Sustainable Innovation - Driving Factors in Large Firms

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ABSTRACT

During recent years, there has been a growing interest in sustainable innovation both in academia and in practice. Our qualitative, multiple case study examines this emerging field in the context of large firms. By doing so, this thesis contributes to the understanding of the concept as well as the underlying factors driving sustainable innovation.

Theory highlighted both external and internal factors in firms’ sustainable innovation engagement. The empirical evidence identifies five key factors driving sustainable innovation in large firms; market demand, new business opportunities, interfunctional collaboration, management commitment and corporate culture. Furthermore, it clarifies to what extent each of the factors affects the process of developing sustainable innovation within firms. These factors are found to go together, sometimes collide and enhance one another. This study is built on rich data collected through semi-structured interviews together with secondary sources from four of Sweden's largest and industry leading firms; Atlas Copco, Ericsson, H&M and IKEA. Theoretical and managerial implications are discussed with important insights for both scholars and practitioners.

Key words: sustainable innovation, regulations, market demand, business opportunities, interfunctional collaboration, management commitment, knowledge management, corporate culture.
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1. INTRODUCTION

The world is facing critical challenges such as climate change, humanitarian crises and natural resources scarcity. In line with this, many countries have adopted the United Nation’s (UN) 17 goals to end poverty, protect the planet and ensure prosperity, as part of a new sustainable development agenda. Each goal represents a development target and the UN claims that it is the responsibility of governments, civil society and the private sector to act together (UN, 2016). Large firms such as Procter & Gamble, Nike and IKEA (three out of 68 global companies) have even gone further and signed a White House-sponsored agreement to take more aggressive action on climate change, as part of President Barack Obama's push on corporate support for global climate (Financial Times, 2015). Hence, corporations play a significant role in society and experience an increased pressure to act upon global challenges. One increasingly important way for companies to address these challenges is through developing sustainable innovation (Klewitz and Hansen, 2014; Trifilova et al., 2013). Sustainable innovation is differentiated from traditional innovation in terms of purpose and direction as it requires integrated thinking and incorporates a wider range of considerations (Adams et al., 2012). While traditional innovation solely emphasizes the financial perspective, sustainable innovation adopts a broader focus with the inclusion of social and environmental concerns into innovation processes (Hansen et al., 2009; Ketata et al., 2015). Accordingly, sustainable innovation is defined as a process where sustainability considerations (environmental, social, financial) are integrated into a company system and applies to products, services, technologies and business models (Charter and Clark, 2007).

During recent years, there has been a vast expansion of research on sustainable innovation, increasing our understanding in what ways new technologies and social practices enable societies to become more sustainable through innovation (Boons and Lüdeke-Freund, 2013). To survive in constantly evolving markets and environments, companies are forced to innovate and to change how they think about products, processes and business models, something that can enable them to develop competitive advantages and drive profitable growth (Waite, 2013). As a result, the adoption of sustainable innovation is accelerating within firms. It can occur at the product level through designing sustainable products and services, process level when making value chains more sustainable or organisational level when creating new forms of management, structures or developing new business models (Klewitz and Hansen, 2014; Triguero et al., 2013). One example of sustainable innovation is Nike’s new shoe, the Flyknit Race. Nike created a 19% lighter shoe by
using yarns and fabric variations and made an overall waste reduction by eliminating multiple materials in the development process. The Flyknit Race has 80% less waste compared to the traditional-profile running shoe. Nike has further included social requirements within their production in order to increase control of the supply chain (Nike, 2016).

1.1. Problem statement

As sustainable innovation is a relatively new concept, much of research to date has focused on trying to understand and further develop the concept (Boons and Lüdeke-Freund, 2013; Charter and Clark, 2007; Klewitz and Hansen, 2014; Schiederig et al., 2012). Previous studies have also highlighted its performance implications (Adams et al., 2012; Nidumolu et al., 2009; Szekely and Strebel; 2013). As firms increasingly embed sustainable innovation practices in their core businesses, they move from optimising operations, through transforming the organization, to building a new system with redesigned infrastructures and reconceptualised business purposes (Adams et al., 2012). The wide spectrum of sustainable innovation indicates varying degrees of its impact, namely incremental innovation, radical innovation and game-changing innovation (Szekely and Strebel, 2013).

Despite a growing body of research on sustainable innovation, little emphasis has been placed on understanding the underlying factors driving sustainable innovation within firms. In the literature, both external and internal factors have been recognised in firms’ sustainable innovation engagement (e.g.: Arnold and Hockerts, 2011; Bossle et al., 2015; De Medeiros et al., 2014; Ketata et al., 2015). External factors refer to regulations and incentives or pressures from a wide range of stakeholders to which companies respond. Meanwhile, internal factors are associated with the existence of internal preconditions and features of companies facilitating their involvement in sustainable innovation (Del Rio González, 2009). Yet, there remains a lack of empirical studies and thereby knowledge regarding how these factors influence the development of sustainable innovation within firms. While Ketata et al. (2015) attempt to address the empirical gap, their quantitative study is dedicated to testing a number of factors through surveys; hence, in-depth insight into the actual process of sustainable innovation development is still limited.

Furthermore, prior research has analysed sustainable innovation at the inter-organisational level or the societal level but few studies have been done at the firm level. Hence, future research should place more emphasis on firm level studies to analyse relevant issues thoroughly at the micro-level;
and to compare sustainable innovation processes from different firms (Schiederig et al., 2012). Particularly, more attention should be given to large firms as they are often recognised as early adopters of new concepts and thus key contributors to fostering sustainable innovation in the business environment (MacKinnon and Cumbers, 2007).

1.2. Research question

The purpose of this thesis is to empirically explore and gain deeper knowledge about the sustainable innovation concept and understand the underlying factors for sustainable innovation development within firms. By doing so, it will contribute to the research stream on this emerging concept and filling the aforementioned gap regarding how large firms drive sustainable innovation. This thesis seeks to answer the following research question:

*What are the underlying factors driving sustainable innovation in large firms?*

1.3. Disposition

The remained of the thesis is structured as follows. In the next section, we will review the literature in this field. Thereafter, the method section is presented, where we discuss the choice of qualitative research design. Then we present our four studied companies; Atlas Copco, Ericsson, H&M and IKEA, as well as our empirical findings, which is followed by our analysis. The thesis ends with a concluding section; highlighting main conclusions, bringing forward theoretical and managerial implications and suggestions for future research.

2. LITERATURE REVIEW

In the following section, we will review the literature on sustainable innovation, more particularly theoretical perspectives discussing the concept of sustainable innovation and suggested factors influencing sustainable innovation. Theory on large firms will also be presented.

2.1. The sustainable innovation concept

Recently companies have started to treat sustainability\(^1\) as a frontier for innovation. Indeed, more companies are focusing on sustainability, which forces them to rethink products, technologies,

\(^1\) Sustainability or sustainable development is commonly defined as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987).
processes and business models (Nidumolu et al., 2009). Following this trend, sustainable innovation is emerging and seen as a major force for change in business and society, owing to its potential to transform technology, markets and products (Larson, 2000). The increased interest and awareness of sustainable innovation has changed the way in which companies innovate and operate. In the past, innovation had a tendency to merely focus on the economic dimension and sustainable innovation adds the environmental and social perspectives to the concept of innovation (Hansen et al., 2009).

The research field has expanded rapidly during the past decade, which has increased our understanding of what sustainable innovation is. Yet, in the literature, there is still a lack of conceptual consensus regarding sustainable innovation (Adams et al., 2012; Boons and Lüdeke-Freund, 2013; Schiederig et al., 2012; Trifilova et al., 2013). A myriad of terms have been used interchangeably and synonymously with the term “sustainable innovation”; eco-innovation, eco-friendly innovation, environmental innovation, environmentally sustainable innovation, green innovation, sustainability driven innovation, sustainability enhancing innovation, sustainability focused innovation and sustainability-oriented innovation (Adams et al., 2012; Arnold and Hockerts, 2011; Carrillo-Hermosilla et al., 2010; Hansen et al., 2009). In relation to these terms, it is argued that sustainable innovation goes beyond eco-innovation, environmental innovation or green innovation as it incorporates the social dimension (Boons et al., 2013; Schiederig et al., 2012). To summarise, Ketata et al. (2015) argue that sustainable innovation is a broad and multidimensional concept linked to the holistic and long-term objectives of sustainability. Drawing upon this reasoning, the thesis uses the following definition of sustainable innovation:

*Sustainable innovation is a process where sustainability considerations (environmental, social, financial) are integrated into a company system from idea generation through to research and development (R&D) and commercialisation. This applies to products, services and technologies, as well as new business and organisation models (Charter and Clark, 2007).*

Earlier studies have primarily focused on the opportunities that sustainable innovation can bring, such as cost reduction, new market opportunities, enhanced brand reputation and competitive advantage (Ketata et al., 2015; Nidumolu et al., 2009). Yet, sustainable innovation may not result in immediate financial benefits, rather its pay-offs are often related to long-term objectives of the
firm. Sustainable innovation is argued to be more expensive than conventional innovation, since it often requires investments in different technologies, exceeding a company’s existing technological capabilities (Ketata et al., 2015). Moreover, sustainable innovation brings uncertainties about the future market, which hinders firms from strong commitment to the development of sustainable innovation (Geels et al., 2008; Hansen et al., 2009). Therefore, companies might fear that sustainable innovation leads to market failure, or can cannibalise their existing products (Geels et al., 2008).

2.2. External factors for sustainable innovation

Below, the two widely mentioned external factors that influence sustainable innovation development; regulations and market demand will be discussed.

2.2.1. Regulations

Regulations appear as a predominant external factor for the adoption of sustainable innovation, usually known as the “regulatory push” (Bossle et al., 2015; Horbach et al., 2012, Ketata et al., 2015). Hansen et al. (2009) stress that the enforcement of laws and regulations on social and environmental issues can increase the pressure for innovativeness. With higher control from government regulatory bodies, the higher is the probability of investments in new equipment and technology, and thus higher probability that sustainable innovations can succeed (De Medeiros et al., 2014). Bossle et al. (2015) further emphasise that the perceived pressures from regulatory stakeholders boost sustainable innovation and are instrumental in stimulating R&D policies and in creating leading markets in sustainable innovation. With firms’ response to regulatory mechanisms, sustainable innovation becomes not only a chosen capability but also a mandatory capability (Ketata et al., 2015).

The importance of regulations also depends on the size of the firm. According to Kungolos (2007), small and medium-size companies are late in learning about new regulations since they do not have the resources to keep up with the latest regulations and dare to take the risk of being a first mover. In opposition, larger firms have the possibility to serve changes to new regulations and react with innovations and thereby become first movers regarding new regulations.
2.2.2. Market demand

Market demand refers to requirements from various stakeholders such as suppliers, customers, competitors, consultants, non-governmental organizations (NGOs) that companies interact with (Ayuso et al., 2011; Bossle et al., 2015). On one hand, these stakeholders are increasingly demanding products to be produced in a sustainable way, for instance, using eco-efficient processes, consuming less energy and resources, mitigating hazardous impacts on the environment, improving health and safety conditions for employees and the local communities and society in general (Ketata et al., 2015). On the other hand, firms benefit greatly from interaction with various stakeholders, as they can help firms to predict, understand and respond faster in the rapidly changing business environment (Ayuso et al., 2011).

Customers play an important role as a stakeholder group, since sustainable innovation depends on consumers’ willingness to buy such innovations (De Medeiros et al., 2014). Customers have certain demands, especially with regards to improved environmental performance, process innovations that increase material efficiency and reduce energy consumption, waste and dangerous substances. Thus, responding to their customers’ requirements serves the interest of the companies (Horbach et al., 2012). As customers become more sensitive about sustainability issues, they can react aggressively with firms’ unsustainable conduct by boycotting their products or services. Reversely, they can increase their loyalty if the companies are known for conducting business in a sustainable way (Ketata et al., 2015).

