, and it is a growing part of the market. In a way a lot of what we are doing is handholding people and saying this is going to be alright, seems a bit scary from the beginning, but it's going to be fine.” *Andrew Holt, Architectopia.*

Many respondents discuss the question of what sustainability means both to them as a company and to the customers they target as vital for being able to concretize an offering. It is obvious that the offering is highly personalized depending on the customer and its requirements. A usual approach is to look at the lifecycle of the building, including both environmental, social and economical aspects.

“It’s a very broad question that goes from what the building is and what it is made out of to how much energy it consumes to the people who are in the building, how do they get there, how can they live their lives. So it involves very, very much, and in some few projects, it is also the way we work, but in most projects we take out a certain part, for example that we want a very energy efficient house, or it is about materials.” *Joakim Kaminsky, Kjellgren Kaminsky Architecture.*

“A sustainability perspective is actually that you draw for more than 60 years, maybe 200 years. Flexibility, robustness and elasticity are also sustainability perspectives. Most houses of the future are already built, therefore, sustainability and refurbishment are extremely important.” *Sverre Svendsen, Ratio architects.*

The respondent state that one specific part of many offerings is to provide the customer with a design that makes it possible for the customer to certify, or even help the customer to certify the building. The respondents articulate that there is a growing demand for this kind of services. Many respondents even discuss this in terms of that certification systems have become a hygiene factor.

Based on this reasoning we conclude that the offering consists of either a sustainability plan or sustainability consulting. The offering is further concretized depending on both the customer’s and the architecture firm’s definition of a sustainable construction and can imply

different parts of a buildings lifecycle, including environmental, social and economical aspects.

When being in contact with the different respondents from all five Nordic countries many aspects of their work regarding sustainability were similar, but some aspects that differ are their availability of natural resources.

“The concrete industry grew very strong in Finland after the war, when towns were rebuilt after the war in the 50s, then it was the concrete industry that got the power because it was the most effective way to build.” *Niklas Sucksdorff, Architects.*

“It’s the fact that energy is relatively cheap here and it’s been sorts of classified as green energy, we don’t have any coal, we don’t have nuclear, or oil produced energy. So that is off course a bit of a luxury, but it is actually also a limitation for us because it makes it very difficult for us to convince our clients that saving energy is important, because if it is only a matter of very small numbers that they can save.” *Björn Guðbrandsson, ARKÍS architects.*

Based on above reasoning we find that there exists path dependency regarding what materials that is available for use. Also we find that the climate, especially in Iceland, influences the job-to-be-done and what the architecture firms can offer their customers.

4.2.3. Personalized relationship

What kind of relationship that an architecture firm develops with its customers depends on how the architects acquire the projects. The most common way is through networking and the respondents claim that a personalized relationship build on trust is beneficial for realizing sustainable construction.

“You know the client on a personal level and you build this trust.” *Marcos Zotes, BASALT architects.*

“We maintain client relationships all the way and we are constantly in contact [with the client] and know how it goes, in terms of time and financials and other things. In those projects where we have not done so we have noticed a big difference since the relationships are very personal. You can not transfer a personal relationship to any other person.” *Niklas Sucksdorff, L architects.*

The respondents articulate promoting previous projects as important for creating credibility and trust. The relationship is thus argued to be highly personalized and built on trust.

“It becomes easier and easier to get projects if you have many references. You build up conscious competence.” *Karin Hagen, Ratio architects.*

Furthermore, networking often involves going to the customers and representing, telling them about your work and educating the customer about what one can achieve when working with sustainable constructions. Some architects even invite new clients to visit older clients. Networking is claimed to be the main kind of marketing most architecture firms engage in.

Based on this discussion, we find that a personalized relationship built on trust is key for acquiring new clients. This involves educating the customer about what can be achieved in a project concerning sustainability through exemplifying with previous projects.

However one other common way to acquire new customers is through competitions. Competitions are largely arranged by the public sector and often involve bigger projects. One has to apply each time involving a long process with much paperwork where competition is fierce.

“You get a project once, but then it is not certain that you get one until about ten times again.” *Karin Hagen, Ratio architects.*

“We do both open and invited competitions, sometimes free of charge, to gain customers that later gives revenue.” *Marcos Zotes, BASALT architects.*

We find that being part of competitions is not that dependent on a close relationship. Participating in competitions influences the architecture firm’s cost structure negatively. The reason for doing so is because of that it involves large projects, and thus large potential revenue streams if winning the competition.

The respondents discuss that the principles of how an architecture firm market itself does not differ from traditionally, it is rather what they decide to discuss with the customers and what competitions they are part of. Furthermore, the respondents value media as an important stakeholder since it through publishing new findings within sustainability can influence what the customers demand. Moreover our empirical findings reveal that it is important to be selective with what customers one works with.

“I think it is important to step away from projects sometimes as well and say, thank you I am sure that you will find the right architect to do this but that is not us.” *Andrew Holt, Architectopia.*

“Architects are great for that cause if you are able to show good examples then people would think that is nice, I might like to have one of those, and then you have a chance to get a foot in the door.” *Jan Schipull Kauschen, Vandkunsten.*

This is closely connected to that many respondents have talked about the importance of branding themselves as being an architecture firm for sustainable construction.

“We profiled ourselves as the company to go to if you want sustainable architecture. That has been our marketing edge and it has been very lucrative. We do make money on this.” *Andrew Holt, Architectopia.*

“It is good to have a profile. It gets easier to gain customers if you are an expert within one field, so it was commercially not a bad idea to engage in this [sustainability].” *Joakim Kaminsky, Kjellgren Kaminsky Architecture.*

The respondents emphasize that creating an image is something that takes time, thus what profile you want to have is very path dependent as it takes time to change the mindset of customers. This, since the customers view of the company is built on the experience the company has. Additionally, as the lead time in the construction industry is relatively long,

some firms feel frustrated with that their efforts to rebrand themselves as an actor with focus on sustainable construction does not come through. This can be evidence for that time compression diseconomy exists. However, the situation is the same for all firms, thus those that have started doing sustainable projects early is claimed to have a first mover advantage.

The competitiveness in the market for sustainable construction has room for more actors, some respondents even wish for more companies to engage as that would create a mutual effort to drive the question of sustainability even further.

“You could set up a company like ours in Oslo, you could set up five of them, and there would still be enough work to go round. We want competition because competition strengthens our market as long as we are still developing.” *Andrew Holt, Architectopia.*

Contradictory, other respondents claim that since almost all architecture firms today engage in sustainable construction in one or another way, the advantage of branding a company in sustainability matters will soon disappear, as the knowledge will become common knowledge.

“Unfortunately many companies offer this today. Now we need to think about what will be the next big thing.” *Niklas Sucksdorff, L architects.*

Discussing this issue with the respondents, the company brand as an intangible resource is not seen as that important. Today architecture firms build their image on experience. Since no one can build a brand immediately it is either up to time or the companies to intervene and expedite the process of creating a strong brand through for instance acquiring a brand associated with sustainability.

Based on above reasoning marketing sustainable construction is similar to marketing traditional architecture, what differs is the content discussed. A strong brand is not considered to be key today, but may be in the future. Moreover, to consciously select what customers to work with can affect a firm's image.

Our empirical findings show that there is a general frustration among the respondents of that they want to achieve more than the client asks for.

“It is a process that is very slow. You cannot convince anyone by saying that follow this or by saying that green building is good.” *Daniela Grotenfelt, L architects.*

“This is a education problem because they do not know that things could be different.” *Jan Schipull Kauschen, Vandkunsten.*

Furthermore the respondents discuss that the constructors have a lot of power and that they are often influencing the customer in opposite direction.

“If the contractors refuse to adjust their methods to a more sustainable design you will basically not get a sustainable building because they will say that it is going to cost you this much and this much.” *Tristan Hughes, PES-Architects.*

The respondents discuss that they have to put a lot of effort into convincing the client about choosing a sustainable solution, this is done both by enlighten and educating the customer. We find the most common arguments to convince the client are arguments about cost reductions, profiling, sustainable constructions as being a higher quality building and the wellbeing of the users. What all these convincing arguments have in common is that they are often communicated through showing examples from previous projects, through visual material and sometimes also through numbers.

The reason for having to put as much time into convincing the customer may be connected to the fact that the value for the customer is fragmented, resulting in ambiguity. To concretize the customers' needs and the common goal in each single project is discussed as important means of convincing the customers.

“Normally, we will start with what the client knows. There is no point to say that this is what it means [sustainability] because they might go and say that this is not what I wanted and go to another architect.” *Tristan Hughes, PES-Architects.*

“We sit down and start talking about the issue, for example, we ask what is sustainability for you? Maybe it's completely different from what sustainability is for me. To clarify this, so that you know that yes, it means different things to us, but in this project, what do we do? Trying to find a common ground.” *Johanna Engberg, White architects.*

Of course this is done already in projects although not working with sustainability, but the respondents believe that it is important to do it even more narrowly regarding sustainability since it has proven to be difficult to unite around one interpretation of what sustainability means. Concretizing the customer needs is claimed to result in that it will be easier to specify requirements and creating a common goal to achieve in the project. Most respondents believe that this is easier to do with environmental aspects, but argue that there is a need to do so even with social and economical aspects.

Consequently, we find that convincing the customers is vital when working with sustainable constructions, both with the use of sales arguments, but also through concretizing the customer's needs and the common goals for the project.

Furthermore integrating the end users is discussed as means of creating a better understanding for what is demanded and making sure that the building is used correctly. This since if a building is not used as intended the sustainability aspects may be lost.

“It's their building, I can make you a dress but it will be my dress, but you can choose if you want to use it or not. It is the same with buildings, I can make a beautiful building but if the users hate to be in the building then they won't care about it.” *Marta Eggertsen, Ratio architects.*

“You can do things that makes it easier to use the building in a more sustainable way.” *Björn Guðbrandsson, ARKÍS architects.*

Based on this discussions we find it valuable to integrate the end users in the design process and to educate them about how to use the building correctly.

4.2.4. How to gain revenue

Many respondents articulate that they either charge more hours than in a normal project or a higher amount for their total work due to more time consuming activities. What is interesting is that they are not charging any extra amount per hour. When taking advantage of learning curve effects they utilize the knowledge the architect has gained in previous projects to the favor of the customer. Thus charging fewer hours compared to the first time and not charging any premium price for the enhanced offering. Furthermore respondent state that they sometimes do sustainability work that they do not charge their customers for. Thus, implying an investment for the architecture firm.

“When starting to sell a new service, it takes time before it starts to become profitable. It is a strategic decision to invest in development.” *Daniela Grotenfelt, L architects.*

“Yes, I think we gain more, at least in a longer perspective, otherwise I think we lose a competitive advantage. We must do this in order to compete and win projects.” *Sverre Svendsen, Ratio architects.*

The respondents argue that this is due to the fact that customers are not demanding the solution, or are not willing to pay the price for it. The reason for doing so is because the architects believe that it will favor them in the long run. On the contrary others argue that there is a general reluctance towards investments concerning sustainability that are not transferable to the customer.

