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Strategic management of corporate value chain emissions

Exploring the drivers and barriers for scope 3 management

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Abstract

Title	Strategic Management of Corporate Value Chain Emissions - Exploring the Drivers and Barriers for Scope 3 Management
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Problem definition	In recent years companies have developed carbon management strategies (CMS) in order to take greater responsibility for their climate impact. However, these have focused on direct emission sources, neglecting substantial emissions downstream and upstream in the value chain. This presents a problem since emission reduction efforts might be misdirected, resulting in ineffective CMS. To address this issue, the Greenhouse Gas Protocol developed the scope 3 emission standard, yet, adoption is slow and companies are struggling.
Purpose	The purpose of this study is to gain a deeper understanding of scope 3 emission management by investigating the drivers as to why companies choose to manage their emissions in scope 3, and the barriers for future development.
Methodology	In order to fulfill the purpose of this study, a qualitative interview study was conducted with a sample of eleven large Swedish corporations. The results were analyzed with support from a theoretical framework that was established based on acknowledged theories from the field of CMS, as well as previous findings regarding scope 3 emission management.
Conclusions	The main driver to scope 3 management was found to be perceived profitability, still, because of the barriers of external uncertainty and measurement difficulties, it remains unclear whether scope 3 management really generates increased profits or reduced emissions. For further improvement of scope 3 management, an interplay between senior leadership in companies and policy makers is required in order to provide the right conditions for development.
Keywords	<i>corporate value chain emissions, carbon management strategies, scope 3 management, sustainable supply chain management, GHG Protocol Scope 3 Emission Standard</i>

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List of abbreviations

CMS - Carbon Management Systems

GHG - Greenhouse Gas

CSR - Corporate Social Responsibility

NGO - Non-Governmental Organization

1. Introduction

This chapter begins with a background description of how the phenomenon of scope 3 emerged, followed by a discussion of why this topic is of interest to study. Lastly, the purpose of the thesis is presented, together with the research questions that this thesis aims to answer.

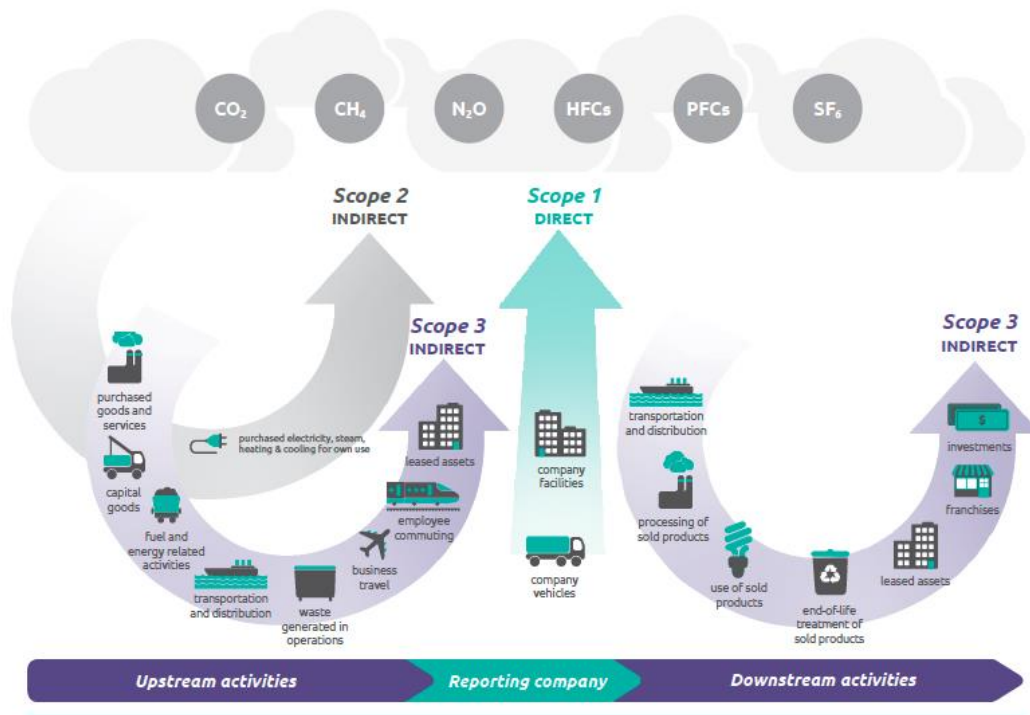
1.1 Background

Temperatures are rising. The climate is changing. Governments, shareholders, consumers and business leaders are all becoming increasingly convinced that companies need to take a greater responsibility in order to reduce their carbon footprints. This presents a global shift in how companies shape strategy, providing both new business opportunities and raising imminent threats (Porter & Reinhart, 2007). In recent years, a growing number of companies have developed carbon management strategies (CMS) to identify GHG emission sources, assess these emissions and thereafter explore efforts and activities in order to reduce emissions (Yunus, Elijido-Ten & Abhayawansa, 2016). By doing this, companies can gain legitimacy from stakeholders and acquire competitive advantages (Paul Lang & Baumgartner, 2017).

However, the focus so far has been almost solely on companies' direct emissions, whereas substantial emissions downstream and upstream in the value chain has been neglected (Huang, Weber & Matthews, 2009). As more than 75 percent of a company's total GHG emissions can be found outside of the company's direct control (Huang et al., 2009), it is important for companies to make a complete assessment of their carbon footprint in order to identify and reduce potential emission hotspots (GHG Protocol, 2011). If companies do not account for their full value chain GHG emissions, they risk focusing on the wrong activities, developing ineffective CMS, and overlooking large parts of their carbon footprint (Matthews et al., 2008). By overlooking indirect emissions, the risk of breaching the 2° degree limit of global warming is increasingly imminent, possibly throwing us into irreversible feedback loops of dangerous global warming (GHG Protocol, 2011; Rockström et al., 2009).

In order to address this issue, the GHG Protocol developed the *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* in 2011, providing guidance on how to systematically measure and manage indirect emissions in the value chain. Direct emissions, which are GHG sources owned and controlled by the company, are categorized in scope 1, whereas emissions from purchased energy consumption are categorized as scope 2. The indirect emissions from the value chain, both

upstream and downstream, which the company does not own or control directly, are categorized as ‘scope 3’ emissions. As these indirect emissions account for a significant share of a company’s total carbon footprint, the GHG Protocol further divides scope 3 emissions into fifteen different categories, presented in *Item 1* below.



Item 1. Corporate value chain emissions (The Greenhouse Gas Protocol, 2011)

For companies to get a full understanding of their carbon footprint, they should map their emissions across the entire value chain, including all emission sources (GHG Protocol, 2011). After having done a full emissions inventory, companies may apply a phased approach, improving the inventory over time and focusing efforts towards emission hotspots in their value chain (GHG Protocol, 2011). By managing scope 3, the GHG Protocol (2011) claims that companies can develop more effective carbon management strategies, leading to several business advantages.