Market demand can lead to collaboration with external stakeholders, where companies can gain knowledge and competence through project work, partnerships and multi-stakeholder cooperation. These collaborations serve as crucial mechanisms for fostering sustainable innovation (Arnold and Hockerts, 2010). De Medeiros et al. (2014) emphasize the importance of establishing networks and collaborations by connecting a broad range of stakeholders, such as businesses, NGOs, organisations and governments. As companies move into new markets, beyond their traditional expertise, they need alliances with other partners. By engaging in collaborations with different stakeholders, companies have the opportunity to gather valuable information to generate positive outcomes for their sustainable innovation projects (De Medeiros et al., 2014).

Nevertheless, companies sometimes find it complicated in establishing cooperation, strategic alliances, monitoring and having a dialogue with other stakeholders (Arnold, 2010). Different
stakeholders have various agendas, and in some cases, they might come with contradictory demands. Consequently, recognising, managing and integrating these demands would become a challenging task for companies engaging in the field of sustainable innovation (Hall and Vredenburg, 2003).

2.3. Internal factors for sustainable innovation

While companies have little control of external factors, they can take a more active role with respect to internal factors. Investigating the internal factors underlying the development of sustainable innovation is crucial to gain a better understanding of how companies can foster sustainable innovation and through that create competitive advantages. Below, five internal factors that affect sustainable innovation development will be discussed.

2.3.1. New business opportunities

Studies show that recognising new business opportunities motivates firms to engage in the field of sustainable innovation. In doing so, firms have the opportunity to lower the costs of their operations considerably. This is attributed to more efficient processes and reduction in the inputs and resources used (Arnold and Hockerts, 2011; Trifilova et al., 2013). An example of this is the Nike shoe presented in the introduction section; by developing a 19% lighter shoe, Nike had 80% less waste in the production compared to the traditional-profile running shoe (Nike, 2016). By reducing costs, companies can generate additional revenues and increase their profits as a result (Nidumolu et al., 2009).

Additionally, sustainable innovation is considered to be a long-term investment, where it creates competitive advantage for companies (Hansen et al., 2009; Ketata et al, 2015; Nidumolu et al., 2009). As more firms look into the area of sustainability, it transforms the competitive landscape and changes the way firms innovate in products, processes and business models. By pursuing sustainable innovation, early movers can develop competencies over their rivals, thereby creating a competitive edge (Nidumolu et al., 2009). Furthermore, sustainable innovation engagement enhances a company’s reputation in the market, appealing to more customers as a result (Ketata et al., 2015). Sustainable innovation opens up new business opportunities when it enables firms to attract new customer segments and tap into new markets (Arnold and Hockerts, 2011; Hansen et al., 2009). As an increased number of consumers prefer eco-friendly offerings, companies have the
possibility to win over rivals by being the first to develop new products incorporating the sustainability aspect and thus capture the market opportunities (Nidumolu et al., 2009).

2.3.2. Interfunctional collaboration
Several studies highlight the important role of interfunctional collaboration in the development of sustainable innovation. Interfunctional collaborations refers to collaboration between different business units (De Medeiros et al., 2014; Jorna, 2006; Ketata et al., 2015). Sustainable innovation is often considered more complex than conventional innovation, thus it requires more complicated routines and capabilities (Ketata et al., 2015; Szekely and Strebel, 2013). In order to drive sustainable innovation, businesses need to apply a wider approach and implement extensive changes in the organisation. It is important to increase the awareness of the firm’s goal, strategy and how to create sustainable innovation, therefore collaboration between different departments is important (Boons and Lüdeke-Freund, 2013; Szekely and Strebel, 2013). Interfunctional collaboration in the field of sustainable innovation involves nearly all organisational functions, from human resources, R&D, production, marketing and sales (Ketata et al., 2015). Firms need to create a network connecting diverse competences in the organisation where proactivity and continuous exchanges among different business areas will drive the company's improvements in sustainable innovation performance (De Medeiros et al., 2014).

2.3.3. Management commitment
Management plays a significant role in shifting companies’ directions from conventional innovation to sustainable innovation (Arnold, 2010; Hall and Vredenburg, 2003). Since sustainable innovation relates to creating new ways of doing business, it requires the company management to question existing models, conduct critical reflections and analysis of the corporation’s actions (De Medeiros et al., 2014; Nidumolu et al., 2009). As companies become more capable at this, their experience will lead them to the final stage of sustainable innovation, where the impact of a new product or process extends beyond a single market (Nidumolu et al., 2009). Nevertheless, managers are faced with considerable difficulties in implementing sustainable innovation strategy. According to Waite (2013), many senior executives are confused about how to best manage sustainable innovation and how to integrate the environmental, social and financial dimension into the company’s strategy. This raises the question whether companies can overcome the fear of losing short-term profitability.
The advancement of sustainable innovation is argued to depend on management commitment. In this sense, a clear vision and management support is crucial for firms to initiate strategic changes toward sustainable innovation (Arnold, 2010). Top management must become active in the process of driving sustainable innovation within corporations as “when a company’s top management team decides to focus on the problem, change happens quickly” (Nidumolu et al., 2009, p.10). In line with this, Waite (2013) states that when management shows their proactivity, it influences how fast decisions can be made in relation to sustainable innovation.

2.3.4. Knowledge management

Knowledge management refers to the process of collecting, distributing and using knowledge resource efficiently in every level and area of the organisation (Ayuso et al., 2011). It highlights the central role of people in the knowledge creation process and a firm’s capacity to innovate depends substantially on the knowledge of its employees (Robinson et al., 2006). According to Jorna (2006), sustainable innovation is tied to knowledge as it elaborates, generates, and produces new knowledge. In this sense, knowledge should be seen as the key engine of sustainable innovation and it is the people who realise and extend existing knowledge. In a similar view, Ketata et al. (2015) state that motivated and trained employees increase the firm’s ability to spot and collect opportunities from the environment, to set priorities and choose the most crucial ones.

Firms need to be able to manage knowledge internally and exploit it successfully in order to convert knowledge into innovative ideas (Ayuso et al., 2011). As knowledge required for successful sustainable innovation is perceived to be more complex and uncertain than for conventional innovation, firms need to focus on providing specific training for employees to prepare them for the execution of sustainable innovation activities (Ayuso et al., 2011; Ketata et al., 2015). Therefore, formal learning processes and structures such as platforms, networks, workshops, sustainability programs and increased spending on employee training are crucial to enable knowledge transfer (Arnold, 2010; Bossle et al., 2015). These systems should be based on non-hierarchical structures, flexibility and openness to change in order to drive sustainable innovation. This allows employees to access and manage knowledge acquired from a wide range of stakeholders and transform it into sustainable innovation (Ayuso et al. 2011). Thus, knowledge management promotes continuous improvement and facilitate sustainable innovation in products and business processes (Robinson et al., 2006). On the contrary, lack of preparation and training
may result in employees’ frustration and tension, which adversely affects the outcomes of sustainable innovation projects (Ketata et al., 2015).

2.3.5. Corporate culture

Corporate culture plays an important role in formulating strategies towards sustainable innovation, where it demands an interplay of all people, relations and processes. Corporate culture conveys the firm’s values as well as represents its established solutions and social integration (Arnold, 2010). In order to create an organisational culture integrating sustainability, a sustainability vision needs to be integrated into all areas of the company, its strategy and overall supply chain (De Medeiros et al., 2014). In this sense, sustainability values and norms should be embedded not only in management but also in organisational members’ activities (Arnold, 2010).

Fichter and Pfriem (2007) stress that sustainable innovation is mainly a cultural challenge for companies, which requires more of a communication debate on sustainable innovation. Companies need to address the innovation process with a change in culture and behaviour. This cultural awareness should also incorporate customers and partners’ values and beliefs (Fichter and Pfriem, 2007). Pushing the inextricable link between the cultural factor and sustainable innovation one step further, Dewberry and de Barros (2009) advocate that sustainable innovation requires transforming the cultural paradigm. This means challenging and rethinking the current business value system, moving from seeking incremental improvements in resource efficiency towards implementing transformational changes in their behavioural patterns. Companies engaging in sustainable innovation should evolve a new type of culture where values, beliefs, priorities and aims are radically different from traditional innovation (Dewberry and de Barros, 2009).

Ketata et al. (2015) highlight that a culture of openness for innovation is an essential condition for firms to recognise the need to innovate. Firms need to follow an open culture allowing them to expose to multiple sources of external knowledge as it is crucial for the emergence of sustainable innovation. De Medeiros et al. (2014) also emphasise the importance of an open culture to foster sustainable innovation and that cultural barriers should be eliminated as they inhibit companies from seizing business opportunities related to sustainable innovation. Complementing these views, Arnold (2010) posits that the success of sustainable innovation is closely associated with a corporate culture that encourages entrepreneurship and freedom for all members in the company.
2.4. Large firms

Production, distribution and consumption of services and goods are mainly organised within global production networks and coordinated by large firms (Dicken, 2011). Large firms operating globally (also defined as Multinational Corporations, Transnational Corporations) have become dominant actors within globalisation and are central to the global economy. In a competitive market, the key goal for large firms is mainly to increase the surplus value through raising the productivity of existing operations (MacKinnon and Cumbers, 2007). However, Rahim (2013) argues that the classical view of large firms’ role in the society is constantly being challenged. Corporations have gained greater influence in politics and been increasingly viewed as responsible for social and environmental damage, such as human rights issues, labour standards, corruption and environmental protection (MacKinnon and Cumbers, 2007). Due to their high profiles and visibility, large companies often attract more media attention and stakeholder scrutiny, and they are more concerned to protect and enhance their brand images. As a result, they face a greater pressure to adapt and to address social and environmental issues. On the other hand, as large firms are more equipped in terms of resources, they are often able to invest and implement sustainability practices (Bansal, 2005).

2.5. Summary of literature review

Nowadays large firms have received an increased pressure to engage in society and some have taken a greater responsibility. In line with this trend, companies have started to investigate the area of sustainable innovation. The concept has been discussed with a myriad of different terms, resulting in a lack of conceptual consensus in literature. In order for companies to foster sustainable innovation, a combination of internal and external factors is highlighted. The literature review is summarised in the following model (see Figure 1). Two main external factors are discussed. Firstly, regulations, so called the “push factor”, drive companies to act in the forefront of new regulations and into innovativeness. Secondly, market demand includes different stakeholder requests that force companies to invest in sustainable innovation and into collaboration. Customer preferences are an important aspect since corporations need to respond to their consumers’ increasing demand in sustainable solutions. With regards to internal factors, five main factors have been identified in the literature as important enablers for sustainable innovation. New business opportunities relate to the identification of many benefits such as; cost reduction, competitive advantage and new market opportunities. Interfunctional collaboration takes into account cooperation among different business units to strengthen the firm’s innovation capacity. Management commitment displays a
significant role because of their responsibility to provide the company with vision, competences and clear directions for sustainable innovation. Investment in knowledge management and training for their employees is also emphasised. At the same time, an innovation-friendly and sustainability-driven corporate culture is essential to motivate employees to invest their time and energy into creating sustainable innovation. The following figure summarises the theoretical framework of underlying factors for sustainable innovations within corporations.