”There are few who do not charge [for their work], at the same time we must of course invest somewhere, but it is really a culture that one should be able to charge for hours on day one.” *Anders Svensson, White architects (former).*

Based on above reasoning we find that revenue model for architect providing sustainable solutions seems to be similar to a traditionally revenue model of an architecture firm. What differs is that more hours are needed in order to design a sustainable building. The architects do not increase the price per hour they charge. Moreover the costs will increase in a short-term perspective because of initial investment intended to generate future revenue streams.

4.3. ORGANIZATIONAL LEVEL

The organizational level concerns all conditions present, regarding both assets and activities, within the four walls of a company.

4.3.1. Project structure

The size of the projects that an architecture firm can take on has been argued to correspond to the size of the company in terms of numbers of employees. Respondents from companies with 20 employees or more say that they have the capacity to handle all sizes of projects, meanwhile respondents from companies with under 20 employees might need to turn down requests due to not having the manpower or not having the financials to hire external

consultants. Regarding a request for a sustainable project, this problem is present even if a smaller firm has more knowledge about sustainable construction than a competing bigger firm. Contrary, a bigger firm might gain customers that demand sustainable construction only due to that size is associated with credibility. Consequently, we find that the numbers of employees determine a company's ability to take on large size sustainable projects.

A project team consists of people with many different professions. The desired structure of the team is described by the respondents as flat and decentralized with the argument that being able to take own decisions drives work motivation. Since an architect needs to have a broad understanding of both the client side and the constructor side of the value chain, the architect does many times possess a leadership position. Whether the leader is motivated to work with sustainability issues or not has proven to be vital for the project.

“You always have to have a motivated leader in the team that is able to drive this question [of sustainability]. Even though all the team members are very interested and passionate about it, it is very hard to get that point across if the leader is not motivated.” *Björn Guðbrandsson, ARKÍS architects.*

Consequently, we find that the project leader's level of conviction about sustainability aspects in construction correlates to the level of accomplishment of these aspects.

4.3.2. Dependency of knowledge

As the final architecture of a building depends on the person designing it, employees that are interested in and have knowledge about sustainable construction is argued by the respondents to be the most important resource of an architecture firm offering sustainable solutions. Hence, as knowledge is connected to individual persons, respondents emphasize that having the right person with the right knowledge at the right project is vital for the project to succeed.

“Architecture is very knowledge-bounded. The knowledge you have in an architecture firm is dependent on the people you have in the firm. As soon as someone moves away from the office, the knowledge is lost for the office.” *Jan Schipull Kauschen, Vandkunsten.*

“Having the knowledge is a competitive advantage.” *Anna Graaf, White architects.*

Consequently, we find that having employees with knowledge about sustainable construction is a way for an architecture firm to gain competitive advantage.

With this said, recruiting the right people becomes essential among architecture firms.

“We just had an interview with a person that we would like to offer a job, and one of the qualities we saw in her is that she has done much work in sustainable architecture, that is a huge plus.” *Hrólfur Karl Cela, BASALT architects.*

“When we see someone that has qualifications in sustainable projects, not to mention someone that has accreditations, that is definitely something we would look into.” *Björn Guðbrandsson, ARKÍS architects.*

As the quotes imply, the knowledge wished for might be both tacit knowledge, such as experience within sustainable construction, and explicit knowledge, such as the accreditations existing in the construction industry, for example BREEAM and LEED. However, as many areas of sustainability in construction are fairly new, the respondents argue that experience is more important than education since it can help gain vital insights for future projects where no theoretical rules can be applied. With this said, we find that to hire someone that has experience within sustainable construction is more desirable than hiring someone newly educated.

The areas of knowledge that are requested within sustainability vary. First of all, knowledge about environmental, social, and economical aspects is demanded. Furthermore, knowledge about the production, behavior and recycling of materials, as well as knowledge about energy and technology is emphasized. Also, to understand the customer and the context as well as the work of collaboration partners and the building process is argued to be important. One aspect that has been highlighted more than others is to have knowledge about business and economy as the respondents experience that lack of this knowledge counteracts work with sustainable construction.

“There is a big potential to increase performance if the architect acquire knowledge about economical conditions. For example, if you do not know the cost of a rational house frame and instead design a frame that costs a lot of money, then you have spent the money on something that is really unnecessary and you have reduced the ability to do sustainable initiatives. Lack of knowledge makes you work against the things you aim for.” *Anders Svensson, White architects (former)*.

The reason for this lack of knowledge is not clear for many of the respondents. However, some argue that architecture as a traditional profession has been mainly artistic, thus the culture of the profession has not always supported business. Consequently, we find that path dependency might in many cases explain the lack of economic knowledge within architects.

Knowledge being essential, we also find that education of employees is a key process in architecture firms.

“The things you know are the things you also can take command over. The risk of not being educated in this matter [sustainability matters] is that it is not prioritized.” *Anna Graaf, White architects*.

Examples of how to educate varies between courses, lectures, and workshops. What method used is argued to influence the cost structure of a company. For example, a workshop where employees can exchange knowledge with each other might be less expensive than hiring an external lecturer or sending individuals on courses. Educating within sustainability matters is argued as prioritized among other areas to educate employees in.

“We have a budget for education, and we choose to spend a lot on in on sustainability matters.” *Sverre Svendsen, Ratio architects*.

In addition to this, the employees also take responsibility for educating themselves through taking part of new research through books, magazines and the Internet. However, the respondents argue that no matter your education, experience is always more important, thus once again emphasizing tacit knowledge. The learning curve of designing sustainable is argued to be steep.

“Eventually you build up the experience you need to do it successfully.” *Andrew Holt, Architectopia.*

“You learn from your mistakes, each project leads to new areas of research and new findings. It is a constant evolution.” *Marcos Zotes, BASALT architects.*

With this said, we find that theoretical education needs to be a constant activity accompanied with as much practical experience as possible. This, since competence within sustainable construction seems to be a victim for time compression diseconomies. However, time to spend on education seems to be hard to find. Some companies solve this problem by integrating education and research into the hours they charge customers of big projects, thus the gained knowledge from bigger projects can be put into smaller ones where time is often more limited.

One other way to gain knowledge is through internal research. Being able to do research within sustainability issues such as material selection and energy use has shown to be very important for the architects in order to work with sustainable construction. It has been argued by many of the respondents that having a research base, physical or digital, which contains both own research and the firm’s experience, is one of the key tangible resources.

“It is always good to have research to rely on. It shows that we have the competence to work with and drive these questions [of sustainability].” *Anna Graaf, White architects.*

However, as the market is argued to be very cost driven, focusing on minimizing margins, only the bigger firms have the financials needed to support this kind of research internally. The respondents claim that having internal research might be an aspect to compete on, thus we find that the financial resources of a firm that can enable internal research might influence a company’s strategic position.

4.3.3. Engagement of employees

The level of engagement and thus knowledge about sustainability issues among employees varies within a company. The respondents discuss two reasons for this. First, engagement correlates to the size of the company in terms of number of employees.

“To reach out to every employee and get them engaged is really hard, you cannot require it either.” *Anna Graaf, White architects (over 700 employees).*

“Being a small firm, there are only so many experts [in sustainability] you can have. Everybody needs to have a certain base knowledge since we work with everything from details to planning, but should we require expertise beyond our

own capacity we solicit external collaborators.” *Hrólfur Karl Cela, BASALT architects (around 10 employees).*

Consequently, we find that the bigger a company is in terms of numbers of employees, the harder it is to create engagement. Also, the bigger a company is, the less important it is to engage everyone for being able to offer sustainable solutions.

Secondly, the level of engagement is influenced by company culture. Here, two sides of how to view sustainable construction have been found. The majority of respondents have indicated that these matters are deeply entrenched in the employees.

“We believe it is a really important issue that we have to tackle if we want this planet to survive, and even though we are a small firm on a global scale, our impact is still very important.” *Björn Guðbrandsson, ARKÍS architects.*

“Here it is the basis of everything that is done. It is not about should we do this, it’s about how do we do this. It is a very big difference.” *Jan Schipull Kauschen, Vandkunsten.*

“Sustainable design is very important. If any other architect tells you differently about that, I think that they are either naive or that they are somehow in denial of the real situation.” *Tristan Hughes, PES-Architects.*

However, the other side put a lot of emphasize on pride and on the architect as an artist.

“We have different architecture history and tradition. Whereas in Finland you are more aiming towards being a star architect, famous, but in Sweden it is more aiming towards what can I do for the social environment.” *Martin Lukasczyk, PES-Architects.*

Hence, we find that the values of the employees and how they look at themselves impact their conviction of sustainability matters. Moreover, interesting to notice is that the last two quotes, by Tristan Huges and Martin Lukasczyk, are from two employees of the same firm. Consequently, we find that what you value as an architect is individual rather than company connected.

Besides that culture might be country specific, the respondents argue that education and age might influence the individual engagement. Younger architects have had sustainability matters more incorporated into their education, while the older generation relies on experience. Designing a building with traditional techniques is because of the learning curve claimed to be more profitable than designing a sustainable construction, and give room for more esthetic interpretations as well as realistic incorporations of sustainability matters. The question about age is a topic discussed by all respondents, however, the majority comes to the conclusion that it is more a question about interest and understanding than it is about age. This is also in accordance with the previous discussion about sustainability values being an individual aspect more than a company aspect. Nevertheless, the respondents claim that the general knowledge has increased during the latest years and is thus deeply rooted. However, the transformation process of implementing sustainability thinking to construction design work has shown to be surprisingly slow.

“I am surprised that it has taken this long time to get it integrated, but in four years we have still not been able to do it.” *Niklas Sucksdorff, L architects.*

This is explained by that the employees are not valuing it highly enough to also do something about it. Thus a lack of interest among the employees exists.

“What is it that we do not understand? I hope we do not need a crisis of nature, that would solve things. You learn from pain as human beings. We are missing the pain, everything is really nice. There is not an enough storm yet.” *Martin Lukasczyk, PES-Architects.*

Consequently, we find that with the values being an individual matter and with the process of integrating sustainable thinking in architectural work being slow, having a culture that supports sustainability values is vital in order to enhance engagement of employees and hence realize the company strategy of offering sustainable construction.

4.3.4. Efforts to enhance engagement

In companies where offering sustainable construction has been a strategic decision from day one it has proven to be much easier to create a company culture that supports sustainability values.

“Since we have had it [a strategy concerning sustainable construction] from the beginning, we find it very easy. We don’t need to think about it, that is an advantage of ours.” *Christer Fröberg, Kjellgren Kaminsky Architecture.*

“People that have been long in the business, they are not that flexible when it comes to changing the organization. It is not easy to integrate it [sustainability thinking] into our work and make the architects understand why we do this.” *Niklas Sucksdorff, L architects.*

Accordingly, we find that path dependency plays a vital role when trying to create a culture supporting sustainable values.

In addition to this, the attempts of companies to shape their company cultures to incorporate a concerns for sustainability and thus enhance engagement of employees have been many. Examples of efforts are; workshops, implementation of new working tools, visualization of sustainability diplomas and certifications, and everyday conversations. One thing that has proven to be very important in order to create a common culture concerns the leadership of the company. The initiative of working with sustainable construction has in most cases come from a personal interest among the partners.