1.2 Problem analysis

Many companies find it difficult to assess and manage their full corporate value chain emissions (Blanco, Caro & Corbett, 2016), and because of the voluntary nature of reporting sustainability issues, several companies choose to exclude certain categories of scope 3 from their GHG emissions inventory, resulting in an incomplete understanding of their carbon footprint (Downie &

Stubbs, 2012). According to a study made in the United States of companies disclosing their corporate value chain emissions, only 22 percent of the total scope 3 emissions were reported, indicating significant room for improvement (Blanco et al., 2016).

While most earlier studies have focused on carbon management strategies (CMS) in general (Lee, 2012; Okereke, 2007; 2010; Hoffman, 2004; 2007; Paul et al., 2017; Mazhar, Bull, Lemon, Taylor & Francis, 2017), it remains unexplored if these propositions also apply for scope 3 management in particular. Research on scope 3 has until today almost solely been focused on how companies measure emissions in their value chain (Downie & Stubbs, 2011; 2012; Blanco et al., 2016; Patchell, 2018), and little attention has been brought to what drives and hinders management of scope 3 emissions. This presents a growing gap between the theories on traditional CMS and how carbon management has evolved to take greater consideration for emissions in the value chain.

Therefore, a study investigating the drivers and barriers for scope 3 management should be of great interest for researchers wanting to get a better understanding of the phenomenon. It might also contribute to a deeper understanding for business leaders who want to get a better picture of the company's carbon footprint, as well as for policy makers who aim to provide the right conditions for sustainable development. This in turn, should be of great public interest, as corporations are important actors in the struggle to combat climate change.

Since Sweden has been highlighted in several studies as a frontrunner for sustainable development because of comprehensive environmental legislation and the private sector's sustainability engagement (OECD, 2014; SDG Index, 2017), it is an attractive country to conduct the study within. Exploring Swedish companies' approach to scope 3 emission management could be seen as interesting examples for other companies and legislators across the world.

1.3 Purpose

The purpose of this study is to gain a deeper understanding of scope 3 emission management by investigating the drivers as to why companies choose to manage their emissions in scope 3, and the barriers for future development.

1.4 Research question

Based on the background, problem discussion and purpose presented above, the research question of this paper is:

- *What are the drivers and barriers to companies' management of scope 3 emissions?*

In order to answer this overarching question, it is broken down to the following two subqueries:

- What are the drivers to why companies manage their scope 3 emissions?
- What are the barriers for companies to further develop their scope 3 emission management?

By first exploring the underlying drivers for companies' management of scope 3 emissions, we will create a foundation for understanding how this connects to strategic choices of scope 3 management. When this is established, the focus will be put on what barriers there are for further development of scope 3 emission management and how companies try to overcome the identified barriers.

2. Theoretical discussion

The theoretical framework for this study is established through a rigorous review of research within the field of carbon management strategies (CMS) and previous research studying the relatively new phenomenon of scope 3 emission management. Based on relevant theoretical findings explaining what drives companies to manage their carbon emissions (Hoffman, 2004; Okereke, 2007; 2010), critical factors to succeed (Mazhar et al., 2017; GHG Protocol 2011), and what hinders them (Okereke, 2007; Downie & Stubbs, 2011; 2012), the framework provides an understanding for possible outcomes of this study.

Drivers for CMS are investigated by Hoffman (2004) and Okereke (2007; 2010) among others. Hoffman (2004) is looking at incentives for why companies engage in management of carbon emissions and what strategic benefits there are to voluntarily reduce them. Okereke (2007) conducted a study of carbon management strategies of the 100 largest companies in the UK, exploring what motivates, drives and hinders the companies to manage carbon emissions and act against climate change. Further, he investigated the six most energy intensive UK firms to find how internal and external drivers for carbon management interact (Okereke, 2010). As these three articles explain drivers for CMS, and scope 3 emission management can be seen as a part of carbon management, they are highly relevant for the first part of this theoretical framework.

Mazhar et al. (2017) investigated critical successful factors for implementation of carbon management in organizations by studying the carbon management plans of higher education institutions in the UK. The lack of these factors were further discussed as barriers moving forward, which makes the study relevant for the second part of the theoretical framework. These results both supports and complements the GHG Protocol Scope 3 Accounting and Reporting Standard, as well as Okereke's findings (2007). In the context of barriers, Downie and Stubbs' (2011; 2012) studies of Australian companies' scope 3 emissions assessments add another dimension by focusing on measuring difficulties. Lastly, Paul et al.'s (2017) literature review compiled the major findings from the field of CMS and categorized these in order to assess business strategies on climate change from a multilevel approach, facilitating the search for relevant theoretical findings.

The presented literature are additionally supported and questioned by findings from other research to amplify the common census or to highlight areas where there are different understandings.

2.1 Drivers for carbon management strategies

In this chapter, the drivers to why companies engage in carbon management activities are reviewed. Starting off with arguments for profitability through efficiency, competitive advantages, risk management and securing a future position, the drivers are later discussed from the perspective of stakeholder pressures and moral obligations. The importance of time horizon relating to profitability is considered, making a distinction between short-term profitability and long-term profitability.

2.1.1 Short-term profitability

One driver to why companies manage their scope 3 emissions derives from the theoretical standpoint of Porter and van der Linde (1995) who argue that businesses, by having an increased environmental concern, can increase efficiency and gain competitive advantages. Increased efficiency, by reduced resource input or enhanced output, is a way for companies to avoid unnecessary costs, directly connected to profitability (Porter & van der Linde, 1995). Furthermore, competitive advantages are gained through implementation of a value creating strategy, generating a better offer to customers than competitors, hence increasing revenues (Barney, 1991).

Research on carbon management strategies (CMS) confirms these theories, stating that efficiency and competitive advantages are the most common drivers for carbon emission management (Hoffman, 2004). As carbon emissions and energy usage in the value chain can be costly, increased energy efficiency and GHG reductions is a way to save costs (Hoffman, 2004). In order to find cost-effective reduction in the value chain, the company needs to have a deeper understanding of scope 3 emissions, as this knowledge is crucial to make informed decisions where reduction efforts have the greatest opportunities (Matthews et al., 2008; Huang et al., 2009). However, according to Hoffman (2004), emission reductions through efficiency efforts will only be possible as long as the cost for the efforts are recovered by the savings. This depends on the external environment, such as legislation, emission permit rights and taxes on carbon (Hoffman, 2004).

Competitive advantage through carbon management is investigated by Okereke (2010), who states that companies' carbon management is driven by market opportunities, where the demand for low-emission products and services will rise. The emergence of the '*green consumer*' in the late 20th century suggested that some consumers were willing to pay a price-premium for products with lower environmental impact, making this a possible strategic choice for companies who wanted to

differentiate from competitors (Peattie, 2001). By meeting these demands, companies can gain competitive advantages and increase revenues (Hoffman, 2004). Simultaneously, Okereke's (2010) findings suggest that even though market opportunity is an important driver, strong governmental regulation is needed in order to drive the fundamental changes necessary for a transition to a low-carbon economy.