![Diagram of underlying factors for sustainable innovation]

**Figure 1. Underlying factors for sustainable innovation**

### 3. METHOD

#### 3.1. Research design

With the purpose of gaining insights into the emerging concept of sustainable innovation, we conducted an exploratory study. This approach was chosen since it is considered a good method to investigate “what is happening; to seek new insights; to ask questions and to assess phenomena in a new light” (Robinson, 2002, p. 59). According to Saunders et al. (2009) exploratory research is particularly useful when we wish to clarify our understanding of a problem or topic, which is the underlying factors driving sustainable innovation within large firms in our study. Currently, there is little knowledge on this subject due to the lack of both empirical studies and theoretical conceptualisations within academic literature. In light of these shortcomings, we used a qualitative research approach as it allowed us to gain a deeper understanding of the studied phenomenon and draw new findings and implications (Yin, 2009). For concepts that are not well established and lacking conceptual consensus in the literature, such as sustainable innovation, it can be challenging...
to quantify our data in a meaningful way (Dey, 1993). Hence, a qualitative approach was preferable to a quantitative approach in order to obtain the richness and fullness of data (Saunders et al., 2009).

Due to limited knowledge in the research field of sustainable innovation, we acknowledged that flexibility and adaptation to change in our exploratory study were important (Adams and Schvaneveldt, 1991). While seeking to empirically identify the underlying factors for sustainable innovation, we fully comprehended that we must be willing to change our direction when new data appear or new insights occur to us (Saunders et al., 2009). Nevertheless, flexibility in an exploratory research does not mean an absence of direction (Adams and Schvaneveldt, 1991). Rather, the focus of the research moves from being generally broad in the beginning to become narrower when the research progresses (Saunders et al., 2009).

3.1.1. Research strategy
As we aimed to gain a deep understanding of sustainable innovation and the underlying factors driving sustainable innovation at the firm level, a case study methodology was considered well-suited for our research (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2009). We chose to perform a case study strategy as it is highly advisable in exploratory research for its considerable ability to generate answers to “why”, “how” and “what” questions (Saunders et al., 2009).

Case studies can be conducted within a single case or multiple cases. For our research, we adopted multiple case studies as Yin (2009) advises that it is preferable to a single case study when we need to observe whether the findings of the first case occur in other cases and generalise from these findings consequently. Our main purpose was to find cross-company patterns regarding the underlying factors driving sustainable innovation. Due to the time constraint of this study, we decided to focus on a small number of cases so that it allowed us more time to spend on designing and piloting the means of collecting data. Furthermore, collecting data from fewer cases enabled us to collect more detailed information (Saunders et al., 2009).

3.1.2. Case selection
In this study, we employed purposive sampling technique as it is often used when working with small samples in a case study research (Saunders et al., 2009). Purposive sampling allowed us to use our judgement to select cases that are particularly informative and thus could best answer our research question and meet our objectives (Yin, 2009). Our criteria for selecting the companies
was that it should be a large-sized enterprise (more than 250 employees); its headquarter is located in Sweden; it has a leading position in its own industry; and has been actively engaged in developing sustainable innovation within its business. Applying all of these criteria, our selected companies were Atlas Copco, Ericsson, H&M and IKEA, representing the construction, telecommunications, fashion and furniture industries respectively. We acknowledged that there are other companies in other industries that might also fit these criteria. However, due to our time constraints and limited access to big companies, we emphasised on studying the four aforementioned case firms. We comprehended that access to the companies played an important role in our selection process (Saunders et al., 2009). Our choices were based on our prior knowledge that these companies would be willing to participate in our study and thus to provide information that would contribute to meeting our research purpose.

3.2. Data collection
Data collection included interviews and written sources such as company documents and reports related to sustainable innovation. This allowed us to gather a rich amount of information to better capture the complexity of sustainable innovation and identify the underlying factors encouraging its development. Data collection methods will be elaborated in the following paragraphs.

3.2.1. Primary data
Empirical data was primarily collected through semi-structured interviews with managers and specialists working with sustainable innovation in the aforementioned Swedish large corporations. In an exploratory study, semi-structured interviews can be used to understand the relationship between variables (Saunders et al., 2009). Using semi-structured interviews, much emphasis lies on how the interviewee understands the issues and events. By adopting this method, it allows for flexibility as questions do not need to follow exactly the same order and more questions can be added if new topics appear interesting (Bryman and Bell, 2015). Flexibility in qualitative interviewing, such as “rambling” or going off topic is often encouraged, as it allows the interviewee to deepen into the area that appears most interesting. With this approach, the interviewee’s point of view is emphasised and hence subjective (Bryman and Bell, 2015). The interviewees may lead the discussions into new areas that was not previously considered but are significant for our understanding and thereby help to address the research objectives. The order of questions can vary from interview to interview depending on the context and type of organisation, as well as the flow of the conversation (Saunders et al., 2009). However, using an interview guide in a multiple case
study design as in this study, with clear structure of the themes, have clear benefits in order to do a cross-case comparability (Bryman and Bell, 2015).

3.2.2. Operationalization

In order to pose relevant and understandable questions when interviewing, it is essential to operationalize the key concepts and variables of our theoretical model. Appendix 1 shows our operationalization of the theoretical concepts regarding important factors for sustainable innovation. Based on the operationalization, interview questions (included in Appendix 1) were created to discuss and obtain insights into the driving factors for sustainable innovation.

For our study, a total of eight interviews were conducted. Respondents were selected on the basis that they are managers or specialists working with sustainable innovation in their company, hence they have adequate knowledge and experience in the field to provide rich information and deep insights to our study. Despite adding more respondents would have been preferable, we came to the conclusion that eight interviews were enough to answer our research question. The interviews were conducted either face-to-face at the firm headquarters or by telephone. The method of performing the interview was determined according to the informant’s schedule and convenience. The following table presents an overview of the interviews we conducted in this study:

<table>
<thead>
<tr>
<th>Company</th>
<th>Informant</th>
<th>Respondent</th>
<th>Time</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlas Copco</td>
<td>Eco Design Specialist</td>
<td>AC1</td>
<td>1 hour</td>
<td>Telephone</td>
<td>11/04/2016</td>
</tr>
<tr>
<td>Ericsson</td>
<td>Global Program Director, Sustainability &amp; Corporate Responsibility</td>
<td>ER1</td>
<td>1 hour</td>
<td>In person, Ericsson HQ</td>
<td>03/03/2016</td>
</tr>
<tr>
<td>Ericsson</td>
<td>Global Program Director, Sustainability &amp; Corporate Responsibility</td>
<td>ER2</td>
<td>30 minutes</td>
<td>Telephone</td>
<td>06/04/2016</td>
</tr>
<tr>
<td>H&amp;M</td>
<td>Sustainability Innovation Manager</td>
<td>HM1</td>
<td>1 hour</td>
<td>In person H&amp;M HQ</td>
<td>21/04/2016</td>
</tr>
<tr>
<td>H&amp;M</td>
<td>Sustainability Stakeholder Engagement Manager</td>
<td>HM2</td>
<td>1 hour</td>
<td>In person H&amp;M HQ</td>
<td>22/04/2016</td>
</tr>
<tr>
<td>IKEA</td>
<td>Head of Sustainability Innovation</td>
<td>IK1</td>
<td>30 minutes</td>
<td>Telephone</td>
<td>09/03/2016</td>
</tr>
<tr>
<td>IKEA</td>
<td>Sustainability Innovation Manager</td>
<td>IK2</td>
<td>1 hour</td>
<td>Telephone</td>
<td>10/03/2016</td>
</tr>
<tr>
<td>IKEA</td>
<td>Sustainability Innovation Manager</td>
<td>IK3</td>
<td>1 hour</td>
<td>Telephone</td>
<td>14/03/2016</td>
</tr>
</tbody>
</table>

(Respondents interviewed from 03/03/2016 to 22/04/2016)
3.2.3. Secondary data

Secondary data is often collected in order to support primary data, including written materials, emails, reports, correspondents, administrative and public records, books, journals and newspapers and from non-written material such as video recording, pictures and films, and organisation databases (Saunders et al., 2009). Saunders et al. (2009) state that the benefit of using secondary data when analysing organisations, is that firms have often already collected large amount of data before and that there are advantages of comparing primary and secondary data. However, secondary data must be viewed with the same discretion as primary data. In our research, secondary data from the companies’ websites, annual reports and sustainability reports were used.

3.3. Data analysis

The primary data collected through interviews were recorded and transcribed, which allowed us to collect accurate quotes and compare data between informants in the data analysis. The transcripts were thoroughly read through to obtain an understanding of each individual firm and how they engaged in sustainable innovation. After the transcripts were produced, summarising the key points emerging from the interviews was the next step that we followed during the analysis process. The summaries enabled us to grasp the meaning of large amounts of texts in fewer words and become familiar with principal themes that were brought up in the interviews (Saunders et al., 2009). During the analysis, the collected data were grouped and structured into a number of categories (Eisenhardt and Graebner, 2007). The categories were initially derived from our theoretical framework. Categorising data provided us with a well-structured framework to dig deeper, identify themes and patterns and further analyse the data (Bryman and Bell, 2015). The empirical findings were first presented thematically in the empirical chapter of the thesis. Afterwards, they were compared and analysed based on our operationalization of the theoretical concepts and presented in the analysis chapter. As a close link between theory and empirical data was established, it allowed for a thorough evaluation of the theoretical framework (Eisenhardt and Graebner, 2007).

3.4. Credibility: validity and reliability

In order to ensure the credibility of our research findings, we paid close attention to two particular matters in our research design: validity and reliability. Validity is a matter concerning whether the findings are really about what they appear to be about (Saunders et al., 2009). In order to ensure the validity of our data, we applied triangulation techniques. Triangulation refers to the use of different data collection techniques to determine the consistency of research findings within one
study (Yin, 2009). In our study, multiple sources of data were used during the data collection process, including primary data collected through semi-structured interviews and secondary data from written sources to triangulate the findings. Establishing our credibility is vital in the process of collecting data. Credibility can be promoted by providing relevant information to participants before the interview (Saunders et al., 2009). Following this advice, we prepared a list of interview themes and sent it to the interviewees beforehand. The list of interview themes helped ensure validity and reliability of our research as it enabled the interviewees to consider the information being requested and allowed them the opportunity to assemble supporting organisational documentation.

Reliability refers to the extent to which consistent findings are yielded through data collection techniques or analysis procedures (Saunders et al., 2009). In the case of qualitative research, reliability is concerned with whether alternative researchers would reveal similar information (Easterby-Smith et al., 2008; Silverman, 2007). As we employed interviews as the main method for collecting data, the concern about reliability was related to the issue of bias, including interviewer bias and interviewee bias. Both types of biases can occur in relation to the interviewee’s perceptions about the interviewer. In particular, when the interviewee does not have enough trust in the interviewer, the value of information given by the interviewee may be limited, causing a possible threat to its validity and reliability (Saunders et al., 2009). In order to establish our credibility and gain the interviewee’s confidence, thereby minimizing this threat, we prepared an information sheet and consent form before the interviews commenced. According to Saunders et al. (2009), these tactics can be very helpful in reducing anxieties from interviewees because they often have uncertainties about sharing information and about the manner in which this information may be used. It is also possible that interviewers will demonstrate bias in the way responses are interpreted (Easterby-Smith et al., 2008). In an effort to overcome this, both researchers attended the interviews and made sure that we went over the transcriptions carefully and discussed the responses with each other to limit the errors caused by different interpretations.

3.5. Limitations

With regard to research methodology, we were aware of the choices we made and the consequences of these choices, which led to certain limitations of our study. The generalisation issue is one of our research’s limitations. As we conducted qualitative case study research in a small number of large companies and these companies operate in different industries, we acknowledged that the
results of our study cannot be used to make statistical generalisations about all large firms or a specific industry. Rather, our findings and analysis were simply to explain the phenomenon in our particular research setting (Saunders et al., 2009). In this study, we aimed to identify the general underlying factors that drive sustainable innovation within large corporations.