“It is very important that we have a management that believes in this. That everybody that works here feel that there is a support in that we should work this way.” *Christer Fröberg, Kjellgren Kaminsky Architecture.*

Consequently, we find that support from the management team is important in order to shape corporate culture.

Also, to have instruments that promote work with sustainability in construction have helped heightening the awareness and thus the interest of employees. Most firms in the empirical study have developed checklists or guidelines for the employees to use concerning topics such as; material selection, energy efficiency, waste handling and work with social aspects.

“We made a system, like a checklist, with 20-25 questions like, have you thought about this?” *Christina Tolstrup, Gottlieb Paludan Architects.*

“It is like having an external inspector who examines the projects, because if you work with it by yourself, then you might get stuck in the design and functionality aspects of the building, not thinking about the sustainability issues.” *Niklas Sucksdorff, L architects.*

The respondents mean that having these tools to use in each project highlights how important these matters are considered in the company. However, the respondents bring up two problems that might occur if the checklists are not developed and promoted correctly. First of all, if the limits are set too high, it might result in that no job gets done and a negative attitude is developed towards sustainability matters. Second, following checklists might make employees that are already convinced about sustainable construction lazy, not putting in any more effort than what it takes to comply with the list. With this said, we find that instruments that promote work with sustainability can be used in attempts to change culture if they are developed and promoted in a reasonable way.

In order to fasten the cultural transformation process, and consequently the business model transformation process, some respondents have also argued the importance of hiring sustainability enthusiasts. The enthusiasts are argued to influence and convince others on a personal level. This since enthusiasm is not a direction from somebody but a rather characteristic of someone's personality. Many respondents brought up examples of specific enthusiastic colleagues that have had great impact on them and on the company's development towards offering sustainable construction. Consequently, we find that hiring sustainability enthusiasts is an effective way to influence and heightening the awareness of employees and thus shaping company culture.

4.3.5. Generalists and specialists

Although the engagement of employees is important, the amount of knowledge available within sustainability aspects is huge and changes rapidly, thus no one is expected to grasp everything. Instead, specialists are called for in order to manage certain aspects. However, concerning the distribution of knowledge, it has been emphasized by respondents that a general knowledge among all employees is wished for.

“When designing, you need a certain amount of knowledge in order to understand what can influence [on sustainability] and when to ask the right questions.” *Anders Svensson, White architects (former).*

“I [as a specialist within sustainability] cannot sit on every project. Everybody needs to have some knowledge so when they draw something they know how to address a question.” *Christina Tolstrup, Gottlieb Paludan Architects.*

Consequently, we find that everybody should be able to have enough knowledge in order to know when it is time to ask for additional expertise.

Whether the individual knowledge of employees is concerned when organizing who to put at certain projects, the answer is no. The reason for this have neither to do with that the company does not have enough specialists to distribute, nor that the specialists are not available when a new project arrives. Once again it is highlighted that general knowledge among all employees is required in order to integrate sustainability aspects into all projects. Consequently, having generalist on the team and specialist coming in when asked for, or according to a schedule, is the respondents answer to this problem.

Whether to have specialists in-house or hire external consultant services from the market is a well discussed topic among all respondents. Most respondents agree that it is very valuable to have sustainability specialist in-house in order to enable everyday work with sustainability aspects in the designs. Many of the sustainability specialists are also seen as sustainability enthusiasts, thus they are argued to have great influence over the conviction of other employees. On the other hand, when it comes to people being specialized within very specific details of sustainability, the respondents rather buy the knowledge from a consultant firm. Outsourcing this kind of knowledge means that they only need to acquire a certain amount of knowledge. This also correlates to the cost structure of the firm. Having an employee that is specialized within a very specific aspect of sustainability might mean that human resources are not fully utilized, thus the company have to pay for expertise not always required, something not appreciated by the respondents. Consequently, we find that whether to have specialists in-house or buy expertise from the market depends on the level of specialization and the corresponding cost.

4.4. INDUSTRY LEVEL

The industry level concerns all kinds of contact that the company has with other actors in the construction industry.

4.4.1. Collaboration with actors in the building process

Collaborations with actors in the building process, such as constructors, engineers, external consultants, and suppliers, have been argued key by the respondents, especially in order to realize sustainable construction.

“For a building to be successful in terms of sustainability, it has to be a team work of all players.” *Björn Guðbrandsson, ARKÍS architects.*

Why collaboration is perceived as essential for architects is argued to be because the realization of the architect's ideas is controlled by other actors in the building process. Respondents claim that the decisions that will have most influence on sustainability aspects are taken in the design processes, however it is the architect's ability to pass these decisions on to all other actors that will determine how sustainable the building will end up being. For

example, if a constructor chooses to use another material than suggested by the architect, the construction might not end up being as sustainable as it was designed to be. In addition to this, collaboration is also needed for the architect in order to gain understanding of what is realistic to do within construction, within sustainability, and within the economical boundaries set by the client.

“To talk about these issues early is a way to make sure that the contractor actually knows what is going to be designed, and that he can bring his expertise in and say this is very difficult to do or that will never work.” *Christina Tolstrup, Gottlieb Paludan Architects.*

Consequently, we find that collaboration with other actors in the building process is vital for an architecture firm that aims to do sustainable construction in order to both pass on decisions and understand the limitations of construction work.

Whom to collaborate with is either the architect’s or the client’s choice depending on who the client is and what kinds of actors that are part of the specific building project. However, there seems to be a tendency within the industry to collaborate with the same people over and over again. The respondents argue that this is because personal relationships are very important in the industry. Knowing how the other actors conduct their work is claimed to be an advantage. Also, the size of the market might influence whom the architecture firm collaborate with. For example, in Iceland there are only a few actors to choose from. The respondents do not find this problematic, although they admit that it is easier to collaborate on sustainability aspects with firms that share the same values of it being important. These firms are not always the same ones as the company have collaborated with earlier. Accordingly, respondents claim that the tendency of working with the same actors might in some cases limit their ability to realize sustainable constructions. Based on this discussion, we find that whether an architecture firm collaborates with a partner that supports or does not support the belief of sustainability being important will influence to what degree sustainability aspects are being realized.

4.4.2. Industry culture

The culture of the construction industry is argued by respondents to have a negative influence on collaboration, especially since the building companies are claimed to be very conservative.

“I think the construction industry, as the group of contractors, are the least flexible people on earth. Any kind of change will be fought against because they are not willing to change their sort of basic process.” *Tristan Hughes, PES-Architects.*

“I have been in the industry for 25 years, and during those 25 years there have been nothing revolutionary, nothing that you feel is wow that is nice development.” *Niklas Sucksdorff, L architects.*

The reason to this is explained by the big amount of money that one project requires, as well as the long lead times. Thus there is a risk with using new techniques in buildings. This is how the respondents explain the conservatism, that it can be claimed to be a natural aspect of the industry. However, some respondents also add that the reality is that every actor want to

maximize their own share, not compromising on margins, being a problem that contributes to the conservative culture.

“Everybody tries to maximize their own share, that is a problem. If you could collaborate and work towards the same goal, that would give a much better result [concerning sustainable construction].” *Christer Fröberg, Kjellgren Kaminsky Architecture.*

“The whole construction industry has to start thinking differently about economy in order for us to develop within sustainable construction. We cannot do this alone, the whole industry needs to comply now.” *Anna Graaf, White architects.*

Based on this reasoning, we find that the conservative attitude and the aim to maximize own shares are barriers towards building sustainable. This since it has a negative influence on the collaboration required between actors in order to do so.

4.4.3. Efforts to enhance collaboration

As it has shown to be beneficial to collaborate, and as the industry culture has shown to provide a barrier for this, the participating companies have put efforts into enhance collaboration. The empirical finding shows three main efforts performed. The first effort concerns the alignment of goals, an activity characterized by compromises.

“To formulate the aim of the project together is a very important part of the projects. You cannot have different objectives.” *Anna Graaf, White architects.*

“Sometimes we look at it and we say, how did we manage to build such a great building? In each project we collaborate with many people with their own agendas, it is always like a give and take, you have to be very open and flexible while maintaining a clear design direction.” *Marcos Zotes, BASALT architects.*

Alignment of goals is argued to make collaboration on sustainability aspects much easier since all parties would be working in the same direction. However, to achieve this is claimed to be problematic. This, because of the cultural contradictions that exists between professions in the construction industry regarding communication.

“The engineers like to calculate stuff while the architects talks in pictures. There is a collision in how you communicate these issues that is extremely important to deal with.” *Anna Graaf, White architects.*

Communicating in different ways is claimed by respondents to be the reason for misunderstandings. Accordingly it might also be the reason for why the goals of different actors are not always aligned although the actors believe they are working in the same direction. The consequences of this are that sustainability aspects might be lost when the project is handed over to new actors in the building process. To solve this problem, some respondents have suggested that the actors can be educated about key aspects about each other’s work concerning sustainability. The argumentation for this is a greater understanding and alignment of goals. Based on this discussion, we find that effective communication and understanding for each actors work would enhance the alignment of goals and consequently enhance the collaboration needed in order to deliver sustainable construction.

The second effort to enhance collaboration concerns the activities done to get sustainability aspects into the drawings and design material that is handed over to the contractor.

“You cannot just write a page about sustainability in the end and not having it integrated in the visual design work, it needs to be intertwined.” *Anna Graaf, White architects.*

“The contractor should only be able to follow the directions of the design, it should be clear enough.” *Björn Guðbrandsson, ARKÍS architects.*

Hence, we find that it is not only the verbal communication that needs to be clear, but also the communication in the physical materials that is handed over. Consequently, that would improve understanding and thus enhance collaboration.

The third effort to enhance collaboration concerns what time the parties start to collaborate. All respondents agree on that the earlier they all start to talk about sustainability issues, the easier it will be to implement and thus collaborate on. This, because of the frustrations that might appear if for example the architect wants to take in new sustainability aspects that have not been planned for on the building site, or if the engineers comes with technical limitations when the design for the building is already set.

“That [thinking about sustainability early] would make a very big difference because that is when you set the main rules for the building.” *Martin Lukasczyk, PES-Architects.*

“We need the [sustainability] specialists already when we set the vision for the project. Unfortunately, that is where we often fall short, we get the knowledge of the specialists too late.” *Anna Graaf, White architects.*

“It saves a lot of money because everything you have to fix in the building site is more expensive than if you can fix it on the drawing board.” *Toivo Moustgaard, PES-Architects.*

However, some argue that it is only passive aspects of sustainability, such as the material selection of the house foundation, that need to be considered in the beginning. Retrofitting buildings to make them for example more energy efficient can easily be done later on.

“In reality, performance can only be increased if you know how it performs in the first place.” *Tristan Hughes, PES-Architects.*

Consequently, we find that it is beneficial for the collaboration between actors to talk about the majority of sustainability aspects early on in the project.

4.5. SOCIETY LEVEL

The society level concerns all kinds of interactions the company has with other actors in society.