2.1.2 Long-term profitability

Improving risk management and securing a future position by managing carbon emissions are connected to long-term profitability, since they do not generate immediate cash flows. Risk management is argued to be a driver for both CMS and, more specifically, scope 3 emission management, as many corporate assets in the value chain are threatened by different risks related to climate change (Hoffman, 2004; GHG Protocol, 2011).

Firstly, the physical risks from climate change such as increased temperatures, natural disasters and rising sea levels might severely affect suppliers and clients alike, destroying physical assets in the value chain (Lash & Wellington, 2007; Porter & Reinhart, 2007). By quantifying the corporate carbon footprint and managing scope 3 emissions, companies can have the ability to foresee these consequences and mitigate the negative effects that might occur (Lash & Wellington, 2007).

Secondly, carbon taxes, regulations, fines and GHG emission caps might increase financial risks for corporations (Hoffman, 2004). By assessing value chain emissions, companies can develop more effective carbon management strategies through the identification of emission hotspots and respond more proactively to these risks, hence avoiding costly future scenarios (GHG Protocol, 2011).

Furthermore, companies managing their scope 3 emissions will get a better understanding of possible emission trade-offs when selecting between new investments and strategies according to the Carbon Trust (2006).

Adding the perspective of how climate change will affect the conditions for how human life will be sustained over time, businesses need to incorporate this scenario when planning for the future (Hart, 1995). As companies are depending on what the planet provides in order to operate and generate profit, this constitutes another driver for why companies engage in environmental strategies, including carbon management. In order for companies to sustain competitive advantages even in the future, they need to develop new capabilities and resources to solve the coming challenges, according to Hart (1995). Companies who have the right capabilities and resources, and know how to exploit them, are the ones who will survive in the long run by securing a place at the

future market (Hart, 1995). This is emphasized by the GHG Protocol (2011) regarding management of scope 3 emissions due to its ability to create understanding for the impact of the value chain on the business.

2.1.3 Stakeholder pressures

On another note, drivers to why companies engage in carbon management activities can be explained by different stakeholder pressures and legitimacy motives. As described by stakeholder theory (Freeman, 1984; Donaldson & Preston, 1995), companies act in complex environments, surrounded by large numbers of stakeholders with different perceived interests. These stakeholders all exert different kinds of pressures (Donaldson & Preston, 1995) which corporations must respond to in order to stay legitimate and survive (Dowling & Pfeffer, 1975). Legitimacy is in this study defined as ‘*a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions*’ (Suchman, 1995, p. 574). By undertaking activities perceived to be morally right and responding to the interests of its’ stakeholders, organisations can gain legitimacy (Suchman, 1995). Consequently, when perceptions, values and beliefs in society change, so must companies’ strategies in order to be successful (Dowling & Pfeffer, 1975). For example, stakeholders’ demand for corporate social responsibility forces companies to engage in CSR activities according to Kitzmueller and Shimshack (2012). Since customers, investors, NGOs and other stakeholders are becoming increasingly concerned about climate change, companies are pressured to report on GHG emissions, develop more environmentally friendly products and take a larger responsibility for their carbon footprints in order to maintain legitimate (Lee, 2012). If companies do not respond to these increasing demands, they might risk losing legitimacy, resulting in several difficulties. Customers might boycott products (Greeno & Robinson, 1992), suppliers might stop deliveries in order to protect their own reputation (Henriques & Sadorsky, 1999), and the company might have trouble being supplied with valuable resources (Suchman, 1995).

Looking at investor pressures, some institutional investors and shareholders request GHG emission disclosures as they have the perception that the market will reward climate change performance (Kolk Levy & Pinkse, 2008; Okereke, 2007). Others associate poor environmental performance with greater risk, hence demanding higher risk premiums or withdrawing capital from the company if it does not disclose data on emission and reduction strategies (Henriques & Sadorsky, 1999; Funk, 2003; Kolk et al., 2008; Okereke, 2007). The increasing concern from investors can be seen reflected in the billions of dollars invested in the Dow Jones Sustainability Index, or the growing

scope of the Carbon Disclosure Project (SAM, 2008; CDP, 2018). As companies are highly dependent on easy and cheap access to capital, activities to manage GHG emissions can be seen as a response to stakeholder pressures in order to maintain legitimacy (Hong & Kacperczyk, 2009; Kolk et al., 2008). This perspective is also reinforced by Hrasaky's (2011) study on motives behind Australian companies' carbon management strategies. He specifically looks at GHG disclosures, and concludes that companies develop these mainly in order to avoid the legitimacy gap between societal expectations and corporate performance.

2.1.4 Regulation

Regulation and governmental legislation constitutes another important driver to why companies develop carbon management strategies according to Okereke (2007; 2010). Rather than focusing on profitability, staying ahead of and adapting to regulation is seen as the main reason for companies' development of climate change strategies. This proposition is also confirmed by Kolk, Levy and Pinkse (2004) in their study of more than 100 multinational companies, and by Hoffman's (2006) study of companies in the United States.

Emerging regulation is considered both as a risk and as an opportunity, depending strongly on the industry in which the company operates in (Kolk et al., 2004). For firms with high carbon exposure, a potential future legislation on a price on carbon emissions might be detrimental (Porter & Reinhart, 2007), and for companies not actively involved in any environmental issues, the rapid development of increasingly complex environmental regulation might prove disastrous (Kolk et al., 2004; Lash & Wellington, 2007). However, by being proactive, companies may gain legitimacy, get to take part in the development of new regulation, and achieve competitive advantages (Porter & van der Linde, 1995; Buysse & Verbeke, 2002). As many business leaders expect that reporting on scope 3 emissions might become a requirement in the near future (Tidy, Wang & Hall, 2016), this might be an important driver for why companies choose to start managing their scope 3 emissions, even though it is not a legal requirement today.

2.1.5 Moral obligation

Finally, the explanation to why companies choose to manage their scope 3 emissions might be due to moral obligations. According to this theory, CEO's and companies may choose to take greater corporate social responsibility not in order to increase profits, but as a consequence from a sense of responsibility (Kitzmueller & Shimshack, 2012). This moral driver can be difficult to identify though, since it is hard to recognize which companies that truly act on climate change due to moral

reasons, and the ones doing so in order to improve reputation (Okereke, 2007). Nevertheless, it should be included in the analysis to get a full understanding of companies' motives for managing their corporate value chain emissions.

2.2 Barriers

In order to understand the possible barriers to scope 3 management, earlier research on scope 3 is here presented together with general barriers for carbon management strategies (CMS). Firstly, the challenges of collecting accurate data, measuring and evaluating scope 3 emissions are discussed. Secondly, the barriers of knowledge and planning are brought up together with senior leadership and resources. Lastly, uncertainties in the external environment are examined as a barrier for management of scope 3 emissions.