Another limitation of qualitative research is that it is rather subjective as it often lies in the researchers’ unsystematic views of what is important and not important (Bryman and Bell, 2015). We also acknowledge that there might be other external and internal factors driving sustainable innovation. However, due to the scope of the thesis and time constraints, we chose to focus on the main seven factors that have been mentioned within our theoretical framework.

4. EMPIRICAL FINDINGS

The following chapter will give a presentation of the empirical findings. The empirical chapter starts with background information about the case firms and then will follow the same outline as the theoretical framework.

4.1. Company description

4.1.1. Atlas Copco

Atlas Copco was founded in 1873 and is one of the world’s leading companies in construction, compressors and mining equipment, power tools and assembly systems. The company has operations spanning over 180 countries and more than 43,000 employees globally. Atlas Copco delivers solutions for increased customer productivity, through innovative products and services and has provided support to their customers to achieve sustainable productivity focusing on energy efficiency, safety and ergonomics (Atlas Copco, 2016).

4.1.2. Ericsson

Ericsson was founded in 1876 and is now one of the world's leading Information Communication and Technology (ICT) companies. The company has customers in approximately 180 countries and has 116,281 employees globally. Ericsson provides industry leading network equipment, software, services for network and business operations as well as products for corporations, cables, mobile platforms and power module markets. With the “Networked Society” vision, which means
everything is connected, Ericsson aims to transform the existing business landscape through business innovations (Ericsson, 2016).

4.1.3. H&M
H&M was founded in 1947 and is now one of the leading global fashion company. With 3,924 stores globally and operates in 61 markets, the company has 148,000 employees globally. At H&M, sustainability is considered an integral part of the business. The company’s vision is to run its business operations economically, socially and environmentally and to provide the best customer offerings and customer experiences in a sustainable way (H&M, 2016).

4.1.4. IKEA
IKEA was founded in 1943 and is now the largest furnishing company in the world. IKEA offers home furnishing products and its vision is to create a better everyday life for customers. IKEA has a total of 328 stores in 28 countries and 155,000 employees globally. Positioned as a value-driven company, IKEA places people and environment at the centre of its business and integrates sustainability into its corporate strategy and day-to-day activities (IKEA, 2016).

4.2. The sustainable innovation concept
Each company interprets sustainable innovation in its own way and integrate sustainable innovation into the strategy with its specific approach. All the companies highlight that sustainable innovation is linked to the corporation's sustainability strategy and its broader corporate strategy and set out the priority areas to focus on in the upcoming years. Furthermore, most of the respondents claimed that sustainable innovation is a new area and their companies are going through a transition to learn more effective ways of engaging in this field.

At Atlas Copco, sustainable innovation plays a bigger part today in the corporate strategy than before. Atlas Copco defines sustainable innovation as “innovating for sustainable productivity”. Within their resource-intensive industry, they have an opportunity to innovate and transform industry standards to build a more sustainable future. Their strategy consists of having a lifecycle perspective, with the aim to increase efficiency and help their customers to adapt to an increased resource-restricted world (Atlas Copco, 2016). Respondent AC1 explained that the perception of sustainable innovation depends on different business areas. From the industrial technique point of view, it is mainly associated with eco design, how the company designs products and implements
processes in an eco-efficient way. According to respondent AC1, Atlas Copco has three main drivers for sustainable innovation, including corporate responsibility to contribute to a better world, legal demands and legislations, and a genuine drive to contribute to a better future.

At Ericsson, sustainable innovation is framed in the company’s sustainability work called “Sustainability and Corporate Responsibility”. Since the autumn 2015 when UN launched the Sustainable Development Goals (SDGs), Ericsson has closely linked the SDGs to their own sustainability strategy; “We have adopted the SDGs as a framework for measuring our impact on society” (Ericsson Sustainability Report, 2015). Respondent ER2 stated that every new innovation that can impact one of the 17 SDGs is automatically regarded as sustainable innovation. Based on that notion, Ericsson has attempted to develop their portfolio to match these goals. The company does not want to use one particular definition of sustainable innovation since there is a risk of missing out on important aspects. Sustainable innovation is advanced through the “Technology for Good” concept where Ericsson uses technology solutions to address global challenges and create positive impacts for their key stakeholders, including employees, customers, shareholders and society (Ericsson, 2016).

In the case of H&M, sustainable innovation is understood as bringing in the sustainability perspective to change the way fashion products are made as well as the processes behind them. Respondent HM1 stated, that sustainable innovation is a tool for the company to reach the height of innovation they target to achieve and become 100% circular. It means that all their products need to be designed for recyclability as well as longer user phase. Sustainable innovation at H&M is mainly related to materials, how the company can create new and alternative materials that have credentials. Respondent HM2 explained the need for innovating with sustainability perspective stems from limited resources, which forces companies to change the way they operate and become more resource-independent to survive in the future. Respondent HM1 added that they are actively engaged in sustainable innovation because “not enough is happening” in the fashion industry and H&M wants to play a role in changing that by developing more innovations and adding more values. However, respondent HM2 shared the view that sustainable innovation is “a rolling target” and what can be seen as a sustainable choice today, might change in a few decades.

At IKEA, sustainability has been an integral part of the company's business for a long time and more specifically, it is identified as a major driver of innovation. According to Respondent IK1, in
2012, IKEA decided to use sustainability as a base for innovation and transformation of their business and set up a team with specific tasks to drive sustainable innovation. The company’s strategic focus on sustainable innovation is also stated explicitly in IKEA Group Sustainability Strategy for 2020 (IKEA, 2012). Respondent IK2 explained that sustainable innovation at IKEA is strongly connected to their sustainability strategy with three specific pillars: inspiring customers to live more sustainable lives, becoming more resource independent and ensuring their business operations are positive for people and community. As IKEA strives to bring the most sustainable solutions to the market, they have invested in developing sustainable innovation with the aim to become a leading force in the industry and create positive transformation for people and society.

4.3. External factors for sustainable innovation

4.3.1. Regulations

The role of regulations in driving sustainable innovation varies in the case companies. While regulations appear to play a significant role in the case of Atlas Copco, it does not have the same degree of importance in the other companies in this study. As stated in Atlas Copco Annual Report 2015 and claimed by respondent AC1, legislation is one of the major driving factors for sustainable innovation as the company applies strict legislation for all their products in their portfolio;

*In large companies, it can be hard to turn the ship around and start focusing on new areas, but legislation can be the catalyst of making it happen (AC1).*

In the case of IKEA, it is evident that the company not only complies with regulations enforcing them to conduct business in a sustainable way but also attempts to act in the forefront of regulations. As respondent IK2 explained, regulations are constantly evolving and also fragmented as there is not a universal regulation that companies can apply, hence they need to take an active approach. Both respondent IK2 and respondent IK3 claimed that IKEA’s strategy is to take one step ahead and to follow the toughest rules and regulations in the world. Furthermore, respondent IK2 drew the connection between regulations and customer demand and commented that these two factors go hand in hand. In some cases, regulations can serve as an awakening factor for consumer concerns. When consumers become more concerned about the products they use, it will drive the company to make better improvements in their product offerings. Monitoring regulations and
customer demand regularly and simultaneously as well as consulting on experts is the strategy adopted by IKEA to illustrate that they go beyond mere compliance and are proactive in the market.

Respondents from both Ericsson and H&M emphasised that the regulatory factor is not an important driver for sustainable innovation. Respondent ER2 explained that regulations depend on the countries where the company conduct their business. Some incentives for sustainable innovation can come from the governments but that varies case by case. H&M expressed a more critical view toward regulatory frameworks as both respondent HM1 and HM2 stated that regulations are lagging behind and do not play a sufficient role in giving clear directions for companies to transition toward sustainable innovation.

4.3.2. Market demand
The awareness regarding global challenges has increased in society according to the majority of respondents. Customers are now more aware of sustainability-related issues and their interests in products and services incorporating social and environmental aspects have risen rapidly during the past years. Despite sharing this notion, the case companies demonstrated mixed views on market demand, and how it can support the development of sustainable innovation.

Respondent AC1 claimed that sustainable innovation signifies a transition in the market, which requires the company’s mentality to evolve to meet its market demand. Respondent IK2 explained that due to customers’ increasing sensitivity about sustainable issues, companies need to make sure that customers associate their brand with the most responsible companies in the market. Even though customer demands may vary in different segments and different regions, customers have a tendency to expect big companies to act and lead in sustainability. Respondent IK3 stated that the company can influence customers to live a more sustainable life by understanding their sustainability needs and converting those needs into innovative and affordable products. However, a challenge was raised regarding changing customer behaviour. Respondent IK3 claimed that when companies change their products into more sustainable alternatives, they also force customers to buy new products and to change their behaviour consequently. Hence, sustainable innovation represents a big responsibility and a challenge for the company to drive that change smoothly for their customers. Respondent AC1 highlighted the need to change the industry and customer mindset in order for them to adopt sustainable innovation and that this process would take time.
On the contrary, respondents from H&M claimed that customer demand is not a strong factor driving sustainable innovation as it only influences how their company acts in this area to some extent. According to respondent HM1, customers do not know what they want until they see the products and there is not adequate demand in the current market supporting the development of sustainable innovation. Both respondents HM1 and HM2 argued that the company’s investment in sustainable innovation is more connected to its vision and belief in future demand. Respondent HM2 noted that if the company is not engaged in this field, customers will notice in the future.

All the respondents claimed the importance of collaboration with a wide variety of external stakeholders, such as academia, third party research institutes, NGOs, venture capitalists, private equity companies, competitors and start-ups. This is regarded as a way for firms to gain competence in the field of sustainable innovation. Working with external stakeholders involves various kinds of engagement, from meetings, to implementation of a project to a strategic partnership. Respondent AC1 emphasised that their key stakeholders, such as the investor group, has put much emphasis on sustainability and sustainable innovation. Much stakeholder discussion has revolved around how the company can go forward with sustainability integration in their business. Respondent ER1 stated that Ericsson was one of the first private companies to add “society” as a key stakeholder in addition to customers, employees and shareholders. This was made to strongly emphasise the society's role for a large corporation to go beyond profit maximization and take into account the society’s needs and demands. In this sense, stakeholder demand can impact Ericsson’s innovation due to changes in their portfolio. As the company looks at how their portfolio might impact the society, it needs to come up with innovations.

Respondent AC1 explained that collaboration with external stakeholders presents the benefit of knowledge exchange when companies share and learn how to address certain sustainability areas together. In a similar view, respondent IK1 and IK3 stated that the company cannot solve the world’s problems alone and needs to share their strategy and journey with other partners.

*A rich network internally and externally allows you to keep an eye on what is happening, the recent trends, and to be able to also internalize the external ideas. No matter how good your company is, the great majority of innovation will happen outside. So you have to have the ability to tap into what is happening in the outside and being able to use them or bring them effectively into your own development pipeline* (IK2).
Atlas Copco, H&M and IKEA are building networks to allow the companies to identify new innovations and technologies and to select the most interesting technologies to invest in. For instance, IKEA is one of the founding members of Launch Nordic, an innovation platform that brings together industry leaders to identify scalable sustainable technologies. Atlas Copco collaborates with large Swedish industrial companies and networks, such as Teknikföretagen, to discuss the circular economy, environmental legislation and how large Swedish industrial companies can affect these. H&M partners with Worn Again and Ellen MacArthur Foundation to work with circular economy. Respondent ER1 emphasised the importance of public private partnerships, and stated that Ericsson’s top management is highly engaged in organisations such as UN Broadband Commission, the Earth Institute, and was involved in drafting the SDGs connected to the ICT area.