4.5.1. Driving the question of sustainable construction

The demand for sustainable constructions is relatively low. Architects offering sustainable construction are motivated to drive the question of sustainability in society, and are trying to create a bigger demand.

“Politicians never come to an agreement, but constructions are built today and then you can actually do something and get an effect. This gives us a responsibility.” *Sverre Svendsen, Ratio architects.*

In addition to this, the architecture firms in the empirical study have noticed that sustainable construction makes good business. Thus, engaging in sustainable construction today and driving the question in society is argued to be beneficial for the future.

“Without demand there will be no supply, and with more demand there will be supply. We try to kick start the supply part, demonstrating how you can construct in another way.” *Søren Nielsen, Vandkunsten.*

“Today we need to rethink things [in our company], it is a growing feeling that sustainability is actually becoming good business.” *Marta Eggertsen, Ratio architects.*

Consequently, we find that the motivation of architects engaging in driving the question of sustainability has both to do with the feeling of an obligation, as well as a strong belief in that it will be economically beneficial in the future. Hence, engaging and learning about sustainable construction today, although there is a relatively low demand, can be explained by companies trying to gain a first mover advantage.

In order to drive the question, and thus enhance demand, a collective action is argued to be necessary. Consequently, we find that partnering up with other actor in society is important in order for sustainable constructions to be realized.

“We will not come anywhere if we do not have an organ where we jointly can drive these questions.” *Anna Graaf, White architects.*

“Sustainability has to be something that society agrees on together and practice together.” *Marta Eggertsen, Ratio architects.*

4.5.2. Who to interact with

Who to partner up with depends on what the architect wants to accomplish with its engagement. However, common actors to involve are; the government, municipalities, NGOs, economists, and scientists. Each of these actors is argued by the respondents to have influence in the sustainability debate. Thus, these actors can be considered stakeholders vital to collaborate with in order for enhancing demand for sustainable construction.

Some respondents argue that one of today’s most important collaborations takes place between the construction industry, government, and banks. There is a need to find a solution so that clients can lend money in order to buy sustainable buildings. Many times, building sustainable will imply a larger initial investment for the customers and convincing banks to

lend more money than what a less sustainable building might cost is very difficult. Because of this, many customers are also forced to choose non-sustainable solutions and materials. Based on this argument, we find that to collaborate with actors in society that might influence the customers' ability to build sustainable is an attempt to increase demand.

One other collaboration that might help driving the question of sustainable construction takes place between the architecture firms, producers of building materials, research institutes, and scientists. These partnerships aim at conducting research on existing materials as well as developing new sustainable ones. The architects have valuable insights since they know what customers demand and they collaborate with the ones that work with the materials on site. The manufacturers then know the technical aspects of production, and the research institutes and the scientists knows about the chemistry of different materials. Thus respondents argue that the combination of actors is valuable.

“Sometimes we develop things together. If you have a project that demands a certain certification level, and you cannot find the materials supporting that on the market, then you contact a material producer and see what you can do about it.”
Joakim Kaminsky, Kjellgren Kaminsky Architecture.

“Then there are people at the innovation center that we can talk to about certain issues we are having.” *Björn Guðbrandsson, ARKÍS architects.*

Regarding partnering up with the producers of building materials, another way to influence demand is to increase the customers' awareness of the manufacturing process. Respondents compare the situation in the construction industry with the food industry, claiming that if the customer knows how something is produced it might change its preferences. The respondents also claim that awareness of the manufacturing process today is very low, thus the motivation for engaging in collaborations that is trying to improve the manufacturing process as well as heightening the awareness might be good for business.

However, some respondents claim that these kinds of work, concerning development of materials or enhancement of manufacturing processes, are not the job of an architecture firm. However, as an attempt to drive the question in society and increase the demand of architectural work concerning sustainability, we find that it is beneficial to be part of these kinds of collaborations.

4.5.3. Knowledge sharing

One other motivation to collaborate with other actors of society concerns knowledge sharing, something the respondents argue to be very important.

“I think sustainability is very much about sharing all the knowledge you have and making it an open source. It is not good if you sit on a very good idea, not publishing it or letting others know and play with it just because you want to have your name on it. That is the most stupid thing you can do.” *Jan Schipull Kauschen, Vandkunsten.*

“The industry of sustainable construction is based on knowledge sharing and the exchange of experience. It is about finding best praxis and a common goal.”
Daniela Grotenfelt, L architects.

“If you learn something you also need to share it for it to be worth something.”
Björn Guðbrandsson, ARKÍS architects.

In order to take part of this exchange, almost all firms in the empirical study are for example a member of the Green Building Council⁷. The reason for this is articulated as that it keeps the firm updated about the development within sustainable construction and that it provides an opportunity for contributing with knowledge. Consequently, we find that architects are not afraid of sharing knowledge, not even with competitors, as they believe that shared knowledge would be beneficial for the whole industry of sustainable construction, including themselves.

Many respondents also talk about the universities as a partner to gain and share knowledge with. For example it seems to be very common among architects to teach about sustainable architecture at universities as a part time job. However, many architects do not charge for lecturing, instead they have other purposes of doing so.

A short-term goal is argued by the respondents to be the accessibility of research. A long-term goal is claimed to be that lecturing might evoke new ideas among the ones that listens, thus in the long-run it might have an impact on the development of sustainable construction. With this said, we find that sharing knowledge might be beneficial for the company in order to keep updated, as well as it might be a way for the company to influence future development.

⁷ The Green Building Council is a non-profit organization open for all actors within the construction and real estate industry. The council is established in order to support sustainability research and development in the industry (Green Building Council, 2015).

5. ANALYSIS

5.1. STRUCTURE OF ANALYSIS

Our analysis is structured in similar way as the empirical findings. What differs is that we in the analysis have chosen to conduct a separate section concerning the transformation of a businesses model. The reason for doing so is closely related to the purpose of the study. Since we want to increase the understanding of how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction, it is not sufficient to only look at what characterizes this kind of business model. We believe that the transformation process is vital for actually understanding what it takes to come there. Through presenting the transformation process as a cohesive process separated from the characteristics of a business model a deeper understanding of what has to be done can be gained. The analysis results in a final framework. All conclusions that are being part of the final framework are summarized in a last paragraph under each subheading.

5.2. MARKET LEVEL

5.2.1. Customer perception

Our empirical findings support Mokhlesian and Holmen's (2012) and Ofori's (2000) discussions about that it is difficult to determine a definite customer to target. This since the customers can be both the one ordering and the one using the building. Hence, we confirm previous research. Moreover, scholars claim that customers are having a short-term perspective (Sayce et al., 2007). We develop this theory with our finding about that there has been a development towards more customers having a long-term perspective in recent years. Moreover Bossink (2002) and Mokhlesian and Holmén (2012) distinguish between conscious and economically driven customers. We have found that these aspects are only characteristics being more or less strong depending on the customer's time frame. Furthermore, Osterwalder (2004) claims that a firm has to find the customer being most compelled to what the firm offers in order to deliver highest possible value. Based on our empirical findings, the job-to-be-done is defined by the architects and offered to already existing customers. This implies that it is not the customer valuing sustainability aspects the most that is targeted, thus highest possible value is not created. Based on this, we advance existing theory adding that the job-to-be-done is defined by the architecture firm and delivered to existing customers.

Bossink (2002) and Mokhlesian and Holmén (2012) claim the job-to-be-done within the construction industry has do with the customer's willingness to control its impact on sustainable development. While this is the overarching problem to solve, we conclude that what an architecture firm helps its customers with is to provide them with sustainability competence regarding construction. More specifically architects use their sustainability competence to help customers solve several problems. The specific problems to solve include; decreasing costs, increasing the market value of a building, providing a building that gives the

customer a profile as an actor concerning about sustainability, providing a design that supports wellbeing, and helping the customer comply with regulations. As complying with regulations makes up one job-to-be-done, there is empirical support for that the governments play an important role for what opportunities that face business. This is in accordance with Porter (1991). Based on this discussion, we extend existing theory through more narrowly specifying the job-to-be-done and confirm theory about regulation as a contextual dimension. What needs to be investigated further is whether the regulations within the Nordic countries are having the same impact or whether they differ.

Scholars such as Mokhlesian and Holmén (2012) and Revell and Blackburn (2007) discuss the demand for sustainable construction as low or absent. Our empirical findings show that this is true in some cases due to lack of economical incentives and knowledge about sustainable solutions. However, we conclude that there is actually a growing demand for sustainable architecture, both among those having a long-term and a short-term perspective. Furthermore, we also conclude that media and the public sector can act as triggers influencing demand. This is in accordance with Mokhova and Zinecker (2014) and Mitchell et al. (1997) arguing that economy and stakeholders are affecting the performance of businesses. In other words, we support existing theory about that media and economical circumstances can play an important role for whether sustainable architecture is demanded, and we extend theory by stating that there is a growing demand for sustainable constructions.

Based on this analysis of the customer perception, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) a fragmented view of the customer, 2) target customers with both short-term and long-term perspective, 3) architects defining the job-to-be-done for existing customer, 4) an existing demand for sustainability competence in construction, 5) problems to solve including decreasing costs, increasing the market value of a building, providing a building that gives the customer a profile as an actor concerning about sustainability, providing a design that supports wellbeing, and helping the customer comply with regulations, and 6) a growing demand for sustainable constructions. Furthermore, governments play an important role in determining the job-to-be-done through heighten the regulation level. Moreover publications in media concerning sustainability and the public sector demanding sustainable constructions influence what is demanded.

5.2.2. Holistic design

We conclude the two most obvious offerings to consist of either a sustainability plan or sustainability consulting, thus strengthening existing theory regarding the offering. The offering is often highly personalized and a common approach is to look at a buildings lifecycle, including both environmental, social and economical aspects. Being in line with Mokhlesian and Holmén (2012) stating that the value is created in the processes behind the actual building. Ngowi (2001) discuss several aspects of doing so, including material selection, energy efficiency, waste management, and design for flexibility. These are similar to the aspects we have found, thus strengthening existing theory. Furthermore our empirical

findings support those scholars stating that assessment tools and lifecycle cost analysis are parts of what the customer is offered (Mokhlesian & Holmén, 2012; Vijayan & Kumar, 2005)

Concerning materials, our empirical study shows that path dependency exists, influencing the architects' ability to design with certain elements. Furthermore, climate, especially in Iceland, impact what the architecture firms can offer its customers. We have not found evidence for this in previous research, thus contributing to advancement of existing research.

Based on this analysis of holistic design we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) an offering consisting of sustainability plans and sustainability consulting, focused on certain parts of a building's lifecycle including both environmental, social and economical aspects. Furthermore the offering is dependent on path dependency and climate conditions.

5.2.3. Personalized relationship

Mokhlesian and Holmén (2012) discuss that the relationship with customers may not differ substantially when working with sustainable constructions. Our empirical findings confirm this. However, what differs is what the firm decides to discuss with the customers, and what competitions and forums to be part of that matters. Furthermore, we conclude that a personalized relationship is key for acquiring new customers, being in line with Bocken et al. (2014) arguing that working with sustainable construction requires close relationships. This is supported by Ankrah and Langford (2005) arguing that architecture firms work in projects being tailored depending on the customer, leaving less opportunities for standardization. Furthermore, we extend existing theory by concluding that previous experience within sustainability becomes important means for building trust and acquiring new customers.