2.2.1 Measuring and evaluation

Measuring and evaluation are argued to be of great importance in order to improve carbon management (Mazhar et al., 2017), however, research on management of scope 3 emissions clearly states that the immediate barrier related to corporate value chain accounting is the lack of knowledge on how to identify and measure value chain emissions (Downie & Stubbs, 2011). The GHG Protocol Scope 3 Standard (2011) states that companies should map their scope 3 emissions out of relevance, completeness, consistency, transparency and accuracy across the value chain. The establishment of a full carbon inventory including all scope 3 emissions can be a very expensive, complex and methodologically difficult task though, according to Minx et al. (2009). The inability to find emission factor information, lack of quality emission data in the supply chain and methodology are argued to be major barriers according to Downie and Stubbs (2011; 2012). As multinational companies might have complex value chains consisting of more than 10 000 suppliers, the sole activity of reaching out to request emission data from suppliers is seen as an unprecedented task (Patchell, 2018). Substantial coordination with other upstream and downstream companies in the value chain, often far away from the direct influence of the reporting firm, is needed to achieve the task (Patchell, 2018). However, even when data on carbon emissions is available, the challenge remains of assessing the quality of the data (Kolk et al., 2008; Melville & Whisnant, 2014). How far upstream carbon emissions should be measured, and how to assess its completeness, are additional challenges companies face when starting to measure their scope 3 emissions (Blanco et al, 2016; Hoffmann & Busch, 2008). The Scope 3 Accounting and Reporting

Standard is supposed to help companies to assess their corporate value chain emissions, but despite this, the lack of guidance is still seen as a particular concern (Talbot & Boiral, 2013). Even though companies think scope 3 emissions are important, they have to understand which sources of emissions to include and how to calculate them (Huang et al., 2009). Patchell (2018) highlights the difficulties in the Scope 3 standard, even stating that *“Just because value chain emissions can theoretically be mapped and emissions audited does not mean they can be measured in practice”* (Patchell, 2018, p. 956).

In order to overcome the barrier of measurement, companies may try to collaborate with suppliers in their value chain to help them improve carbon disclosure (Downie & Stubbs, 2011). They might also choose to join networks and collaborate with other businesses, as it enables companies to exchange information and increase knowledge for a low cost (Schilling & Phelps, 2007). It is important though, that these kind of collaborations are based on the interest from the whole supply chain, rather than just from an individual company in order to be successful (Cao & Zhang, 2011).

2.2.2 Planning

Since a full inventory of greenhouse gas emissions across the value chain is seen as the first step towards an effective carbon management strategy (Kolk et al., 2004; GHG Protocol 2011), the lack of data becomes a barrier for planning - including target setting, measurement systems and evaluation (Kolk et al., 2004). Further, as measurement systems are needed in order to focus strategies and policies on where they make the most impact (Mazhar et al., 2017; GHG Protocol, 2011; Tang & Luo, 2014) and help when choosing between different investment alternatives (Jasch, 2003; Burritt, Herzig & Tadeo, 2009), the lack of data has a direct connection to how effective CMS are formed (Qian, Hörisch & Schaltegger, 2018). From Kolk and Pinkse's (2004) study in 2004, they saw that companies not having made a full assessment of their value chain had neither set targets nor developed methods to reduce their emissions. As targets are argued to be a crucial enabler for effective scope 3 management according to the Scope 3 Standard (GHG Protocol, 2011), the lack of it can be seen as a barrier. The standard further emphasises that companies have to make a strategic choice between if targets will be measured in relative or absolute numbers (GHG Protocol, 2011). In order to reduce emissions, however, Bui and Villiers' (2017) empirical findings suggest that absolute reduction targets are needed, rather than intensity targets. On the other hand, Patchell (2018, pp. 956) states that because of the difficulties in measurement, *“a ‘what gets measured gets managed’ regime is not always appropriate”*.

2.2.3 Senior leadership and resources

Strong senior leadership and engagement from the CEO is crucial for a carbon management strategy to be implemented effectively (Epstein & Buhovac, 2014; Okereke, 2007; Mazhar et al., 2017), therefore, lack of this can be seen as a barrier for scope 3 management. The complex cause-effect relations connected to climate change require substantial understanding and knowledge that is not always applicable with the traditional business thinking that managers have, according to Paul et al. (2017). As activities today can cause effects in the distant future, and investments to reduce GHG emissions usually require substantial financial capital, business leaders need to leave their typically short-term perspectives behind when it comes to carbon management strategies (Paul et al., 2017). Further, Downie and Stubbs (2011) argue that knowledge is needed in order for effective allocation of resources, something that is strengthened by Mazhar et al. (2017), who argues that the level of engagement from senior leadership is reflected in allocation of resources for CMS.

The implication of resources and capabilities on a company's strategy is discussed frequently in the field of corporate management, stating that both financial and human resources, as well as capabilities to exploit these, have a large effect on how a company's strategy is formed (Barney, 1991; Hart, 1995). The same applies for CMS, where theory states that for CMS to be successful, both access to financial and human resources are crucial (Lee, 2012; Weinhofer & Hoffmann, 2010). For management systems to be effective, they must be designed in relation to companies' human and financial capital, as well as organisational capabilities (Epstein & Buhovac, 2014). The more proactive environmental strategy a company aims for, the more funding and resources are needed in terms of investments (Buysse & Verbeke, 2002). Hence, lack of leadership engagement and knowledge, which in turn affect allocation of resources, can be a major barrier to implementation of CMS (Mazhar et al., 2017). Additionally, allocation of resources is also shown to be affected by company size, since larger companies often have greater capabilities and slack financial resources available that can be directed to carbon reduction activities (Lee, 2012; Weinhofer & Hoffman, 2010). Both leadership and resources are therefore important aspects to investigate as barriers to scope 3 management.

2.2.4 External uncertainties

The external environment in which companies operate has an impact on how strategies are formed (Porter, 2008). Uncertainty in the external environment can hence put up barriers for companies' strategic choices, which also applies for carbon management strategies (Okereke, 2007). Previous research identifies three main barriers for carbon management, all related to external uncertainty

(Okereke, 2007). Even though the external barriers are overlapping in some ways, they variegate the understanding which can bring clarity to the challenges related to the progress of CMS. The first barrier explains how the absence of a clear policy and framework for future development lead to investment difficulties (Okereke, 2007). Since solutions for more effective carbon management often are costly, board managers and investors need to be convinced of the generated benefits, still, this becomes difficult since framework for future development lacks a long-term view (Okereke, 2007). This is supported by Hoffman (2004), explaining that robust policy frameworks can give incentives for the more expensive investments needed to reduce carbon emissions. Policy uncertainty is further depending on the next barrier, namely governmental irregularity including international institutions.

This relates to variance in governmental abatement actions for climate change on different levels, such as carbon and energy prices, geographical regulation variances, and political instability (Okereke, 2007). Paul et al. (2017) provides a deeper explanation of how this interrelates, stating that as climate change is a transnational issue, geopolitical factors are important since they shape the global governance. Hence, companies' CMS are indeed affected of how climate change negotiations turn out. Important to acknowledge, however, is companies' ability to influence these processes, not making them passive bystanders (Paul et al., 2017). Companies are able to engage closely with regulatory stakeholders in order to influence political processes. By writing their own policy proposals, sending spokespersons to important meetings and engaging in lobbying, companies hope to prevent potentially harmful regulations, and promote legislation that might be beneficial for the company (Hoffman, 2007).