4.4. Internal factors for sustainable innovation

4.4.1. New business opportunities

All the respondents emphasised that sustainable innovation delivers opportunities for their companies and it is a strategic direction for them to take in the future. On a broader perspective, it will help transform not only the company but also the industry into a more sustainable direction when business as usual is not considered sustainable. Following statements were raised from each company emphasising the relevance of sustainable innovation; “Sustainable innovation will change the world, it is a huge opportunity.” (ER1); “Going forward we should be innovating only if sustainability is an element of every innovation, any product or service that we launch.” (IK2); “Finding new business opportunities is something we have gained from sustainable innovation.” (AC1); and “It will help to transform us and our industry in a more sustainable direction.” (HM1).

According to respondent IK2 and HM2, sustainable innovation enables their companies to reduce costs as they are constantly improving the processes to reduce energy consumption and water consumption. Leif Johansson, Ericsson Chairman of the Board stated; “Reducing product energy consumption provides a benefit already in the short term” (Ericsson Sustainability Report, 2015). Respondent IK2 further noted that the company can drive costs down by trying to become more independent of resources. Respondent IK3 brought up the need to balance between costs and sustainability aspects during product development. He explained when IKEA develops sustainable
products, they start by identifying different parts that need to be included, and finding the balance of price and sustainability. If one sustainable material costs 100 times more expensive, the total cost of the product would be too high and customers would not be willing to buy it. The focus of sustainable innovation therefore is to find new ideas to create a sustainable product in a cost-efficient way.

Sustainable innovation allows the company to enhance its brand reputation and create a competitive advantage in the market. Respondent IK2 explained that through their engagement in sustainable innovation, customers would associate their brand with one of the most responsible companies in the world and at the same time perceive that the company is not merely complying with demands but actively driving their efforts to create positive impacts. Furthermore, both respondent IK3 and respondent AC1 emphasised that sustainable innovation creates a competitive edge, differentiating the company from other competitors in the market. According to respondent AC1, their competitiveness can be illustrated by applying the same standards on all of their products. Acting upon global trends and moving fast towards sustainable innovation will put the company in a better position than its competitors. Interviewee HM1 further emphasised that driving sustainable innovation can help the firm to gain a leading position in its industry.

Many respondents brought up new market opportunities and new revenue sources. According to respondent IK2, by driving sustainable innovation, the company can offer new sustainable solutions to customers and thus generate new revenue streams. Along the same line, respondent AC1 emphasised that sustainable innovation enables the company to find new technical solutions, expand their business and achieve organic growth. Respondent HM2 explained that investing in technologies for sustainable innovation, such as recycling technologies in H&M, will give the company first hand access to new technologies and enable it to produce new materials given an increasing shortage of materials in the future. In the case of Ericsson, respondent ER2 stated that the company can look into new segments, and tap into new business opportunities when it has an ambition of linking the SDGs with its portfolio and new innovations. ICT has the potential to transform how Ericsson innovates and collaborates and can be a big contribution to achieving the SDGs. That presents a huge opportunity for Ericsson as one of the world’s leading companies in the ICT industry (Ericsson Sustainability Report, 2015).
Despite recognising new business opportunities, the respondents also brought up associated challenges. Respondent ER2 stated that sustainable innovation will be hard to justify the business case, even though it appears to be a good innovation and creates impacts on the society. He further claimed that sustainability is sometimes considered as “best effort” but there is a clear need to better evaluate the business aspect of sustainable innovation so that it is not characterised as philanthropy. In a similar view, respondent AC1 highlighted that it is difficult to see the customer gain and profitability prospect from sustainable innovation. Due to that reason, sustainable innovation is not yet a top priority of Atlas Copco despite the company’s active engagement on this front. Rather, as a business-driven company, making profits is still the core of their business. Respondent IK3 explained that when a company incorporates a new perspective such as sustainability within product development, there is an uncertainty of what would be the best solution. Hence, it needs to analyse to find out a better solution in comparison to others, and identify the best alternative and approach. Respondent HM2 also shared this view, indicating that it is difficult to know whether a sustainable innovation would work and the company cannot rely on one solution.

4.4.2. Interfunctional collaboration

To integrate sustainable innovation within firms, the companies have various forms of interfunctional collaboration. At IKEA, all the respondents stated that due to the large organisation and variety of functions, interfunctional collaboration is important to enable sustainable innovation. Respondent IK1 and IK2 claimed that the key internal stakeholder is their 150,000 co-workers and emphasised the need to harvest their ideas for innovation. According to their opinion, innovation does not happen in one place, at one time, thus the company needs to have a strategy to deploy high-empowered staff in different parts of the organisation to collaborate. By doing so, it can increase the chance of capturing new ideas and developing innovations in the corporate environment. In order to achieve that, both respondents IK1 and IK2 stated that networks is the key cornerstone of driving sustainable innovation in IKEA.

H&M also recognises the importance of collaboration between departments, where respondent HM2 stated that it is only happening cross-functionally and generally the company can only succeed if sustainability is integrated where decisions are made. H&M CEO stated; “I am happy to see that sustainability is in the minds of so many people at H&M, every day and in all departments” (H&M Sustainability Report, 2015). At Atlas Copco, the way interfunctional
collaboration is organised depends on which function you are working within the company. However, respondent AC1 claimed that cooperation between business units is important in order to make sure that they “live as they learn”, meaning that sustainability productivity is incorporated in the organisation. More specifically, business functions such as R&D and sourcing departments need to be engaged in this process. Interfunctional collaboration brings together people with diverse competences. At Ericsson, they have engaged different people with various backgrounds, knowledge and experience through the “Sustainability steering group”. Employees from different departments are gathered to decide on new sustainability targets, which are integrated into different units in the organisation afterwards.

However, interfunctional collaboration can be affected by the way in which an organisation is structured. A challenge raised among the respondents at Ericsson and IKEA is that the complex structure of a large corporation can hinder efficiency in executing sustainable innovation. More specifically, respondent IK2 claimed that bureaucracy can affect the speed of sustainable innovation because it not only slows down the innovating process but also can potentially kill innovation. In the business environment where companies like IKEA operate, speed is important to ensure the product is still relevant when it comes out to the market. Thus, the company has to keep bureaucracy down to increase the chance for sustainable innovation to flourish faster. Furthermore, for a company to be able to capitalise on sustainable innovation, it needs to be introduced at the right time and balanced with current operations at the same time. Respondent ER2 stated that due to the large size of the company, it would take time to create awareness in the whole organisation as driving sustainable innovation calls for a mindset change internally. Nevertheless, it is significant to engage all the employees in order to implement changes and new strategies successfully. This view is also shared by respondent AC1 stating that employees need to be given time to adopt the changes and voice their concerns during the transition toward sustainable innovation.

4.4.3. Management commitment

It is evident in all the cases that management commitment serves as a driver for sustainable innovation, where top management shows a long-term commitment and helps spread the awareness of sustainable innovation within the company. At IKEA, the Chief Sustainability Officer reports directly to the CEO, which indicates how important sustainable innovation is to the CEO and the group management in general. Furthermore, there is a full support from IKEA management on the
sustainability innovation agenda and strategy forward. Respondent IK1 stated that management support is vital because the sustainable innovation team can carry out the pilot phase but the whole organisation needs to take over in order to scale it up. This process needs full management support in order to execute the sustainable innovation strategy successfully.

At H&M, management commitment is exemplified by the company goal of becoming 100% circular. Respondent HM1 and HM2 stated that there is a clear long-term direction from top management which acknowledges the need of innovation. Since H&M is a family-owned company, there is a strong personal commitment on sustainability from the founder and family, and it is related to what legacy they want to leave behind.

Respondent ER1 stated that the CEO of Ericsson is a member of the UN Broadband Commission and other foundations that push the agenda of sustainability forward. “We take steps each year to continuously improve management of sustainability issues” (Ericsson Sustainability Report, 2015). This showcases Ericsson’s proactivity in the forefront of sustainability and convinces the rest of the company how important sustainability is. When it comes to setting the firm targets in relation to sustainability, decisions are made from the top according to respondent ER1 and ER2.

At Atlas Copco, respondent AC1 indicated that management engagement provides guidance for the company to act and that top management shows interest in sustainable innovation from both personal perspective and business perspective. As acknowledged in the company’s annual report, the competency and commitment of leaders and managers are crucial to achieving sustainable profitable growth (Atlas Copco Annual Report, 2015). However, respondent AC1 also stated that for the management, it all boils down to “hard fact, showing the money”, what the company can measure and what the customer value is.

Long-term commitment from management enables the company to work on sustainable innovation in the long run. As respondent IK3 claimed, as a large company with strong financial performance like IKEA, they do not need to show results for their shareholders every quarter. This puts them in a position where they can develop solutions that are affordable for their customers as well as gives them time to think carefully about every investment. H&M respondents also stated that their long-term commitment on sustainability allows them to think long term and not have to worry about showing results every quarter.
As the companies expressed their commitment in pursuing sustainable innovation, they also pointed out the need for financial support to execute sustainable innovation ideas. This fact was emphasised by the respondents from Ericsson, H&M and IKEA. Respondent ER1 claimed that for every innovation, an internal discussion is held to decide the budget, and there would be no chance for sustainable innovation to take place without financial support. Likewise, respondent HM2 acknowledged that access to finance can be a barrier for the creation of sustainable innovation and depending on where you are located in the company, you can access finance differently. According to respondents IK1 and IK2, a funding structure should be in place to give sustainable innovation the speed to flourish.

4.4.4. Knowledge management

According to the respondents from Ericsson, H&M and IKEA, internal tools and communication systems are utilised to encourage employees to share their ideas, knowledge and experience around innovation. However, there are no specific tools designed for fostering sustainable innovation yet. IKEA is attempting to improve their tools and platforms to generate more ideas for sustainable innovation. Respondent IK1 and IK3 stated that the company is building a new innovation platform to utilise the whole organisation’s internal knowledge, gather ideas, then evaluate and take action on some of them.

However, according to respondent ER1, the challenge is how to make employees engaged in available tools and internal platforms. Respondent IK2 claimed that informal networks through personal relationships are more important than tools and programs. He stated that most of the selected ideas come from informal networks rather than established channels such as IT tools or formal programs.

*It is really about people being creative, feeling empowered, being entrepreneurial, bouncing and sharing ideas with each other. The most important thing is to have informal, soft elements in the right place to drive innovation (IK2).*

For Atlas Copco, the main reason for utilising internal tools is to spread information and to make everyone aware of sustainable innovation. All ideas need to be collected from the organisation so it can affect future product development. However, respondent AC1 highlighted the need to “keep
it simple” by having clear guiding tools for everyone. Atlas Copco has developed communication materials during the past years to provide information about sustainable innovation and eco design as the employees need to know about it to do it the right way, otherwise it will be hard to realise the products.

In relation to employee training, the majority of respondents from all the case companies mentioned that their companies provide information and education regarding the corporate sustainability strategy, but no specific training regarding sustainable innovation. At Ericsson, they provide training in sustainability for all their employees both online and in workshop formats. However, the training is not mandatory. As respondent ER1 stated, it depends on individual interest and engaging in sustainable innovation will be more effective when it is connected to passion. According to respondent ER1, it is a difficult task to force employees to get involved if they do not feel motivated.

Respondents from IKEA and H&M presented a similar view on employee training. Respondent IK1 stated that IKEA does not have a general sustainability innovation training, since each employee has their individual competence development plan specifically related to their work and tasks. In addition, respondent IK2 presented that the company encourages “on-the-job” experience, where employees are given time to explore possible avenues of sustainable innovation and develop their capabilities accordingly. H&M has a mandatory sustainability training program for their employees and the respondents claimed that it is important to integrate sustainability vision and goals in the training.