Boons and Lüdeke-Freund (2013) and Girotra and Netessine (2013) claim that offering sustainable solutions can imply high initial investments. One such investment we have found valid within the architecture industry is the fact that architects are being part of competitions, something influencing the architecture firm's cost structure, thus confirming existing theory.

Moreover, our empirical findings discovered that some architecture firms focusing on delivering sustainable solutions actively select which customers they work with or not work with. This since experience influence how clients evaluate architecture firms against other firms. We claim this to be a new finding contributing to the development of theory within the fields studied. This is argued to be a key resource when profiling as an architecture firm offering sustainable construction. While Stubbs and Cocklin (2008) argue that a brand being associated with sustainability is an important intangible resource, we have not found strong enough empirically evidence for this being the case. It may have to do with the fact that this phenomenon is relatively new and time compression diseconomies exists, or that it plays a less important role. What we found more important in today's industry is a portfolio based on experience.

Stubbs and Cocklin (2008) argue that communication and education are important means for getting the customer to formulate more specific preferences and thus affecting demand.

Similarly we have found that many architecture firms work a lot with trying to convince the client, both through education and general enlightening, but also through concretizing the customer's needs and the common goals for the project. Furthermore, Sterner (2002) articulate that systems providing customers with tools to assess and compare different offerings is needed. We have not found any direct evidence for such system, but the fact that the architect helps the customer to concretize can be means of achieving the same outcome. Thus partial evidence supporting existing theory is found. Something hindering this is contractors' reluctance towards working with sustainability, sometimes influencing clients' decision on what aspects to bring into a project.

We have through the empirical study found evidence for that it is important for the architect to create a relationship with the end user if not being the same as the client. Architects like to involve them in the design process and educate them in how to use the building correctly. We have not found any evidence for this in previous research which seems quite reasonable since articulated by the respondents to be a quite new way of working, and we thus develop theory.

However, Bocken et al. (2014) and Boons and Lüdeke-Freund (2013) discuss the importance of influencing the customers' behavior towards being more responsible. Integration with the end customer can possibly be one way of doing so. We suggest further research within Customer Relationship Management theory to investigate the importance of integrating the end-customer.

Based on this analysis of personalized relationship, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) a personalized relationship built on trust and experience, 2) the same means of getting in contact with the customer as traditionally, 3) high initial investments and effort to convince the customer, 4) the architects actively selecting which customers to work with, 5) a portfolio based on experience rather than brand, and 6) integration with the end customer. Moreover, contractors' motivation is a contextual dimension that can influence whether the client is convinced.

5.2.4. How to gain revenue

Bocken et al. (2014) discuss that a firm offering sustainable solutions either can provide a premium product or a more affordable product. Comparing his suggestions with our findings it is clear that even though customers sometimes perceive sustainable construction to be more expensive, it is not a premium solution. We conclude that the revenue model for an architecture firm providing sustainable construction is to be comparable to a revenue model of an architecture firm offering conventional buildings, thus we strengthen existing research. The reason for that it often becomes more expensive for the customer is that the architect has to spend more hours to come up with sustainable solutions. Thus it becomes a bit more expensive for the customer even though the architect does not charge a higher amount per hour. Furthermore, Osterwalder (2004) argue that customers' willingness to pay needs to be incorporated into a firm's pricing strategy. Architects sometimes give away work concerning sustainability for free. The reason for this is a lack of customers' willingness to pay for the solution. This is seen as a strategic decision in order to gain revenue in a long-term

perspective. On the other hand, Styhre and Gluck (2009) state that architects are reluctant towards not charging for their work, something that is strengthened by our empirical findings emphasizing that architects are reluctant to investing in sustainability competence that cannot be charged from day one.

Based on this analysis of economical opportunities we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) being comparable to the revenue model of an architecture firm offering conventional buildings, 2) billing more hours, but at the same price per hour, and 3) initial investments intended to generate future revenue. However, the culture among architects is reluctant towards not charging for performed work.

5.3. ORGANIZATIONAL LEVEL

5.3.1. Project structure

Hedman and Kalling (2003) claim that the organizational structure of a company should support the value creation process of that company. In an architecture firm, scholars explain that the organizational structure is decentralized and characterized by project based work and informal relationships (Andreu & Oreszczyn, 2004; Ankrah & Langford, 2005; Styhre & Gluck, 2009). Findings in our empirical study of architecture firms that offer sustainable solutions comply with these characteristics, however no conclusions can be drawn regarding if this structure also supports the value creation process of sustainable construction.

No previous research has been found that discuss the relationship between the number of employees and the size of projects that the company is able to take on. However, we have found that an architecture firm with fewer than 20 employees might need to turn down customer requests of sustainable projects do to not having the manpower although having the competence. Consequently, our study has proved that the number of employees determines a company's ability to take on large size sustainable projects, 20 employees being the tipping point.

Furthermore, we have not found any research that discussed the impact of having or not having a project leader that is motivated to work with sustainable construction. However, we found that the project leader have a great influence over what aspects that are being part of a design. Consequently, our empirical study develops previous research claiming that the project leader's level of conviction about sustainability aspects correlates to the level of accomplishment of these aspects.

Based on this analysis of project structure, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) a decentralized organizational structure, work in projects, and informal relationships, 2) a number of employees that supports the company's ability to take on the sustainable projects requested by clients, and 3) leaders that are motivated to work with sustainable construction.

5.3.2. Dependency of knowledge

Umbeck (2009) argues that people play an important role for the success of business, and many scholars have identified the employees and their individual knowledge as a key resource of an architecture firm (Altomonte et al., 2012). Our findings comply with this argument, meaning that the employees and their individual knowledge about sustainability will impact on the level of sustainability achievements the company can reach. Thus, having the right employee with the right knowledge is a way to gain competitive edge. With this said, knowledge has also proved to be a competitive element in the industry that influence on other business model components.

Our study further shows that knowledge based on experience is more wished for than knowledge based on education. This since experience might bring insights for future projects where no theoretical rules can be applied. However, no similar argument is found in previous research, hence this evidence contributes to the development of existing theory. Further strengthening this argument, our study also reveals that what knowledge that exist in the business might have to do with path dependency. For example, although Cohen et al. (2005) argue that the architects do perceive themselves as business men, our findings show that because the traditional profession has emphasized artistic talent, there is a lack of current business knowledge. This is in line with previous research claiming that the dominant logics of a company influence future circumstances (Prahalad & Bettis, 1986; Porter, 1991).

Johnson et al. (2008) argue that if the employees are viewed as a key resource, education is viewed as a key process. Cranz et al. (2014) further claim the importance of educating employees of architecture firms in sustainability matters. Our empirical study complies too this theory, showing that education concerning sustainable construction is highly valued in the participating companies. However, the study goes deeper thus expanding previous research by claiming that since knowledge based on experience is vital, theoretical education should be intertwined with practical exercise.

Closely linked to knowledge and education, internal research about sustainability in construction has in our empirical study proved to be an aspect to compete on. However, research costs money thus the empirical study also finds that an architecture firm that has the required financial resources enabling internal research might enhance their strategic position. Ketata et al. (2015) and Shrivastava (1995) claim that in order to grasp the opportunities that offering sustainable solutions can have, companies are often required to invest in new resources and competences. Consequently, the finding in our empirical study conform previous research, meaning that a company that has the financials needed in order to possess key elements important for competition, will enhance their strategic performance.

Based on this analysis of knowledge dependency, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) employees with knowledge that enable sustainable construction, 2) knowledge based on experience, 3) education activities within sustainable construction that combine theoretical and practical exercises, and 4) having the financial resources enabling internal research. Moreover, we

conclude that the level of knowledge about sustainability in construction is an aspect to compete on in the industry.

5.3.3. Engagement of employees

No previous research has been found that discuss the relationship between the size of an architecture firm and the level of engagement in sustainable construction by the employees. However, our empirical study has proven that the bigger the company is in terms of numbers of employees, the harder it is to create engagement. Contrary, the importance of reaching out to every employee has also shown to be less important in bigger companies in order to offer clients sustainable architecture. Consequently, we add to previous research that the size of the company correlates to the level of engagement of employees as well as the level of importance to engage everyone.

Alvesson and Sveningsson (2012) and Umbeck (2009) claim that the culture of a company might impact the level of achievement of a company's strategy. Our study conforms to this argument as it clearly proves that the values of the employees and how they look at themselves impact on their conviction of and interest in sustainable construction. In addition to this, our study also shows that the value of an architect is more of an individual matter than a company matter. However, the reason to this has proven to not comply with previous research. Styhre and Gluck (2009) claim that the level of engagement correlates to age, however our study shows that it is more a question of personal interest and understanding than it is about age. This further strengthens the argument of values being an individual aspect. Cohen et al. (2005) argue that architects perceive themselves as both an artist, a public servant, and a business person. However there is no argumentation on whether the architect perceives itself as all of these three things or only individual attributes. Thus our findings adds to existing theory by claiming that which aspects an architect identify itself with is individual thus might imply only one of these attributes. Hence, the fragmented culture might impose problems as a culture supporting sustainability values has been clearly proven in our study to be important in order for a company to influence its employees to incorporate sustainability aspects into their design work. Consequently, an employee only valuing the artistic aspects of a building will not incorporate as many sustainability aspects into its design as an employee valuing sustainability.

Based on this analysis of engagement, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) a company size that supports required employee engagement in sustainable construction, 2) individual employees valuing sustainability aspects, and 3) a corporate culture supporting sustainability values.

5.3.4. Efforts to enhance engagement

Scholars have discussed the architecture industry as being slow in adapting to new circumstances (Kibert et al., 2000; Mokhlesian & Holmén, 2012). Our empirical study complies with this argument, reasoning that the engagement for sustainable construction among architects takes time to enhance. Path dependency have shown to play a vital role, as architects that have been in the business for a long time is less flexible and are having a harder

time to adjust. This is also in line with theory about corporate culture arguing that cultural aspects such as the conviction of certain values take time to change (Alvesson & Sveningsson, 2012). However, Hedman and Kalling (2003) claim the importance of managing culture in order to accomplish company goals. Efforts to shape culture and thus enhance the engagement of architects have been shown empirically. One thing that has proven important is the support employees of an architecture firm feel from the management team regarding their work with incorporating sustainability aspects into their designs. One other effort concerns the implementation of instruments that promotes work with sustainability. Both this efforts has proven to enhance engagement, however neither of these efforts has been found in previous research about architecture firms and sustainable construction. Consequently, we develop existing theory claiming that a supportive management team and working tools promoting sustainability in construction is important in order to enhance engagement and thus being able to offer customers sustainable buildings.

One effort in order to enhance engagement has also been conformed in theory. Stubbs and Cocklin (2008) argue that visionary persons are a useful human resource in order to convince others of the importance of sustainability thinking. Our empirical study finds that hiring sustainability enthusiasts is an effective way to influence and heightening the awareness of employees and thus shaping company culture toward valuing sustainable construction.