The last barrier, market uncertainty, is also an important aspect because even though companies receives clear guidelines for future development and have support from the governmental surroundings, the market still have to reward carbon reduction efforts (Okereke, 2007). How the market responds to companies' actions to combat climate change is in turn depending on societal awareness and concerns, meaning that there must be a demand for the actions to pay off (Okereke, 2007). Whether the market reward companies' CMS is further depending on other factors such as economic development, purchasing power and social conditions (Paul et al., 2017). With this said, companies need to engage with all kinds of stakeholders in order to affect how their CMS is rewarded by the external environment (Mazhar et al., 2017; Paul et al., 2017).

Since lack of stakeholder engagement often can be explained by insufficient knowledge or understanding, it is important for companies to have an open communication and dialogue with their stakeholders (Mazhar et al., 2017). This enables companies to make more informed and inclusive decisions as well as creating a better understanding of how its decisions affect stakeholders in the whole value chain (O’Riordan & Fairbrass, 2013).

3. Methodology

The research question for this paper derives from the imminent need for companies to manage their corporate value chain emissions. Looking at the drivers and barriers for scope 3 emission management and how these interrelate can give businesses, policymakers and other stakeholders a better understanding of companies carbon management practices. The study is narrowed down to focus on Swedish companies due to practical constraints and since it can be seen as an interesting market to investigate.

3.1 Research design

In order to answer the research question regarding drivers and barriers for scope 3 management, there are several different methods available. A quantitative study could be used to get more compelling numerical evidence, confirming or disproving existing theory (Bryman & Bell, 2011). However, as this study aims to investigate a process in-depth and highlight different aspects to get a holistic picture, a qualitative interview study is preferred, as suggested by Bryman and Bell (2011). Further, qualitative studies have the ability to investigate why certain things occur based on context (Bryman & Bell, 2011). This is an aspect that quantitative studies fail to describe, which in this study is crucial.

Conducting interviews is a way to follow up on interesting leads as well as visualize how problems arise. According to Bryman & Bell (2011), semi-structured interviews taking a process perspective can provide deeper understanding of a social context. This will be helpful in order to answer the research questions of this thesis.

As many qualitative studies, we used a grounded theory, meaning that the theoretical framework as point of departure was readjusted as data was collected (Bryman & Bells, 2011). This approach was desirable since the subject of this study is a relatively new phenomenon, not having much theoretical exploration. By letting theoretical ideas derive from interesting discovers parallel to the data collection, the theoretical standpoint gets tested (Bryman & Bell, 2011). This approach was preferred since it allowed us to focus on the actual answers, not actively looking for data that fits to what theory suggests.

3.2 Data collection

3.2.1 Secondary sources

To first gain a better understanding of earlier research within the field, a literature review were conducted, including both printed and digital sources. By using terms such as ‘*scope 3 strategy*’, ‘*corporate value chain*’, ‘*CMS*’ and ‘*drivers*’ in different databases, i. e. Google Scholar, Elsevier and Gothenburg University (ub.gu.se), relevant articles were found and used based on their findings. The articles were systematically and critically reviewed in order to reveal important understandings and discourses within the field.

Another important resource for this study, which gave a deeper understanding for how companies are promoted to manage their scope 3 emissions, were the Greenhouse Gas Protocol report on the Scope 3 Accounting and Reporting Standard (GHG Protocol, 2011). This report explains in detail the concept of scope 3 and how companies can use management of scope 3 to create corporate value. Sustainability reports from the sampled companies were also used, together with companies’ responses to the Carbon Disclosure Project (CDP), where several of the interviewed companies revealed thorough explanations of their carbon management practices. These sources were valuable both for preparations before conducting the interviews in order to adapt questions to the specific companies, as well as for the empirical evidence. Other secondary sources used for data collection were company websites and reports from business networks.

3.2.2 Sample

In order to understand the drivers and barriers to scope 3 management, we wanted to study companies who have some experience of working with scope 3. The sample of companies were therefore chosen based on their voluntary communication on how they include scope 3 emissions in their carbon management strategies (CMS). The companies’ size were also taken into consideration when selecting the sample, since previous findings show that large companies have greater potential when it comes to CMS (Lee, 2012; Weinhofer & Hoffmann, 2010). Further, it was desirable to have a broad sample with companies representing many different sectors and industries due to the ambition to get a holistic view of scope 3 management, enhancing the possibility to generalize the findings on a wider level.

Currently there are about 50 large cap companies reporting on scope 3 emissions in Sweden (2050, 2016) that were seen as suitable for this study, further explaining why in-depth interviews were

preferred over quantitative research methods. From a report conducted by the consulting firm 2050 (2016), 17 top rated Swedish public companies reporting on scope 3 were contacted. Additionally, the 15 member companies in the Haga Initiative, a corporate network whose members all report on some scope 3 emissions, were contacted. Totally, about 30 companies were approached to participate in the study whereas eleven agreed to take part in an interview. More participants might have been desirable, however, time was limited and we perceived some level of theoretical saturation in the answers which indicates that the sample size was large enough. Bryman and Bell (2011) state that theoretical saturation is fulfilled when chosen categories are supported enough with the gathered data, hence data collection is sufficient. Interviews were held with the following companies:

Item 2. Details of interviews

Company	Size	Industry	Interviewee	Time of interview
Stora Enso	26 000 employees, 100 billion SEK	Forestry	Johan Holm, <i>VP Environment</i>	20/4 - 2018 13:00-14:00
SEB	16 000 employees, 4.5 billion SEK	Banking	Anette Andersson, <i>Portfolio Manager & ESG Investment Specialist, SEB Investment Management</i>	23/4 - 2018 13:00-14:00
Essity	48 000 employees, 100 billion SEK	Hygiene products	Martina Eisenbeis, <i>Sustainability Reporting Manager</i>	24/4 - 2018 09:30-10:40
Löfbergs	300 employees, 1.5 billion SEK	Coffee	Eva Eriksson, <i>Director Sustainability</i>	24/4 - 2018 14:00-15:00
Castellum	400 employees, 5 billion SEK	Real Estate	Filip Elland, <i>Head of Sustainability</i>	26/4 - 2018 10:00-11:15
Sveaskog	800 employees, 6 billion SEK	Forestry	Lena Sammeli Johansson, <i>Head of Sustainability</i>	26/4 - 2018 14:00-15:00
SKF	45 000 employees, 73 billion SEK	Bearings and industrial products	Jonas André, <i>Manager, Stakeholder Communications and Engagement, Group Sustainability & Compliance</i>	27/4 - 2018 09:00-10:30
AkzoNobel	45 000 employees, 150 billion SEK	Chemicals and paint	Johan Widheden, <i>Sustainability Project Manager</i>	2/5 - 2018 13:00-14:10
HK Scan	1 800 employees, 9 billion SEK	Meat industry	Patrik Holm-Thisner, <i>Head, Corporate Responsibility</i>	3/5 - 2018 15:00-16:00
Vattenfall	20 000 employees, 135 billion SEK	Energy	Thomas Olsson, <i>Environmental Advisor</i>	4/5 - 2018 13:00-14:00

H&M group	161 000 employees, 220 billion SEK	Textiles & furniture	Vanessa Rothschild, <i>Business Controller, Sustainability Department</i>	4/5 - 2018 15:00-16:00
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3.2.3 *The interviews*

Before conducting the interviews with the sampled companies, we had conversations with experts within the field of scope 3 management in order to enhance our understanding of the area. The conversations were held via telephone for about one hour, and questions about why companies engage in scope 3 management and what challenges there are for succeeding with management of scope 3 emissions were asked. This gave us better conditions to conduct the interviews with higher quality, and increased the chances of getting significant answers to analyze.