Atlas Copco is in the forefront of education related to sustainable innovation. They have been focusing on raising awareness of sustainable innovation across the organisation so their employees are equipped with essential knowledge regarding how the company can improve and differentiate their products, and how to gain a competitive advantage by applying eco design in their work. According to respondent AC1, the company has strengthened their knowledge management and educated employees on how to work with sustainable innovation. They provide training for different business units on how to approach eco design and sustainable innovation. Respondent AC1 stated that this is an important factor enabling sustainable innovations as everyone in different business sections (such as sales and marketing) are educated about the company’s sustainable productivity strategy.
4.4.5. Corporate culture

For IKEA, all respondents stated that their corporate culture influences the way the company innovates which is strongly affected by the founder Ingvar Kamprad. The company embeds core principles driving innovation in general and sustainable innovation in particular its culture. Both IKEA’s and Atlas Copco’s mottos are; “There is always a better way”, which suggests that the company is constantly innovating and seeking new and better solutions. The majority of respondents from Atlas Copco, H&M and IKEA explained that their corporate culture is characterised by people who are encouraged to pursue their passion and what they believe in, as an “entrepreneurial spirit”. This is described as people who are driven to make a change and are given the opportunity to do that. According to respondent IK1, the culture is an enabler to creativity as it drives people to constantly seek new solutions and find new ways of doing things. Based on that ground, innovation can thrive everywhere in the company. One way for Ericsson to spur innovation is through diverse teams, which are claimed to be more high-performing and innovative because of the variety of perspectives, experiences and references (Ericsson Sustainability Report, 2016).

The respondents claimed that the specific characteristics of corporate culture that spur innovation, also apply for sustainable innovation. Additional values that are more connected to sustainable innovation is, for example cost consciousness which mentioned by IKEA and H&M. A cost-conscious company aims to create big impacts with small resources, which forces people to be creative and to find new ways to do things in a cheaper way. This value can be seen as a driver for sustainable innovation. However, according to respondent HM2, in the short term perspective, cost-consciousness can also be seen as a barrier as it can inhibit the company from investing in sustainable innovation.

Another value within the corporate culture driving sustainable innovation according to all the companies is moral obligation. Empirical findings show that corporations are responding to global challenges, where they have identified a moral obligation to act and thus engage in sustainable innovation. All respondents from IKEA claimed that sustainable innovation is driven by the fact that the company is acknowledging global challenges, such as climate change and resource scarcity as the world is using much more resources than it can reproduce. Therefore, they need to have a strong reaction to make sure that they remain relevant for their customers, and that their business model is not making the situation worse but goes beyond what is currently demanded to become a
positive force for the society. The moral obligation is also recognised at Ericsson. 40% of all the world’s call go through Ericsson's networks (Ericsson, 2016). With their position in the industry and with their technology, respondent ER1 stated that they can impact the society and have a huge impact. They have done that by supporting UN agencies, engaging and working with fighting Ebola, and supporting technologies in the refugee crisis. When there are natural disasters (e.g.: the Nepal earthquake), Ericsson network supports the development of a new ICT infrastructure.

Respondent AC1 explained that Atlas Copco's main driver for sustainable innovation is that they want to take responsibility to contribute to a better world and create a better future. The company is reported to commit to “sustainable development goals for economic growth, sustainable industrialisation and shift to modern energy” (Atlas Copco Annual Report, 2015). Respondent HM2 also claimed that it is important for employees to identify with the company's action, and H&M sustainability is a top priority with long-term commitment. H&M's CEO has stated that since its foundation in 1947, there has been a long term view and strong values, where sustainability commitment is deeply rooted in their culture (H&M Sustainability Report, 2015). Respondent HM2 claimed that, due to awareness on resource constraints in the future, businesses will not succeed without the work on sustainability.

5. ANALYSIS

The analysis will be presented in the same structure as the previous sections, following by a summary in the end to capture the main discussion points.

5.1. The sustainable innovation concept

As large firms have become increasingly important actors in the global economy, their roles have changed accordingly (MacKinnon and Cumbers, 2007). Theory suggests that more companies are starting to integrate sustainability dimensions into their innovation process and engage in the field of sustainable innovation (Boons and Lüdeke-Freund, 2013; Hansen et al., 2009; Nidumolu et al., 2009). In line with theory, empirical findings show that all the companies in this study are committed to pursuing sustainable innovation and convinced that driving sustainable innovation can transform their business and industry. However, the extent to which they engage in this field varies, depending on their own corporate strategies and the different industries they operate in. In addition, all the case firms are found to have linked sustainable innovation with their sustainability
strategy as well as broader corporate strategy in order to guide their work in this field. This supports Ketata et al.’s (2015) argument that sustainable innovation is strongly connected to the holistic and long-term objectives of sustainability within the company. Moreover, large firms often have a long term perspective on sustainability and identify a greater pressure from society to engage in sustainability related activities.

Despite an increasing interest in this field, sustainable innovation is still an emerging concept and lacking general conceptual consensus (Adams et al., 2012; Boons and Lüdeke-Freund, 2013; Schiederig et al., 2012; Trifilova et al., 2013). The empirical evidence confirms that sustainable innovation is a fuzzy concept with no clear definition and common guidance regarding how a company should work with sustainable innovation. Each of the cases has a different way of understanding and defining sustainable innovation, leading to their own approach in this field. Their different focus in their work with sustainable innovation could be explained by the fact that they operate in different sectors. A new notion can be observed from the case of Ericsson, who stated that any sustainable innovation must serve to achieve the SDGs of the UN. This viewpoint places the role of sustainable innovation in a larger picture moving beyond the corporate goals to contribute to the global goals.

Moving into a new area such as sustainable innovation requires broad perspectives and extensive changes in the organisation as argued by Boons & Lüdeke-Freund (2013) and Szekely and Strebel (2013). All the corporations stated that they are making the transition to increasingly engage in sustainable innovation. Theory does not clearly elaborate on what kind of changes need to be applied for that transition. However, empirical findings suggest that transitioning towards sustainable innovation requires a mindset change of employees as well as customers and the overall industry. Indeed, this is implicitly related to Hall and Vredenburg’s (2003) and Ketata et al.’s (2015) notion that firms need to take into account various interests of different stakeholders in order to execute sustainable innovation.

Despite that sustainable innovation will occupy an important position on large firms’ agenda in the future, it is not a fixed and static concept with clear boundaries. Large firms can choose to work with sustainable innovation in their own ways and under different frameworks. This means that the concept itself will keep evolving. The way an industry leading corporation defines and engages in sustainable innovation will likely set the trend for other companies in that same industry. However,
the lack of a common understanding will arguably inhibit the popularisation of the sustainable innovation concept. In this sense, whether the concept “sustainable innovation” can take a strong foothold in business practices remains uncertain or if it rather will be defined individually firm by firm.

### 5.2. External factors for sustainable innovation

#### 5.2.1. Regulations

While theory suggests that regulations are a dominant external factor that drive sustainable innovation (Bossle et al., 2015; Horbach et al., 2012; Ketata et al., 2015), the empirical findings in this thesis show inconclusive results. The majority of evidence from Ericsson, H&M and IKEA does not fully support the theory, whereas evidence from Atlas Copco shows a strong support. Theory explains that the enforcement of legislation can increase pressure for innovativeness and enhance the probability of investing in new avenues of technologies and R&D (Bossle et al., 2015; De Medeiros et al., 2014; Hansen et al., 2009). This notion was confirmed in the case of Atlas Copco where legislation undoubtedly plays a determinant role in pushing the company to focus on new areas such as sustainable innovation and to apply strict standards and requirements for their product portfolio. As it is generally hard for a large corporation to transform and move into a new direction, legislation can act as the catalyst for change.

On the other side, as evidenced by findings from Ericsson and H&M, the regulatory mechanism is not a driving factor for the development of sustainable innovation. According to respondent ER2, regulations vary country by country and its effect on sustainable innovation is varying as a consequence. Respondents from H&M emphasised that legislation is lagging behind and not giving adequate and clear directions for companies to make the transition from conventional innovation to sustainable innovation. IKEA suggests a more neutral view toward the role of regulations. Respondent IK2 and IK3 explained that their company is taking an active approach by applying the toughest rules and regulations in the world due to the lack of universal regulations. This proactivity on the forefront of legislations is to emphasise that large firms such as IKEA are going beyond compliance with law enforcements and taking the lead in driving sustainable innovation in the market.
Theory on regulations as an external factor for sustainable innovation did not elaborate on the relation between regulations and customer demand. However, empirical findings suggest that these two factors are related to some extent. Respondent IK2 stated that regulations can play a role in awakening consumer concern about the products they use. When there is an increase in consumer concern, companies need to innovate and make improvements in their product offerings to accommodate their customers. Thus, monitoring regulations regularly, especially the way they influence customer demand should be emphasised in the company’s sustainable innovation strategy. Some large firms might find it imperative to act beyond law requirements because customers demand it.

Due to inconclusive results from the empirical findings, regulations is not considered a driving factor for sustainable innovation within large corporations in this study. Nevertheless, one cannot disregard its impact on the way large firms act in this area and the result depends on the industry the firm operates in, as Atlas Copco stated. Regulations can arguably affect how large firms develop sustainable innovation to some extent, either directly or indirectly through its interaction with customer demand. On the other hand, large corporations’ proactivity can alter the legislative landscape that regulates the development of sustainable innovation. Clearly, large firms have the possibility to adapt to new regulations and thereby become first movers ahead of new regulations.

5.2.2. Market demand

According to theory, there is a substantial increase in market demand that forces companies to operate their business and produce their products in a more sustainable way (Ayuso et al., 2011; Bossle et al., 2015; Ketata et al., 2015). Empirical evidence from Atlas Copco, Ericsson and IKEA are in line with the theory while findings from H&M do not support it to the same extent. As respondent AC1 explained, due to the market transition toward more interests and demands for sustainable products and services, companies are forced to change their business mentality and transform the way they operate and innovate. Among various stakeholders, theory indicates that customers play a significant role in fostering sustainable innovation as they can determine whether to buy such innovation and put pressures on how companies innovate (De Medeiros et al., 2014; Horbach et al., 2012; Ketata et al., 2015). According to respondent IK2, large firms need to make sure that their brands are associated with the most sustainable companies in customer mind. Respondent IK3 further emphasised that companies need to understand their sustainability needs and convert those needs into innovative and affordable product offerings. This means that an
increased awareness of sustainability in society, pushes companies into attracting tomorrow's customers, rather than only managing risks. Respondents from H&M expressed that there is currently not adequate demand in the market for sustainable innovation, nevertheless, the company’s pursuit of sustainable innovation is more related to their vision for future demand.

With regards to collaboration with external stakeholders, Arnold and Hockerts (2010) and De Medeiros et al. (2014) indicate that companies need to be proactive to find new ways to collaborate and find new sources of information to spur sustainable innovation. As evidenced by empirical findings, all the case companies shared a coherent understanding that collaboration with a wide variety of stakeholders such as NGOs, governmental organisations, academia, other companies, and start-ups is important to enable sustainable innovation. The respondents from IKEA and H&M explained that collaboration helps the firm identify which projects and new technologies to invest in, exchange knowledge and gain competences, discuss how to engage in solving global challenges and use of natural resources, as well as discuss future trends in their industries. According to respondent ER1, integrating “society” as a key stakeholder in their strategy and taking society’s needs into account, have strongly impacted the company’s innovation portfolio. More specifically, implementing sustainable innovation requires public-private partnerships, otherwise it is “doomed to fail”.