Based on this analysis of efforts to enhance engagement of employees, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) a management team supporting employees work with sustainability aspects in designs, 2) working tools promoting sustainability in construction, and 3) sustainability enthusiasts influencing employees and heightening the awareness of sustainable construction.

5.3.5. Generalists and specialists

Ankrah and Langford (2005) argue that working tasks are distributed depending on the employees' individual characteristics. This argument could be a way to manage the variety in employees' level of engagement in sustainability matters, making sure that motivated employees are set on the projects where sustainability in construction is highly valued by clients. However, our empirical study shows that the individual characteristics of employees, such as level of knowledge and interest in sustainability matters, are not considered when organizing whom to put at certain projects. Thus our findings do not comply with previous research. Instead, our study shows that in order for the company to work efficient, all employees should be able to have enough knowledge in order to know when it is time to ask for additional expertise. Consequently, we extend previous research, arguing that all employees of an architecture firm should have a certain level of general knowledge in order for the company to make sure that sustainability aspects are thought of in all projects.

Architectural work is by Ankrah and Langford (2005) argued to not being able to standardize, thus what knowledge that is required in each project will vary. Kateta et al. (2015) and Shrivastava (1995) further claim that companies deciding to offer sustainable solutions will require competences beyond what they initially are possessing. This have also be shown empirically through the discussion about whether specialized knowledge within certain

sustainability aspects should be possessed by the company in-house or bought from the market. This concerns transaction cost economics, where the cost of having something in-house needs to be compared with the cost of buying it from the market. Choosing the alternative that implies the lowest cost will enable companies to focus on their core competences (Coase, 1937; Williamson, 1979). This is in line with the findings of our empirical study, where it is claimed that having employees that are specialized in too detailed aspects of sustainability might mean that their knowledge is not utilized enough thus it implies opportunity costs. Moreover, the resource based view adds that partnering with external actors contributes to making resources that the firm not yet possess available (Barney, 1991). This is also discussed by Osterwalder (2004) claiming that motivations to engage in partnerships concern both acquisitions of resources as well as optimization of operations. Thus once again do our findings comply. Consequently, we claim that whether an architecture firm should choose to have sustainability specialists in-house or buy expertise from the market depends on the level of specialization and the corresponding cost. Beyond the cost of specialists, our empirical findings confirm previous research concerning the cost structure of an architect firm, where Mokhlesian and Holmén (2012) argue that, the difference in costs between designing a sustainable building and a non-sustainable building is minor.

Based on this analysis about generalists and specialist, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) employees that have enough knowledge in order to know when it is time to ask for additional expertise, 2) a balance of in-house generalists and specialists, where external transactions of specialists depends on the level of specialization and the corresponding cost, and 3) a cost structure not that different from non-sustainable projects.

5.4. INDUSTRY LEVEL

5.4.1. Collaboration with actors in the building process

It has been claimed in previous research that the construction industry is characterized by close interaction and coordination between actors (Andreu & Oreszczyn, 2004; Styhre & Gluck, 2009). Gann and Salter (2000) and Mokhlesian and Holmén (2012) claim that collaboration is vital in order to successfully deliver sustainable construction. This since different customer value is created in different phases of the building process, and thus the whole supply chain of actors needs to work together. Our empirical findings confirm this theory. Collaboration has shown to be vital for an architecture firm that aims to work with sustainable construction in order to both pass on decisions and understand the limitations of construction work. Consequently, these findings do also comply with the value chain theory created by Porter (1985) and the theory about value creation in service companies developed by Stabell and Fjeldstad (1998). The value chain consists of sequential activities that need to be performed in order to create and deliver value. Concerning a building process, the activities required spread among different actors, thus collaboration is needed in order to make sure that what the architect design is also what ends up on the building site. The theory by Stabell and Fjeldstad (1998) further explains that the main activities of a service provider,

which architects view themselves as, concern problem-finding, problem solving, choice, execution, control and evaluation. Our empirical findings shows that the motivation for engaging in close collaboration has to do with a desire to share and receive knowledge, thus the actors can together engage in the activities of problem-finding and problem solving in a way that will make execution successful through the whole building process. Osterwalder (2004) adds that a main motivation to partnering with other actors is the optimization of operations, something that our findings have shown that the collaborations in the building process aim to do.

Our study has also resulted in findings proving that whether the architecture firms collaborates with a partner that supports or does not support the belief of sustainability being important will influence the level of realization of sustainability aspects in a construction project. This finding is supported by Stubbs and Cocklin's (2008) argument that companies should only engage in partnerships with actors that share the same goals concerning sustainability aspects. Consequently, our findings are in line with previous research.

Based on this analysis of collaboration in the building process, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) collaborations that enable the architect to pass on decisions to contractors and receive information about the limitations of construction, and 2) collaborations with partners sharing the same goals of sustainability aspects.

5.4.2. Industry culture

We have found the industry culture to have a huge influence on the realization of sustainable construction. This is a finding not discussed in previous research thus we develop theory by arguing that the industry culture is a contextual dimension that will influence other business model components. Scholars argue that the whole system of actors which the company is part of needs to change in order to achieve a sustainable outcome (Gann & Salter, 2000; Mokhlesian & Holmén, 2012). This is a clear argument found in our empirical study. The construction industry consists of many actors with a conservative attitude, not willing to change their own procedures. The majority of actors are claimed to not compromise on their maximization of own shares and margins. This has shown to be a barrier for collaboration regarding sustainability aspects in the building process, thus impacting the realization of the architects design.

Based on this analysis of industry culture, we conclude that a business model in an architecture firm that offers sustainable solutions is influenced by the culture in the construction industry, many times being a barrier for the realization of sustainable construction.

5.4.3. Efforts to enhance collaboration

Hummel et al. (2010) argue that it is of great importance for a company to not only understand its own business model but also the business model of the actors the company collaborates with. Scholars also argue that collaboration needs to enhance in order to

accomplish sustainable outcomes (Gann & Salter, 2000; Mokhlesian & Holmén, 2012). Consequently, efforts to enhance the collaboration are proved vital in our empirical study.

In our empirical study, findings have been made regarding that the alignment of goals between actors is fundamental. To reach alignment, effective communication, both verbally and in contracts and designs, as well as a better understanding for each actor's work are examples of efforts that have proven to do this. These findings are in line with Girota and Netessine (2013) claiming the importance of goal alignment. Mokhlesian and Holmén (2012) add that the lack of knowledge about what other actors do in the supply chain is a barrier to collaboration. Furthermore, Altomonte et al. (2012) claim that the different actors need to exchange more information, thus enhance communication. Consequently, our findings are strengthening the research about architecture firms already existing.

Ngowi (2001) argues that in order to realize the sustainable construction designed by the architect, it is important to bring sustainability thinking into the process early in the projects. This has also been shown empirically in our study. Early discussions about sustainability matters can prevent future frustration about sustainability aspects not being realized since early discussions prevent misunderstandings. Hence, early discussions can enhance collaboration and thus the likelihood of that the architects' sustainable design comes through on the building site.

Based on this analysis of efforts done to enhance collaboration, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) alignment of goals with other actors in the building process through effective communication and understanding of other actors' work, and 2) early discussions with other actors concerning sustainability aspects in construction.

5.5. SOCIETY LEVEL

5.5.1. Driving the question of sustainable construction

Mitchell et al. (1997) and Osterwalder (2004) argue that stakeholders play an indirect role in the value creation process of a company. They may have sufficient impact on a company's possibility to succeed. This has also been demonstrated in our empirical study. The study explains that architects try to drive the question of sustainable construction in society, and try to influence other stakeholders. This is done both because they feel morally obligated to, but also because they have a strong belief in that it will make good business in the future. Hence, putting in efforts to enhance demand will in the long-run be economical beneficial for the architect. This is also in line with Cohen et al. (2005) claiming that architects view themselves as both public servants and business persons, thus they emphasize both acting for the benefit of society and for the benefit of the company.

In order to drive the question of sustainability in society, we have found that architects partner with other actors since a common effort will create greater results. Hence, the empirical findings show that partnering is a way of making sure that a sustainable construction actually

is realized. This finding complies with previous research. For example, Styhre and Gluck (2009) argue that architects recognize their own capacity to influence as minor, thus collaboration becomes vital. Rudawska et al. (2013) claim that close relationship with other actors in society will be essential for the realization of sustainability strategies. This argument is also presented in business model research (e.g. Osterwalder, 2004; Sommer, 2012). In addition to this, the theory of transaction cost economics claims that partnering with other actors will make the ones involved able to focus on their core competence. This can also be seen in the empirical findings, as the architecture firms' motivation to partner with other actors has partly to do with a belief in that it will be beneficial for their own business if other actors start to act in a more sustainable way. Consequently, our findings strengthening previous research claiming that partnering with other actor in society is important in order for sustainable construction to be realized.

Based on this analysis of driving the question of sustainable construction, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) a feeling of obligation toward working for the benefit of society, 2) a strong belief in that sustainable construction will make good business, and 3) partnerships with other actors in society in order to drive the question of sustainable construction, thus enhancing the demand. Based on this analysis we also conclude that a business model in an architecture firm that offers sustainable solutions is influenced by stakeholders' conviction of sustainability in construction.

5.5.2. Who to interact with

Styhre and Gluck (2009) claim that architects have a high willingness to come up with new ways of doing things. Partnering with actors that are not in direct connection to the value creation process can be seen as one initiative of doing things differently. Many examples of this has been shown in the empirical study, where banks, governments, manufacturers of building materials, research institutes, and scientists are examples of actors architects want to partner with. The reason for these collaborations has to do with the actors influence over the sustainability debate in society. The exact examples of collaborations has not been found in previous research, however Rudawska et al. (2013) claim that collaborations with suppliers is a way to optimize operations, and Bocken et al. (2014) further add that this can help to secure company success. Consequently, our study once again strengthen previous research arguing that collaboration with mentioned actors is beneficial for the architecture firm and for the realization of sustainable construction.

Based on this analysis of who to interact with, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) partnerships with actors such as banks, governments, manufacturers of building materials, research institutes, and scientists.

5.5.3. Knowledge sharing

The empirical findings have shown that architects are not afraid of sharing knowledge, not even with competitors, as they believe that shared knowledge would be beneficial for the

whole industry of sustainable construction, including themselves. This conforms to Chong et al. (2009) arguing that knowledge about sustainability is fragmented and spread among a variety of actors within the construction industry and society. The resource based view further adds that partnering with actors contribute to making resources that the company does not possess available (Barney, 1991). This argument is also shared by Osterwalder (2004). Concerning the construction industry, Bossink (2007) means that firms working with sustainability often trace, identify and develop knowledge through cooperating with others. Learning from peers and networking is further discussed as effective means of doing this (Chong et al., 2009; Mokhlesian & Holmén, 2012). In the empirical study we find that means of doing this include membership in platforms such as the Green Building Council, or collaborations with universities.

Based on this analysis of who to interact with, we conclude that a business model in an architecture firm that offers sustainable solutions is characterized by 1) openness towards knowledge sharing in order to both keep up to date and contribute to research and development.