The majority of the interviews were conducted on telephone since time was limited and the interview subjects were geographically dispersed. By doing this, the right people for this study could be reached in an effective manner, but we were deprived of visual impressions that might have added some valuable unspoken information. Two of the interviews took place as personal meetings which enabled us to capture important details and get a better connection with the interviewee (Patel & Davidsson, 2011). All interviews were recorded, transcribed and had a duration for about one hour. The time duration was decided due to both adequacy and time constraints. The interviews were of semi-structured nature where the respondent were able to express their answers within thematic question areas, and follow-up questions were asked in whatever order suited the conversation best, see *Appendix 1. Interview Guide*. This interview structure is often used in qualitative research as it can provide a deeper understanding of the reasoning and thoughts behind the answers (Patel & Davidson, 2011). The respondents were requested to participate based on their position within the company, mainly sustainability managers, chief of sustainability or others within the sustainability department that possessed unique information and insight about their management of scope 3, enabling us to get rich information about the subject. Most of the interviews were held in Swedish and both authors participated in all interviews, but only one were asking questions to avoid confusion. All interviews were then transcribed, in order to help interpret the results and ensure high accuracy in our analysis, as described by Bryman and Bell (2011).

3.3 Data analysis

The empirical results were thereafter analyzed through the theoretical framework, building on well-cited articles within the area of business strategy and carbon management strategy (CMS). More recent articles, focusing on the role of scope 3 emissions in CMS, were also used to better understand and explain drivers for scope 3 emission management and what barriers there are to improve and further develop it. The framework was adjusted after what was discovered in the interviews in order to establish a more relevant analysis and hence draw more thorough conclusions.

As every qualitative research problem is different (Patel & Davidson, 2011), the method for analysis were adjusted to fit the specific conditions of our study. In order to answer our research question and structure the multifaceted answers from the interviews, the empirical evidence were categorized into different main areas which were developed during our research. We identified these mainly based on the findings from the interviews, since they were hard to predict in advance, but also from what we could estimate from earlier theoretical propositions. The main categories were further broken down into subcategories in order to sort out the answers and get a more precise understanding of the phenomenon, as presented below in *Item 3. Theoretical framework*. Using this framework when analyzing the empirical data helped to better structure the study and operationalize the compiled answers to present the results.

Item 3. Theoretical framework

Drivers:

Short-term profitability:

- Efficiency
- Competitive advantages

Long-term profitability:

- Risk management
- Attractive future position

Stakeholder pressures:

- Investor pressures
- Customer pressures

Regulation

Moral obligations

Barriers:

Measuring and evaluation:

- Data collection
- Knowledge

Planning:

- Targets
- Management systems

Senior leadership and resources:

- Commitment
- Resource allocation

External uncertainty:

- Policy uncertainty
- Market uncertainty

We have in the majority of the answers assumed that what the interviewee states reflects the company's standpoint. Because of this, we can cite the company as a whole in some statements in the results. Some statements are, however, cited as personal opinions or perceptions since the questions sometimes were asked in such way.

3.4 Ethical considerations

During this study, several considerations have been taken in order to ensure high ethical standards. As Bryman and Bell (2011) suggest, persons' involvement in a study should be regarded according to voluntariness, integrity, confidentiality and anonymity. We followed these considerations by informing the interviewees in advance what the interviews were about, that the interviews, with permission, preferably were going to be recorded, that the interviewee would have opportunity to correct their statements, and that they could chose to interrupt the interview at any time. Everyone agreed to be recorded in order to ensure correct citations, and none of the interviewees chose to end the interview in advance. After finishing the first draft proposal of the study, it was also sent out to all interviewees who got the opportunity to correct their statements.

3.5 Quality of research

In order to deliver a high quality report, this study was conducted with the following aspects in mind; validity, reliability and generalization. The validity refers to what extent the conclusions connect to the theoretical framework, meaning if the result can be analyzed through the chosen litterature to generate relevant conclusions (Bryman & Bell, 2011). Reliability describes how well the result would match if the study were to be conducted again, or if there were any circumstances affecting the outcome in any way (Bryman & Bell, 2011). Finally, generalization refers to if the result can be used to describe other contexts other than the one investigated (Bryman & Bell, 2011).

By asking relevant questions highly connected to the purpose and research question we believe we were able to collect sufficient qualitative empirical evidence to draw thorough conclusions. Even though the theoretical framework did not completely explain the empirical results, we still found it relevant to use since it was able to highlight areas that could be interesting to investigate for future research. In the end, the research question was answered with substantial depth which in turn

contributes with important findings for both policy makers and researchers within the field. This ensures a high degree of validity, although there might certainly be areas of improvement.

The results from the conducted interviews are believed to be reliable due to the respondents' positions in respectively company, providing the right insight to participate in the study. No respondent were perceived to have reasons not to answer the questions truthfully, yet, some questions were sensitive for receiving biased answers. However, knowing this in advance we were able to take that into consideration by asking follow-up questions to reveal potential bias. Since the interviews were of semi-structured character and the questions were not asked in similar sequences, a replication of this study might yield somewhat different answers. On the other hand, the results were sent back to each respondent in order to control for possible misinterpretations. To conclude, even though the interviews are hard to replicate in exact manners, due to the nature of semi-structured interviews, repeating the study should most likely generate similar results.

This study were aimed to be generalizable providing applicable result usable for other contexts. However, as this study focused on large cap companies the result might not apply for small or medium sized companies. Another important aspect is the investment in deep, rather than wide understanding, which risks the degree of generalization as the study focuses on a few companies' complexity. In other words, a larger sample could strengthen the generalizability of this study.

4. Results

This chapter presents the empirical data and quotes primarily gathered from interviews, together with data from secondary sources. In the first section, the empirical evidence describing the drivers to why companies manage scope 3 emissions is presented. Secondly, the findings related to barriers of scope 3 management is presented, and lastly, a summary of the empirical key findings is made.