Yet, one complexity with regards to market demand is that firms need to incorporate different interests from a wide variety of stakeholders (Hall and Vredenburg, 2003; Ketata et al., 2015). Respondent ER2, AC1 and IK3 highlighted the challenge of changing employee mindset as well as customer mindset and behaviour associated with their drive toward sustainable innovation. Respondent IK3 emphasised the need to recognise, integrate and manage customer concern and at the same time, to find a “smooth” way to drive the change in customer behaviour. With regards to partnership, respondent IK2 emphasised the difficulty to communicate with other organisations and to establish strategic alliances and cooperation given their different agendas, which is argued by Arnold (2010).

Drawing upon the above discussion, market demand is of great importance and can been seen as a key factor to drive sustainable innovation in large firms. The main benefit is cooperation with external stakeholders, since it contributes with a broader knowledge base and creates networks and thereby supporting firms in understanding how to approach sustainable innovation, what
technology to invest in and discussing future market and resources. The position of large firms in society also enables cooperation with global stakeholders, such as the UN, NGOs and governments.

5.3. Internal factors for sustainable innovation

5.3.1. New business opportunities

Nidumolu et al. (2009) present that sustainable innovation is a new frontier of innovation, which will change the business landscape and provide enormous opportunities for companies. All the firms stated their commitment to sustainable innovation as a strategic direction for the future ahead as they believe it would open up new business opportunities.

Findings from IKEA, H&M and Ericsson suggest that driving sustainable innovation helps the company lower its costs and increase its profitability. This is in line with Arnold and Hockerts’ (2011) and Nidumolu et al.’s (2009) argument that companies can achieve cost-saving benefits by reducing the resources they use and making their processes more efficient. In the case of IKEA, it has been constantly improving its processes to reduce energy consumption and water consumption aligned with the value of “cost consciousness”. As explained by respondent IK2, operating many factories around the world with more resource-efficient processes enables the company to cut significant costs. Furthermore, IKEA and H&M have set out specific targets to become more independent of resources, which is not only to drive the costs down but also to cope with increasing scarcity of the world’s resources. However, cost reduction depends on which industry a firm operates in and the possibilities to produce with fewer resources.

Another business opportunity is that sustainable innovation creates a competitive advantage for companies as it forces them to change the way they think about products, processes and business models and become first movers (Ketata et al., 2015; Nidumolu et al., 2009). Empirical findings from IKEA, H&M and Atlas Copco are aligned with this theory. Respondent AC1 explained that engaging in sustainable innovation requires the company to apply the same standards on every product in their portfolio and thereby helping the firm to gain competitiveness in relation to their competitors. Competitive advantage can also be achieved through enhancing the firm’s reputation. Findings from IKEA indicate that when a company puts efforts in creating sustainable innovation and bringing sustainable solutions to the market, it would gain reputation as one of the most
responsible companies in the world, which confirms Ketata et al.’s (2015) notion on reputational benefits of sustainable innovation and only companies that are moving fast toward sustainable innovation can become competitive in the future. Since the studied companies are industry leading, large and reputable firms, they have a greater pressure to protect their brand images due to more media attention compared to smaller firms. At the same time, they have the ability to act in the forefront of new technologies and thus to invest more resources in sustainability related activities.

Yet, the respondents raised concerns regarding uncertainties about the future market and difficulty in measuring sustainable innovation, which might prevent firms from capitalising on sustainable innovation. Respondent IK3 and HM2 noted that when integrating the sustainability perspective into the innovation process, the companies are uncertain about whether a sustainable innovation would be successful and what could be the best solution. Both respondent AC1 and respondent ER2 emphasised the challenge of making a concrete business case for sustainable innovation, measuring the customer gain or the profitability prospect. This can hinder sustainable innovation from becoming a top priority in the company. It is evident that sustainable innovation needs to show clear business cases in order to create long term success, but there remains a difficulty to know how to measure the benefits of sustainable innovation. This will likely affect the development and the speed of sustainable innovation.

Despite the above challenges, the case firms are realising the huge benefits of sustainable innovation and have identified important business opportunities associated with cost reduction, brand reputation and competitive advantage. By unlocking the potential of sustainable innovation, we argue that new business opportunities is a strong factor driving sustainable innovation in large companies.

5.3.2. Interfunctional collaboration

Empirical findings indicate that interfunctional collaboration plays a major role in the development of sustainable innovation, which supports the theory stated by De Medeiros et al. (2014) and Ketata et al. (2015) regarding the importance of involving different organisational functions in working with sustainable innovation. All the respondents claimed that most organisational functions need to cooperate on developing sustainable innovation. Respondent HM1 emphasised that “cross-functional collaboration is everything” in the process of driving sustainable innovation in the company. Respondents from Atlas Copco, IKEA and Ericsson highlighted the importance of
establishing networks and gathering people from different units and functions to harvest new ideas inside the organisation and capitalise on different competences. This is in line with De Medeiros et al. (2014) notion that pursuing sustainable innovation requires networks and cooperation of different capabilities. As respondent IK1 and ER1 explained, the reason behind collaboration across the organisation is that innovation does not happen in one place, at one time but can come from anywhere. As big corporations have a large and diverse pool of human resources, they have the opportunity to exploit a wide range of capabilities needed for sustainable innovation development.

Despite acknowledging the role of interfunctional collaboration in driving sustainable innovation, empirical findings also reveal a related challenge that has not been discussed in theory. It can be argued that how different departments cooperate cross-functionally in a large firm is governed by its organisational structure. The respondents from IKEA and Ericsson claimed that the complex structure of a large corporation hinders the efficiency and speed of executing sustainable innovation. These factors are important in order to ensure the relevance of products when they are launched in the market. In particular, bureaucracy was brought up by respondent IK2 as a common issue in large companies that has the potential to slow down the innovation process or even kill innovation. One might argue that is the challenge to innovation in general. Nevertheless, as new as sustainable innovation is in business practices, the adverse effect of complex organisational structure will likely be larger.

In order to facilitate cross-functional cooperation on sustainable innovation, it is crucial that everyone in the organisation is aware of what sustainable innovation means and change their business mentality accordingly. Findings from Ericsson and Atlas Copco indicate that raising awareness and changing mindset of the whole organisation would take time due to the large size of their company. Especially, respondent AC1 highlighted that employees need to be given time to adopt the changes and raise their concerns. It can be discussed that creating awareness for all employees about sustainable innovation should be emphasised as a prerequisite for interfunctional collaboration. Only if they gain a better understanding of the field would they be able to engage and collaborate in better ways.

Due to a coherent view from the case companies, interfunctional collaboration can be regarded as a key factor driving sustainable innovation in large corporations. Indeed, creating sustainable
innovation is a complex task which requires different competences in various departments of an organisation. On one hand, large firms can reap from their abundant workforces with diverse skills and knowledge. On the other hand, they are faced with certain challenges due to their complex organisational structure and bureaucracy, which might hinder the efficiency and speed of sustainable innovation implementation.

5.3.3. Management commitment

Theory state that management commitment plays an active role in driving sustainable innovation (Arnold, 2010; Hall and Vredenburg, 2003; Nidumolu et al., 2009). As indicated by empirical findings, it was generally agreed that management commitment is needed to guide the company’s action in this area. However, the way it influences the company’s pursuit of sustainable innovation can be demonstrated differently in different cases. As Nidumolu et al. (2009) and Waite (2013) claim, when management is dedicated to sustainable innovation and incorporates it in the corporate agenda, changes and decisions facilitating sustainable innovation development can happen quickly. This notion is corroborated by empirical findings, as the majority of respondents claimed a long term commitment and full support from top management in developing sustainable innovation within their firms. Respondents from IKEA and H&M stated that they do not need to worry about showing results or positive figures every quarter, rather, they are given the opportunity to work long term with sustainable innovation. This implies that sustainable innovation is viewed as a venture where it is not assessed as a conventional business practice. Quite often, large firms dare to take the risk of diving into new ventures and have the resources to do so. When management shows strong commitment and guarantee their support for sustainable innovation, large firms are more motivated to pursue this venture.

The findings also raise the importance of carrying out the vision from top management down in the organisation. The role of management is to create and convey the vision for sustainable innovation in the whole company. As respondent HM2 stated, sustainability vision needs to be integrated throughout the organisation and where decisions are made, otherwise the execution of sustainable innovation will not be successful. This is found to be aligned with Arnold’s (2010) argument that a clear vision and direction from top management is needed to initiate strategic changes for sustainable innovation.
As evidenced by empirical findings, it requires a funding structure in place to provide financial support for the implementation of sustainable innovation. The majority of respondents from Ericsson, H&M and IKEA emphasised the significance of financial resources to enable sustainable innovation. As respondent ER1 and HM2 claimed, access to finance can be a barrier for developing sustainable innovation and there would be no possibility to execute an innovative idea without a budget. The findings can be found related to Ketata et al.’s (2015) notion regarding the high cost of sustainable innovation as companies need to invest in new technologies. However, the relation between management commitment and funding for sustainable innovation development was not addressed in the theory. In a conventional way, an innovation needs to show a clear business case in order to obtain the budget for development. As sustainable innovation is regarded as a venture, investing in this field would be largely determined by how top management believes in its prospects. Drawing upon this reasoning, one can argue that management commitment would influence how funding would be allocated to drive sustainable innovation inside the organisation. As management shows a long term commitment regarding sustainable innovation, it would direct more organisational resources into this area.

To sum up, management commitment is perceived as a driving factor for sustainable innovation among large corporations. As large firms have enormous resources, they can diversify their resources into many different areas and pursue new ventures. With top management paying more attention to sustainable innovation, it will likely be given more capital investment as well as other resources of the organisation. Moreover, as management commitment dictates the corporate strategy in this new area, it can largely impact other factors, such as corporate culture.

5.3.4. Knowledge management

Ayuso et al. (2011) claim that corporations need to manage knowledge internally and exploit it successfully in order to convert knowledge into innovative ideas. The majority of respondents highlighted that innovation can come from everywhere within an organisation and thus, the task is to encourage employees to create and share their new ideas. However, a challenge remains for large companies with over 40,000 employees like all the case companies, is how they could best capture ideas for sustainable innovation. All the companies have internal platforms, where employees can share ideas, receive information and interact with each other but there seems no clear strategy how these internal platforms are addressed for advancing sustainable innovation. One can argue that even though all the firms acknowledge the importance of managing and
facilitating knowledge exchange as suggested in theory, empirical evidence shows that their actions do not fully correspond to that perception at this stage. Nevertheless, the majority of respondents recognises room for improvement as they try to seek more effective ways to capture sustainable innovation ideas within the organisations through internal platforms and tools. In this sense, better knowledge flows inside the organisation can be created to foster ideas for sustainable innovation.

Ayuso et al. (2011) and Ketata et al. (2015) highlight that knowledge is required for successful sustainable innovation since it is generally more complex than conventional innovation and therefore firms need to provide specific training. Even if all the case firms have employee training on sustainability, there are no specific education on how to develop sustainable innovation. Only findings from Atlas Copco show that they have developed specific education guidelines as part of their training for all the employees. Their aim is to provide guidance regarding how to develop sustainable innovation (also called eco-design products) and how to adapt the sustainability perspective into their daily work.

Motivated and trained employees is argued to increase the firm’s ability to spot and collect opportunities (Ketata et al., 2015). Findings from Ericsson indicate that sustainable innovation engagement will be more effective when it is connected to employee motivation and passion. However, the importance of employee motivation is not thoroughly discussed within the existing literature of sustainable innovation. Even if the company provides education, platforms and ways to exchange ideas in order to enable sustainable innovation, the factor of enhancing knowledge might be overestimated if employees do not feel personally connected with the field. The majority of respondents used the word “transition” when explaining what sustainable innovation means for their company. It seems evident that there are no specific ways of implementing “sustainable innovation”, rather it is seen as a process that takes time within the organisation and motivate the employees. Whereas theory indicates that sustainable innovation is a process of integrating sustainability considerations in the entire company system (Charter and Clark, 2007), it is lacking in terms of relating the transition process with employee motivation.