5.6. BUSINESS MODEL TRANSFORMATION

Architecture firms that choose to incorporate sustainability through the offensive approach - offering sustainable construction - will have to do changes in their existing business models (Chesbrough & Rosenbloom, 2002; Mokhlesian & Holmén, 2012). This has also been clearly proved in our empirical study. Findings concern how the companies try to change for example their operations and their culture, as well as trying to influence their customers and collaboration partners. Linder and Cantrell (2000) argue that a business model transformation takes place when changes are required in the core logic of businesses that being the business model components. As the architecture firms in our study have tried to redefine their whole value creating process when deciding to offer sustainable construction, this has resulted in implications for all business model components.

Johnson et al. (2008) argue that the development of a new business model should always be based on the identified job-to-be-done, and only if being so should the content of other components be determined. However, our findings imply that companies are having a hard time deciding what the actual job-to-be done is. A fragmented view of who the customer is and what problem the customer has, has resulted in a variety of different sustainability offerings that the companies try to pursue. We have found this having a negative impact on other business model components. For example, a lack of understanding among employees of what creates value has created a culture not always supporting the company strategy of working with sustainable constructions. It has also resulted in that a company needs to possess a huge amount of resources, such as employees with knowledge in very specific areas of sustainability. In turn, having this accumulation of resources in-house has meant that resources are not utilized and thus value creation is not maximized. Consequently, we conform to previous research claiming that also a business model transformation among architecture firms should be based on a clearly identified job-to-be-done for a clearly

identified target customer. If not, the content of the other components will not be based on the same strategy, thus optimization of the value creation process will not occur.

Our study has shown that companies trying to change their business models have put in different efforts in order to define the job-to-be-done. For example, architects use their personal relationships with customers in order to educate and guide customers in one direction, thus concretize their needs. They also take advantage of previous projects, arguing that they have special competence within certain areas of sustainability thus steering the customers towards demanding the same aspects. Furthermore, they collaborate with other actors in society in order to drive the question of sustainability in certain directions. Although previous research within architecture concerns many of these efforts, no research has been found that discuss architects efforts to define their customer value. Consequently, we contribute to the development of existing theory arguing that the architect can put in efforts in order to more clearly define the job-to-be-done, something that is vital when it comes to offering sustainable construction.

Osterwalder et al. (2005) describe three phases of business model transformation; plan, change and implement. In the planning phase, many scholars claim the importance of thinking about political and cultural aspects, thus involving all people that can affect or be affected by the transformation. This, since involvement can result in conviction for the new business model, as well as the reduction of resistance (Lewin, 1951; Alvesson & Sveningsson, 2012; Sommer, 2012). Our empirical study shows that employees have a huge impact on the realization of sustainable construction. Thus a corporate culture supporting sustainability aspects is vital for transformation. Mitchell et al. (1997) further add that the conviction does not only concern employees but also other stakeholders. This has also been showed empirically. Findings regarding the influence of the culture in the construction industry are a clear proof of how the realization of an architecture firm's strategy within sustainable construction is discouraged. In addition to this, our findings conform to previous research claiming the importance of thinking about political and cultural aspects when planning a business model transformation such as the choice to start offering sustainable construction.

The changing phase includes translating the business model planed for into concrete operations (Osterwalder, 2004). Scholars argue that understanding among management and employees of both the current business model, the new business model, and the change process is vital (Osterwalder, 2004; Osterwalder et al., 2005; Johnson et al., 2008; Sommer, 2012). Our study reveals that education activities that combine theoretical and practical exercises help to increase understanding for the company's strategy. Our study also shows that employees need to have enough knowledge in order to understand when it is time to ask for additional expertise. Consequently, our findings comply with previous research emphasizing the importance of the employees' level of understanding of the new business model in order to realize the company strategy of sustainable construction. In addition to this, our study also found that sustainability enthusiasts help to heighten the awareness of sustainable construction in architecture firms, thus being a part of the transformation process. Hence, once again do we comply with previous research.

The implementation phase concerns activities that help to create a stable organization after the transformation (Lewin, 1951; Alvesson & Sveningsson, 2012). Previous research has not discussed which activities this may imply. However, we extend existing theory as our empirical study shows that aspects such as 1) having a supportive management team and project leader that values sustainability, 2) having working tools promoting sustainability in construction, and 3) having collaborations with partners sharing the same goals of sustainability aspects, will enhance realization of the sustainable construction.

The path dependency of a company will influence the company's ability to transform (de Reuver et al., 2013; Porter, 1991; Prahalad & Bettis, 1986). Our study demonstrates that path dependency of an architecture firm clearly influence their attempts to transform their business models towards supporting sustainable construction. For example, the traditional view of the profession as an artist has shown to be a barrier in order for employees to realize sustainability aspects in construction. Moreover, the fact that customers recognize companies depending on their previous projects has proven problematic when the company decides to change its offering. Consequently, our findings are in line with previous research claiming that the path dependency of the company will play a vital role in a business model transformation process.

Osterwalder et al. (2005) argue that no matter the content of the business model, it will accomplish nothing if it is not implemented in the company's operations. We found proof for this argument in our empirical study as the process of transformation has shown to correlate to the intensiveness of implementing activities. However, many architects are being frustrated as the process of integrating sustainability thinking has proven to take long time. This is in line with Johnson et al. (2008) arguing for the importance of patience since learning and adjusting is vital in order to transform to a well working business model. Consequently, our empirical findings are in accordance with previous research arguing the importance of time in business model transformation.

Based on this analysis of business model transformation, we conclude that an architecture firm that wants to adapt its business model towards offering sustainable construction should 1) base its new business model on a clearly identified job-to-be-done for a clearly identified target customer, 2) if needed steer the definition of the job-to-be-done through interactions with the customer and society, 3) think about political and cultural aspects of the firm when planning for the transformation, 4) create understanding of the new business model among employees, 5) emphasize the importance of supportive management, working tools promoting sustainability in construction, and collaborations with partners sharing the same goals of sustainability aspect, 6) be aware of their limitations of path dependency, and 7) not stress progress.

5.7. FINAL FRAMEWORK

Concluding our empirical study, the final framework presented in this chapter describes what characterizes the business model in an architecture firm that actively works with sustainable construction. The final framework also gives important insights to how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction. Hence, the final framework answers to the purpose of this study.

Table 5: Final framework.

Analysis level	Characteristics of an architecture firm offering sustainable construction
<p>Market level</p>	<p><i>Customer perception:</i></p> <ul style="list-style-type: none"> - A fragmented view of the customer. - Target customers with both short-term and long-term perspective. - Architects defining the job-to-be-done for existing customer. - An existing demand for sustainability competence within construction. - Problems to solve include decreasing costs, increasing the market value of a building, providing a building that gives the customer a profile as an actor concerning about sustainability, providing a design that supports wellbeing, and helping the customer comply with regulations. - A growing demand for sustainable constructions. - Contextual: Governments play an important role in determining the job-to-be-done through heighten the regulation level. - Contextual: Publications in media concerning sustainability and the public sector demanding sustainable constructions influence what is demanded. <p><i>Holistic design:</i></p> <ul style="list-style-type: none"> - An offering consisting of sustainability plans and sustainability consulting, focusing on certain parts of a building's lifecycle including both environmental, social and economical aspects. - Contextual: The offering is dependent on path dependency and climate conditions. <p><i>Personalized relationship:</i></p> <ul style="list-style-type: none"> - A personalized relationship built on trust and experience. - The same means of getting in contact with the customer as traditionally. - High initial investments and effort to convince the customer. - The architects actively selecting which customers to work with. - A portfolio based on experience rather than brand. - Integration with the end customer. - Contextual: Contractors' motivation can influence whether the client is convinced. <p><i>How to gain revenue:</i></p> <ul style="list-style-type: none"> - Being comparable to the revenue model of an architecture firm offering conventional buildings. - Billing more hours, but at the same price per hour. - Initial investments intended to generate future revenue. However, the culture among architects is reluctant towards not charging for performed work.

<p>Organizational level</p>	<p><i>Project structure:</i></p> <ul style="list-style-type: none"> - A decentralized organizational structure, work in projects, and informal relationships. - A number of employees that support the company's ability to take on sustainable projects requested by clients. - Leaders that are motivated to work with sustainable construction. <p><i>Dependency of knowledge:</i></p> <ul style="list-style-type: none"> - Employees with knowledge that enable sustainable construction. - Knowledge based on experience. - Education activities within sustainable construction that combine theoretical and practical exercises. - Having the financial resources enabling internal research. - Contextual: Level of knowledge about sustainability in construction as an aspect to compete on in the industry. <p><i>Engagement of employees:</i></p> <ul style="list-style-type: none"> - A company size that supports required employee engagement in sustainable construction. - Individual employees valuing sustainability aspects. - A corporate culture supporting sustainability values. <p><i>Efforts to enhance engagement:</i></p> <ul style="list-style-type: none"> - A management team supporting employees work with sustainability aspects in designs. - Working tools promoting sustainability in construction. - Sustainability enthusiasts influencing employees and heightening the awareness of sustainable construction. <p><i>Generalists and specialists:</i></p> <ul style="list-style-type: none"> - Employees that have enough knowledge in order to know when it is time to ask for additional expertise. - A balance of in-house generalists and specialists, where external transactions of specialists depends on the level of specialization and the corresponding cost. - A cost structure not that different from non-sustainable projects.
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<p>Industry level</p>	<p><i>Collaboration with actors in the building process:</i></p> <ul style="list-style-type: none"> - Collaborations that enable the architect to pass on decisions to contractors and receive information about the limitations of construction. - Collaborations with partners sharing the same goals of sustainability aspects. <p><i>Industry culture:</i></p> <ul style="list-style-type: none"> - Contextual: The culture in the construction industry, many times being a barrier for the realization of sustainable construction. <p><i>Efforts to enhance collaboration:</i></p> <ul style="list-style-type: none"> - Alignment of goals with other actors in the building process through effective communication and understanding of other actors' work. - Early discussions with other actors concerning sustainability aspects in construction.
<p>Society level</p>	<p><i>Driving the question of sustainable construction:</i></p> <ul style="list-style-type: none"> - A feeling of obligation toward working for the benefit of society. - A strong belief in that sustainable construction will make good business. - Partnerships with other actors in society in order to drive the question of sustainable construction, thus enhancing the demand. - Contextual: Influence by stakeholders' conviction of sustainability in construction. <p><i>Who to interact with:</i></p> <ul style="list-style-type: none"> - Partnerships with actors such as banks, governments, manufacturers of building materials, research institutes, and scientists. <p><i>Knowledge sharing:</i></p> <ul style="list-style-type: none"> - Openness towards knowledge sharing in order to both keep up to date and contribute to research and development.

Business model transformation

An architecture firm that wants to adapt its business model towards offering sustainable construction should:

- Base its new business model on a clearly identified job-to-be-done for a clearly identified target customer.
- If needed steer the definition of the job-to-be-done through interactions with the customer and society.
- Think about political and cultural aspects of the firm when planning for the transformation.
- Create understanding of the new business model among employees.
- Emphasize the importance of supportive management, working tools promoting sustainability in construction, and collaborations with partners sharing the same goals of sustainability aspect.
- Be aware of their limitations of path dependency.
- Not stress progress.