4.1 Drivers for scope 3 management

4.1.1 Short-term profitability

The dominating driver to why companies choose to manage their scope 3 emissions was short-term profitability through improved efficiency and gained competitive advantages. Efficiency was seen as a result of scope 3 emission management and can be related to profitability due to its ability to reduce costs, either by increased output or reduced input, which was mentioned by André at SKF “... all this together means reduced emissions, reduced costs and higher productivity. All these three are drivers”. Holm at Stora Enso explained, “It is pretty simple. If one can make the value chain more energy efficient, in any way - one most likely can save expenses”. Andersson at SEB put it in another way stating that anything that gets measured can be improved, which was also mentioned by Holm at HK Scan. Even though all companies saw efficiency in the value chain as a step in the process of scope 3 management, they mentioned that it is not always possible to measure the outcome of efficiency efforts. For example, both SKF, Castellum and Stora Enso admit that they have not seen any emission reductions at all when it comes to scope 3, “To see progress you have to drill down to a separate category or even further” (Holm, Stora Enso).

A majority of the respondents also stated that scope 3 management can generate some kind of advantages in relation to business customers and other stakeholders such as investors. The general perception was that management of scope 3 signals a responsibility that attracts stakeholders in all the different industries. For example, Löfbergs saw scope 3 management as a way to take responsibility, which makes them a more attractive supplier. Sveaskog and AkzoNobel agreed and described the demand for more sustainable supply chains, “Today, competition is not just about the company, you compete as a whole value chain” (Widheden, AkzoNobel). Vattenfall further made the connection between having a high environmental performance, where scope 3 emission management is a crucial part, and what kind of customers the company can attract. No company

identified end consumers as a driver for scope 3 management on the other hand, since it was perceived as too complex to understand on an individual level.

4.1.2 Long-term profitability

Since many of the interviewed companies saw GHG emissions in the value chain as a future risk that might directly impact their own businesses, risk management were argued to be a major driver for working with scope 3. For example, AkzoNobel saw that in light of international agreements, non-renewable resources will become increasingly more expensive, and other companies mentioned rising energy prices and taxes on fossil fuels as a risk in the value chain. HK Scan saw scope 3 management efforts as a requirement in order to sustain the business *“If we don’t take these actions, then we are out of the game and won't be able to sell our products in the future”* (Holm, HK Scan). Castellum and H&M group also saw scope 3 management as a way of securing the business, *“... in order to stay profitable in the future, we need to secure our resources”* (Rothschild, H&M group). Even though the physical risk of climate change was not discussed during the interviews, a majority of the companies communicate this issue in their sustainability reports.

Another long-term profitability aspect is securing an attractive future position in the market, as mentioned by several respondents, *“It is foresight from our part. We realize that this is what our customers will ask for”* (Johansson, Sveaskog). According to H&M group, management of scope 3 emissions was seen as a crucial aspect for succeeding with their strategy as they recently took on a leadership role in sustainable development in the fashion industry (H&M, 2017). However, several of the respondents acknowledged that even if scope 3 management is the right way to go, efforts still need to pay off. For example, SKF explains that the company can only change in the speed of the technical development in order to stay profitable, stating that it is a gradual process.

4.1.3 Stakeholder pressures

The majority of the responding companies acknowledged investor and business customer pressures as drivers for why they manage scope 3 emissions. For example, Andersson at SEB said *“... the institutional investors asks for a deeper analysis...”*, and Eisenbeis at Essity explained that in order to receive investments, the company must show that it understands its business and that it can prepare for the future, *“Not because they [the investors] are super ethical and wants to save the world... Their driver is business risk!”* (Eisenbeis, Essity). Elland at Castellum also mentioned investor pressures as a driver but clarified that it is not the specific scope 3 information that they require, it is rather the overall quality of climate change management where scope 3 *“... is still just*

'check boxes' and not so much in detail'. This was also confirmed by André at SKF, who explained that climate issues are an important factor for investors, but they lack the technical understanding of scope 3 emissions. To improve, Elland at Castellum wished to see higher demand on scope 3 management from investors, since that would make scope 3 management an even higher priority in the company.

No company identified end consumers as a driver since a majority perceived scope 3 emission management as too complex to understand on an individual level, still, business customer pressure was mentioned as an important driver. Big retailers have their own sustainability agenda and therefore demand information about scope 3 emissions, *"They try to understand their own footprint and then they get in touch with their suppliers. The engagement along the value chain is gaining speed"* as stated by Eisenbeis at Essity. Both H&M group, Löfbergs, Vattenfall and Sveaskog supported this perception which was further explained by AkzoNobel, stating that it is a question about customer relations, where scope 3 emission management is a way of gaining supplier credit rating.

Transparency and credibility were also common when discussing drivers for scope 3 emission management. For example, Holm at Stora Enso says that in order to gain credibility, they must disclose the emissions from the value chain. Eisenbeis at Essity shares this view by explaining *"We have a big footprint, this is so obvious! Therefore, we must focus on scope 3 since it has a large impact on our emission footprint"*. Olsson at Vattenfall also expressed a similar thought, saying that it is necessary to communicate a fair description of the company's environmental impact in order to give stakeholders the right picture. H&M group, HK Scan and SEB brought up transparency and credibility as well, but in regards to their customers' ability to make informed decisions. Even though the specific concept of scope 3 emissions is not demanded, general information about how their decisions make impact is requested.

4.1.4 Regulation

Regulation was not mentioned by any of the eleven companies as a driver for scope 3 emission management. On the contrary, several companies expressed regulation as non-existent when they first started to work with value chain emissions. However, all of the companies acknowledge regulation as an important foundation for carbon management in general and are all positive to more stringent regulation. Some companies engage actively on a political level to push for a faster

development of scope 3 management, something that is further described in the section concerning *External uncertainty*.

4.1.5 Moral obligations

All of the responding companies mentioned some kind of moral obligations as a driver for scope 3 management. Inherent responsibility to reduce emissions, understanding the business, and ethical reasons are drivers for their engagement. At H&M group, for example, the management of scope 3 derived from their sustainability strategy of being fair and equal, leading the change towards a circular and renewable fashion industry. Furthermore, several companies stated that management of scope 3 was important in order to improve internal knowledge and reduce their overall climate impact. Johansson at Sveaskog, for example, stated that “*We need to reduce emissions in general, not because of business purposes, but because climate change is a common challenge we face*”, and André at SKF argued that almost all employees have family and children, which then becomes a strong driver for action on climate change.

4.2 Barriers

4.2.1 Measuring and evaluation

The most common barrier mentioned for management of scope 3 emissions was the difficulty of data collection, data credibility and measuring methods. All of the interviewed companies stated this as a challenge moving forward. They all measure at least one emission category out of the 15 included in the Scope 3 standard, and four companies have made a complete assessment of their corporate carbon footprint. However, these full assessments vary from general emission estimations to detailed measuring, and there is a large uncertainty in numbers. Stora Enso, who recently did their third full emission inventory, explained that they mainly use generic factors collected from databases since it is perceived to be impossible to make exact calculations “... *we generally don't measure, we estimate*” (Holm, Stora Enso). The evaluations are also done with different frequencies and precision between the responding companies, varying from detailed measures several times a year to more general estimations biannually. As measuring is seen as a major barrier, Holm at HK Scan explains that they started with the categories most easy to calculate and measure. According to him, they probably have more emissions in other categories, but they choose not to measure and report on those since it is too complex to estimate credible numbers (Holm, HK Scan).