Overall, knowledge management is not considered as a strong factor driving sustainable innovation in large corporations. However, one can argue that as large firms acknowledge how it can advance the development of sustainable innovation, they will likely put more efforts in improving knowledge flows inside the organisation. The fact that large firms become more adept at managing
knowledge related to sustainable innovation will also enhance interfunctional collaboration in this area. In this sense, knowledge management serves as an influencing factor that can complement and strengthen the interfunctional collaboration factor.

5.3.5. Corporate culture

The majority of the respondents confirms that corporate culture plays a significant role in driving sustainable innovation development within large firms (Arnold, 2010, De Medeiros et al., 2014). This factor can be substantially influenced by management commitment. The empirical findings suggest that management vision and commitment spark the spread of sustainability values and entrepreneurial spirit, contributing to a corporate culture supporting sustainable innovation.

Ketata et al. (2015) highlight that a culture of openness for innovation is an essential condition for firms to recognise the need to innovate and Arnold (2010) suggest encouraging entrepreneurship and freedom for all employees. Even if these are the values supporting innovation in general, they need to be encouraged even more in the case of sustainable innovation. Findings from Atlas Copco, IKEA and H&M indicated that the companies embrace an “entrepreneurial spirit” in their cultures, and this value can be seen as an enabler to innovation. More specifically, IKEA and Atlas Copco follow the motto “There is always a better way”, which motivates employees to generate new innovations frequently. According to Dewberry and de Barros (2009), companies engaging in sustainable innovation need to adapt to a new type of culture where values, beliefs, priorities and aims are radically different from traditional innovation. This is emphasised by the majority of respondents, that sustainable innovation is new and represents a transition process into doing business in new ways with a long term perspective. Therefore, an encouraging culture is crucial, where employees feel that they are given freedom and time to explore the area. It is clear that motivation, personal commitment and awareness of sustainable innovation within an organisation are key elements for how corporate culture can enable sustainable innovation.

Our study also found that a specific value of the corporate culture driving sustainable innovation is cost consciousness, as it exemplifies that sustainable innovation is about “doing with what you have”. If firms have limited resources, they need to innovate in different ways. Furthermore, many respondents brought up moral obligation as something embedded in their corporate culture, driving them to tackle challenges that the world is facing. All the respondents highlighted that their companies strive to contribute to a better world through addressing global issues, such as climate
change, natural disasters, resource constraints, human rights; and through helping customers make better choices, creating a better quality of life for people in communities and societies. Large companies today have shown a stronger commitment to facing these challenges and accordingly started to rethink their traditional business to better cope with them.

Our study found a common perception within large firms that corporate culture is a major factor underlying sustainable innovation development. When discussing sustainable innovation, the respondents often linked it to the deeply rooted culture and strong values of the organisation. The case firms in this study were founded over many decades ago, thus they have become mature organisations with strong corporate cultures. An open culture, increased awareness of employees, freedom and time to explore new fields are identified as key values enabling sustainable innovation. Moreover, moral obligation is of great importance within the firm's corporate culture. As large firms are major actors in the global economy, they are more driven to act upon the world’s challenges and contribute to a more sustainable future.

5.4. Summary of analysis

Large firms today are seen as key global actors; thus are required to engage in solving global challenges. Due to increasing pressure from society, they have strived to act in the forefront of new regulations, technology and resources. Sustainable innovation has become an important way for large firms to innovate new products and services and at the same time contributing to a better world. The empirical findings show that sustainable innovation is an emerging concept in business practices and has yet to reach a common perception among large corporations. Large firms have different ways of understanding sustainable innovation, resulting in their different approaches in integrating sustainable innovation into their business. Evidently, the lack of conceptual consensus in theory is also illustrated in practice. Nevertheless, sustainable innovation is shown to play an increasingly important role in large firms’ strategy in general and sustainability strategy in particular among all the studied companies. The implication of firms adding social, environmental and economic dimensions in the innovation process will presumably increase in the future. However, sustainable innovation may not be a fixed concept due to its ambiguous boundaries and various ways of understanding.

With regards to the underlying factors driving sustainable innovation, even if they are separate, they sometimes collide and enhance each other. Despite operating in different industries, all the
case firms shared a common view on the strong influence of the five factors in stimulating the development of sustainable innovation, including market demand, new business opportunities, interfunctional collaboration, management commitment and corporate culture. The other factors showed inconclusive results. Thus, regulations and knowledge management should not be seen as driving factors, but rather influencing factors, meaning that they are important to some extent in the process of developing sustainable innovation but their roles vary in different companies and different industries.

Drawing on the above reasoning, we revised the theoretical framework and presented it in the following figure (Figure 2).

![Figure 2. Revised theoretical framework: Underlying factors for sustainable innovation](image)

### 6. CONCLUSION

Previous research has examined the topic of sustainable innovation and how it can change the way companies operate and the business landscape, especially in the context of having to face increasing global challenges such as climate change, humanitarian crises, and resource scarcity. Yet, minor attempts have been made to explore how large firms perceive and engage in sustainable innovation as well as what factors drive sustainable innovation development within large firms. This thesis has empirically explored to gain deeper knowledge about the concept of sustainable
innovation and answered the research question; “What are the underlying factors driving sustainable innovation in large firms?” In doing so, it contributes to extant knowledge about the drivers of sustainable innovation at the firm level both in theory and practice.

6.1. Theoretical contribution

By conducting a qualitative multiple case study in four of Sweden's largest and industry leading firms, we developed a rigorous framework of the underlying factors driving sustainable innovation. Some important insights are highlighted to enrich our knowledge in this field. Our theoretical framework (as shown in Figure 2) identifies five key factors driving sustainable innovation; *market demand*, *new business opportunities*, *interfunctional collaboration*, *management commitment* and *corporate culture*. Although these factors are separate, they are found to go together, sometimes collide and enhance one another. The other factors can serve as influencing factors where; *regulations* depend on which industry the company operates in and *knowledge management*, is not yet fully developed to drive sustainable innovation. Thus, our contribution is to add more in-depth knowledge regarding how each of the above factors affects sustainable innovation development within firms.

Additionally, the thesis addresses the gap in literature regarding lack of empirical studies on sustainable innovation in the context of large corporations. Large firms are recognised as early adopters in the field of sustainable innovation, since they have adequate resources, networks to transform traditional business practices. Sustainable innovation can be viewed as a venture where it is not evaluated as a normal business case and requires investment with a long term perspective. A clear vision and strong commitment from the management can influence the allocation of organisational resources in this area. Moreover, the pursuit of sustainable innovation is also recognised as a moral obligation where large companies are driven to act upon global challenges and adapt their business operations accordingly. The moral obligation shall be integrated into the corporate culture, serving as a crucial value to motivate all employees to engage and collaborate cross-functionally.

6.2. Managerial implications

Some managerial implications are suggested. In order to find a clear business case for sustainable innovation, firms need to develop concrete methods to measure the benefits and values it can bring. By doing so, firms’ management will be able to establish a funding structure and dedicate more
resources for developing sustainable innovation. Moreover, large firms should try to reduce bureaucracy and complexity of the organisational structure for better cross-functional collaboration and for enhancing the speed of sustainable innovation implementation. Developing more effective tools and platforms to create better knowledge flows for sustainable innovation as a way to motivate employees is also recommended. Most importantly, the key to enable the development of sustainable innovation is to encourage an open and entrepreneurial culture so that employees across the organisation adopt the mindset sustainable innovation requires.

6.3. Limitations and suggestions for further research

The main limitation of this thesis is the possibility of generalisation beyond this research context. Since the case firms are operating in different industries, our results cannot be generalised on statistical grounds. Rather, we focused on understanding the general drivers for sustainable innovation among large corporations. The empirical analysis is limited to a sample of Swedish firms and consequently the results might not be representative for firms in other countries. Another limitation is that our data was collected and captured at one specific point in time. Yet, sustainable innovation is seen as a process with a long-term perspective, longitudinal data might be needed to explore this field thoroughly.

For future research, it would be interesting to test the identified factors on small and medium-sized firms to expand the scope of this study. Depending the size of the company, these factors might generate different effects on driving sustainable innovation within firms. In addition, due to limited knowledge on knowledge management framework for sustainable innovation in firms, more research could be done with regards to motivation for sustainable innovation. The thesis also recognises that firms find it difficult to measure sustainable innovation and additional research could look into how firms develop measurement methods for sustainable innovation.
7. REFERENCES


Web


### 8. APPENDIX

**Appendix 1 - Operationalization and interview questions**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
<th>Author</th>
<th>Concept</th>
<th>Interview Questions</th>
</tr>
</thead>
</table>
| Sustainable innovation concept  | General concept      | Adams et al. (2012); Arnold and Hockerts, 2011; Boons and Lüdeke-Freund, (2013); Boons et al. (2013); Carrillo-Hermosilla et al. (2010); Geels et al. (2008); Hansen et al. (2009); Ketata et al. (2015); Larson (2000); Nidumolu et al. (2009); Schiederig et al. (2012); Trifilova et al. (2013) | Sustainable innovation, Environmental, social and financial dimensions | - How does your company define sustainable innovation?  
- Can you give some examples of sustainable innovation in your company? |
| Regulations                     | External factor      | Bossle et al. (2015); De Medeiros et al. (2014); Horbach et al. (2012); Hansen et al. (2009); Ketata et al. (2015); Kungolos (2007) | Regulatory push, Government control, Pressure on innovativeness, Adaption to regulations | - Are there any regulatory factors that influence sustainable innovation development in your company? |
| Market demand                   | External factor      | Arnold and Hockerts (2010); Ayuso et al. (2011); Bossle et al. (2015); De Medeiros et al. (2014); Horbach et al. (2012); Hall and Vredenburg, (2003); Ketata et al. (2015) | Customer demand, Stakeholder demand, Stakeholder collaboration | - Are there any market demand for sustainable innovation?  
- How does your company work with other stakeholders to drive sustainable innovation? |
| New business opportunities      | Internal factor      | Arnold and Hockerts (2011); Hansen et al. (2009); Ketata et al. (2015); Nidumolu et al. (2009); Trifilova et al. (2013) | Competitive advantage, Cost reduction, New market segments | - Are there any business opportunities that sustainable innovation presents for your company? |
| Interfunctional collaboration   | Internal factor      | Arnold and Hockerts (2011); Boons and Lüdeke-Freund (2013); De Medeiros et al.(2014); Jorna (2006); Ketata et al. (2015); Szekely and Strebel (2013) | Organisational collaboration, Diverse capabilities, Networks | - How do different departments in your company work together on sustainable innovation initiatives? |
| Management commitment           | Internal factor      | Arnold (2010); De Medeiros et al. (2014); Hall and Vredenburg (2003); Nidumolu et al. (2009); Waite (2013) | Top management support, Management commitment, Vision | - How do you describe the support and commitment from management for sustainable innovation in your company? |
| Knowledge management            | Internal factor      | Arnold (2010); Ayuso et al. (2011); Bossle et al. (2015); Jorna (2006); Ketata et al. (2015); Robinson et al. (2006); | Knowledge exchange, Competence development, Employee training | - How does your company collect, distribute, share knowledge regarding sustainable innovation?  
- How does your company invest in employees to develop competencies for sustainable innovation? |
| Corporate Culture               | Internal factor      | Arnold (2010); De Medeiros et al. (2014); Dewberry and de Barros (2009); Fichter and Priem (2007); Ketata et al. (2015) | Sustainability values and norms, Openness for innovation | - How does your company create a corporate culture stimulating sustainable innovation? |