6. CONCLUSION

Our purpose with conducting this study was to increase the understanding of how the business model of an architecture firm needs to adapt when the company decides to offer sustainable construction. We did this by identifying what characterizes a business model in an architecture firm that actively works with sustainable construction. Insights about the transformation process the firm needs to go through in order to offer sustainable construction have been provided as well. Through a literature study a preliminary theoretical framework was developed providing us with a preliminary theoretical answer to the purpose of this study (see *chapter 2.4.*). Thanks to our multiple case study we were able to develop theory by complementing, rejecting and positioning the suggestions offered by the preliminary theoretical framework in an empirical context. We constructed the final framework by matching the empirical patterns with the patterns suggested by the preliminary framework, with an interpretive approach allowing for the empirical observations to challenge and offer perspective on both the preliminary framework and the entire research purpose. Thus the final framework includes both previous theoretical findings that were confirmed by our empirical findings and additional empirical findings contributing to an increased understanding.

The answer to our purpose is the final framework, which in our view offers a robust, rigorous and relevant perspective on what the business model of an architecture firm entails in order to successfully offer sustainable construction. The final framework can further guide architecture firms in their attempts to transform their business models. The framework is structured into four different levels of analysis, which explain different relationships that a firm has to consider to successfully transform. Key at the market level is to start with defining the customer and its needs in order to build a personalized relationship and thus gain revenue in the long run. At the organizational level an organizational structure that facilitates engagement among employees and enables efficient distribution and development of knowledge is vital. At the industry level collaboration with other actors is argued to be necessary in order to realize a sustainable design. Finally, the society level considers the relationship an architecture firm needs to have with external actors in order drive the question and consequently influence the level of demand.

As a basis for our conclusion, and as a basis for the subjective evaluation of our research, we use Lincoln and Guba's (1985) trustworthiness measures credibility and transferability. One of our framework's strengths is the fact that it is an integration of the theoretical domains; the offensive sustainability approach, business models, and architecture firms. There are scholars, such as Mokhlesian and Holmén (2012), Bocken et al. (2014), and Stubbs and Cocklin (2008) that have studied one or two of these domains before, but unsurprisingly perhaps, given the relative novelty of the phenomenon in question, there are few, if any, studies of the intersection between all three fields. Thus, the framework is the only one of its kind and contributes by filling gaps in an area hitherto rather under-researched. The theoretical aspects are well integrated with empirical findings and a holistic perspective of what characterizes a business model in an architecture firm that actively works with sustainable construction is provided.

Knowledge about how a firm converts its ideas about offering its customers sustainable solutions, in other words transforming its business to successfully do so, is highly demanded today (Barkemyer et al., 2014). For architects our framework contributes with additional understanding of how to adapt all aspects of the company's business model. In other words, one will as an architect not only know that something has to be changed, but actually what it is that has to change and how to do so. Since offering customers sustainable architecture are not yet widely dispersed those who manage to do so successfully can gain a first mover advantage all the while contributing to a more sustainable society. Since our empirical study has a holistic perspective, our findings can also be of value for other actors within the construction industry. The findings may for instance be applicable for engineers being part of a building project. Our empirical findings show that architects are very eager to be up to date and that they want to contribute with developing existing knowledge about sustainability within the industry. Furthermore our respondents have stated that being part of this study is something they value highly and that it has made them reflect over what they are actually doing in their day-to-day work. They are also very eager to take part of the results. These are emblematic examples of the practical importance and usefulness of our study for actors within the construction industry.

Furthermore, we believe that our empirical findings can be valid for other architecture firms operating within other western countries. However, one should be aware of that all Nordic countries have quite similar contextual circumstances such as climate, history, educational level, technological development, culture together with political and economical environment. For instance we have in our empirical study come across that regulation is a vital contextual dimension for whether sustainable construction is realized. Thus, differing contextual circumstances could limit the possibility for our findings to be valid in other countries.

As indicated above, our study investigates a research domain that is relatively unexplored but at the same time identified by scholars as highly relevant to study (Magretta, 2002; Mokhlesian & Holmén, 2012; Sommer, 2012; Teece, 2010). Based on our empirical findings, we predict a development within architecture firms offering sustainable solutions in the next years, something that imply that our findings will have to be updated. We thus encourage other scholars to take advantage of our framework's holistic perspective and further deepen the knowledge within this field. In the same way as one of our study's main strength is its holistic perspective, it would be interesting if future research focus on only a few components of a business model in order to achieve further depth. For instance, it would be interesting to study customer relationship management theory since the target customer and its needs have proved to be very fragmented. Another interesting field to study more narrowly would be how the culture within the industry influences an architecture firm offering sustainable construction. Moreover, it would be interesting to repeat our study in countries with other contextual circumstances in order for the framework to become more general. It would for instance be interesting to conduct research in a country such as the United States of America where a lot of the international building certifications are developed, or in China where growth in population means great challenges for sustainable development. A further suggestion for

future research is to statistically study changes to the revenue model and cost structure when a company has succeeded with transforming its business model.

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APPENDIX

Appendix 1: Interview guide

PERSONAL BACKGROUND

- Personal questions***
- Education? Education within sustainable construction?
 - Earlier working experience? Working experience within sustainable construction?
 - Personal interest in sustainability?
- Company related questions***
- Why this company?
 - Position(s)? What does that imply? Sustainable construction?

COMPANY

- Company in general***
- What kind of architecture? Niches? Assignments?
 - What is core in *company name*?
 - How does *company name* differentiate itself from others?
- Sustainability***
- What is the industry view of sustainable construction?
 - What is the company view of sustainable construction?
 - Active work with sustainable construction?

VALUE FOR THE CUSTOMER

- Job-to-be-done***
- What need/problem does *company name* solve by working with sustainable construction?
 - What motivates customers to buy sustainable constructions?
 - Demand from customer or society? Demand / Pressure?
- Offering***
- What is it that *company name* offers the customer to satisfy this need?
 - Offer in functionality / Resource use / Premium solutions?
 - What does sustainability imply in *company name* constructions?

VALUE FOR THE FIRM

- Revenue model***
- What is the customer ready to pay for, sustainable / non-sustainable projects?
 - Affordable / Premium price?
- Cost structure***
- Comparison of costs in sustainable /non-sustainable projects?
 - Does sustainable constructions cost more? For who?
 - Short / long-term investments?

CUSTOMER INTERACTION

- Target customer***
- Who is the customer of sustainable constructions? What differs this customer from other?
 - Economically driven / Conscious?
 - Who do *company name* design for, the customer ordering / customer using?

<i>Customer relationship</i>	<ul style="list-style-type: none"> - What characterizes the relationship of a customer of sustainable / non-sustainable solutions? - Do you use different approaches for interacting with customers regarding sustainable constructions than for non-sustainable? - Is there a need for educating the customer in sustainable matters? - Co-creation of value?
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THE FIRM

<i>Internal conditions</i>	<ul style="list-style-type: none"> - How is a sustainable project structured? Work distribution? Coordination? Collaboration? - Does your company culture promote or counteract offering sustainable solutions? How does this affect your sustainable projects?
<i>Resources</i>	<ul style="list-style-type: none"> - What are the key resources in terms of; tangible, intangible, human and financial assets, when working with sustainable constructions?
<i>Processes</i>	<ul style="list-style-type: none"> - What are the key processes / activities when working with sustainable constructions?

BUSINESS INTERACTION

<i>Partnerships</i>	<ul style="list-style-type: none"> - How do <i>company name</i> work with partnerships regarding sustainable constructions? - In or beyond the industry?
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CONTEXTUAL DIMENSION (If not already answered)

<i>Political and economical environment</i>	<ul style="list-style-type: none"> - Does regulation support or contradict work with sustainable constructions? - How does countries economical circumstances influence? - How does this affect <i>company name</i>?
<i>Stakeholders</i>	<ul style="list-style-type: none"> - What pressure do you experience from stakeholders regarding sustainability? - How does this affect <i>company name</i>?
<i>Competitive elements</i>	<ul style="list-style-type: none"> - Is offering sustainable solutions a must or a way to compete in the industry? - How does this affect <i>company name</i>? - What is important in the competition with other architecture firms?

OPERATIONALIZATION AND FUTURE ASPECTS

<i>Realization</i>	<ul style="list-style-type: none"> - Working with sustainable construction, what is the hardest / easiest thing to do?
<i>Future aspects</i>	<ul style="list-style-type: none"> - Why offering sustainable solutions today? What is the drive? - Do you feel that you as an architect can make a difference towards a more sustainable society? - What role do you think offering sustainable solutions will have in the future?

Appendix 2: Respondents in pilot study

Name	Company	Profession	Date	Location
Jesper Magnusson	Lund university school of technology	Professor	29-01-2015	Lund
Ellen Siesjö	What!	Architect	01-02-2015	Gothenburg
Catharina Sternudd	Lund university school of technology	Professor	13-03-2014	Lund
Björn Siesjö	Municipality of Gothenburg	City architect	23-02-2014	Gothenburg

Appendix 3: Respondents in multiple case study

Nordic country	Company	Name of respondent	Profession	Date of interview
Sweden	White architects	Anna Graaf	Partner, Director Sustainability	19-03-2015
		Johanna Engberg	Partner, Environmental specialist, Architect	24-03-2015
	CaseLab (former White architects)	Anders Svensson	Process manager, Professor of the practice, Architect, (Former CEO of White architects)	20-03-2015
	Kjellgren Kaminsky Architecture	Joakim Kaminsky	Partner, Architect	23-03-2015
		Christer Fröberg	Office manager, Business developer	23-03-2015
Denmark	Vandkunsten	Søren Nielsen	Partner, Architect	20-03-2015
		Jan Schipull Kauschen	Architect	20-03-2015
	Gottlieb Paludan Architects	Christina Tolstrup	Head of Sustainability Design, Architect	08-04-2015
Norway	Architectopia	Andrew Holt	Partner, CEO, Architect	26-03-2015
		Paul Woodville	Partner, Architect	26-03-2015
		Ingunn Heiberg	Architect	26-03-2015
	Ratio architects	Sverre Svendsen	Partner, CEO, Architect	27-03-2015
		Karin Hagen	Partner, Architect	27-03-2015
		Marta Eggertsen	Architect	27-03-2015
Finland	PES-Architects	Tristan Hughes	Architect	09-04-2015
		Martin Lukasczyk	Architect	09-04-2015
		Toivo Moustgaard	Architect	9-04-2015
	L architects	Niklas Sucksdorff	Chairman of the board, Partner	10-04-2015
		Daniela Grotenfelt	Leading Consultant Sustainability Services	10-04-2015

Iceland	ARKÍS architects	Björn Guðbrandsson	Partner, Architect	13-04-2015
		Viggó Magnússon	Constructing architect	13-04-2015
	BASALT architects	Hrólfur Karl Cela	Partner, Architect	14-04-2015
		Marcos Zotes	Partner, Architect	14-04-2015