In several companies, they hired external consultants in order to assess their scope 3 emissions, as they believe that *“what gets measured gets done”* (Rothschild, H&M group), allowing them to focus on reduction activities instead of measuring. Yet, the challenge of data collection was brought up by all of the interviewed companies, stating that *“There is always a challenge to find data, and enough quality proved data”* (Andersson, SEB), *“It is never totally correct numbers, it can never be”* (Eriksson, Löfbergs), *“it is very difficult to make detailed calculations”* (Eisenbeis, Essity) and *“you can get whatever numbers you want”* (André, SKF). Several companies argued that this was because of a lack of guidance, as they have to choose between different methods and emission factors, and advocated for sector specific standards. Most of the interviewees, however, stated that supplier data were the most fundamental barrier. As Holm at Stora Enso said *“In a large company like ours, it’s almost impossible to know exactly how large scope 3 is”*, referring to the difficulty in retrieving carbon emission data from suppliers. Olsson at Vattenfall agreed, stating that acquiring data on very detailed carbon emission information from more than 25 000 suppliers is a considerable challenge. There is a large difference in how far suppliers have come with measuring and managing their greenhouse gas emissions, and this makes it difficult for companies to choose (Holm, Stora Enso).

Both geographical location and size were mentioned by several as influential factors for how easy it is to acquire emission data from suppliers. Vattenfall, for instance, mentioned that *“We want to use the local community, but that kind of firms might not have information about their CO2 emissions”* (Olsson, Vattenfall), a notion that was also mentioned by Johansson at Sveaskog. In order to overcome this challenge of insufficient knowledge among suppliers, many of the interviewees stated that education is a very important activity. At Stora Enso, they arranged a supplier day where more than 100 of their largest suppliers met in order to increase knowledge and engagement for these issues. They also pressure their suppliers to develop their own carbon reduction goals in pursuance of a smaller climate impact. Eisenbeis at Essity added that *“we need to get our suppliers going because they know their business the best”*. Because of the sheer amount of suppliers, however, several companies stated that it is almost impossible to engage in a meaningful and productive way with all of them. Therefore, most companies target education and other engagement towards their largest and most strategically important suppliers. Demanding emission information in tenders and procurements were another important measure mentioned by several interviewees to how they work with their suppliers. Both Sveaskog, Stora Enso, SKF, H&M group, Vattenfall, Castellum, Löfbergs and AkzoNobel mentioned carbon emissions as an important aspect when choosing between suppliers and contractors, yet, none of them said it was a decisive factor. *“As a*

buyer, your highest priorities are price, time, safety and reliability. [...] environmental issues are quite far down” (Widheden, AkzoNobel). Holm at Stora Enso stated that it is a process though, where demand on carbon emission information from your suppliers is one of the first steps towards creating awareness and setting the right requirements.

Internal engagement and knowledge were also mentioned as a challenge, because even if emission data from suppliers is collected, internal competence is needed to be able to evaluate the gathered data, *“you have to know what you are doing in order to be able to use it for decision making”* (Widheden, AkzoNobel). At AkzoNobel, Essity and Vattenfall they have a extensive experience of working with life-cycle assessments, which according to them has helped the internal understanding of value chain emissions. At SEB, the fund managers are the ones mainly responsible for reducing their scope 3 emissions since a majority are derived from investments, however, lack of knowledge is seen as a challenge in order to effectively address these issues, *“I think that if you mention scope 3 to most people, they will look at you and wonder what you are talking about”* (Andersson, SEB).

Elland at Castellum echoed that knowledge among employees is an important challenge to deal with, stating that *“There are always knowledge barriers. Our focus is on creating the right tools for dealing with those barriers. This is one of the keys moving forward.”*. In order to overcome these barriers, almost all of the interviewed companies mentioned internal education and training programmes as important activities. At Stora Enso, for example, they try to deal with this by having activities such as e-learning and training for employees, and at SEB they have recurring education on climate issues in order to improve knowledge and engagement for scope 3 management. At Essity, scope 3 has not yet been part of education for employees other than the product development teams, *“I would say it hasn’t been on the top of the agenda, but it will move up. And it will definitely be included in the systematically training going forward in the education”*. At H&M group, however, scope 3 management was said to be *“very well integrated and is high on the agenda”* in the company. Eriksson at Löfbergs had the same perception, stating that employee knowledge of scope 3 is no issue since most of the people they recruit already have a strong engagement for climate issues. Widheden at AkzoNobel specifically mentioned that even though they have great knowledge of scope 3 in some departments, there are large differences within the organisation. While the chemists and engineers have a good understanding of value chain emissions, it is harder to raise this type of questions to the people working in sales (Widheden, AkzoNobel).

4.2.2 Planning

Because of the difficulties in measuring their emissions in scope 3, several of the interviewed companies stated it was almost impossible to set goals and incorporate scope 3 emissions into management systems. *“It’s challenging because you can’t set a target which you cannot measure, and some things are really difficult to measure”* (Eriksson, Löfbergs). Andersson at SEB also argued that it is difficult for them to set targets for scope 3, since a large cash inflow to their funds would almost inevitably increase their emissions. As of today, none of the interviewed companies have set specific carbon reduction targets for their full scope 3 emissions, however, AkzoNobel, H&M group, Castellum and Vattenfall have goals for their value chain. At AkzoNobel, they have a target of reducing the total impact on climate change of its products by 25-30 percent across the entire value chain until 2020, and measure this by managing over 400 life-cycle assessments . Castellum has a target of net-zero carbon emissions by 2030 (including scope 3), Vattenfall has a goal of becoming fossil-free within one generation and H&M group’s vision is to achieve a climate positive value chain by 2040.

Looking at SKF, they had carbon reduction targets including scope 3 until 2012, however, these were abandoned since they did not give any effect. Too much attention was directed towards collecting data rather than focusing on real improvements, according to André at SKF. Instead, they now have a target saying that 40 percent of their most energy-intensive suppliers should have an energy management system, focusing on the core issue of energy, *“CO2 reductions is super important, but it’s so difficult to measure, so we focus on energy reductions instead”* (André, SKF). This way of setting targets on other measures than carbon emissions specifically, were seen in many of the interviewed companies as a way to overcome measuring challenges. While SKF focused on energy management systems, Stora Enso targeted their suppliers to develop their own carbon reduction goals, Sveaskog put a lot of emphasis on fuels for transport, and H&M group had targets for material choice in their products. Several of the interviewed companies were also in the process of setting new climate targets including scope 3.

Since the measurement and follow-up of scope 3 were argued to be incredibly difficult, incorporation into investment decisions, KPIs and internal pricing on carbon were not widespread among the interviewed companies. As stated by Holm at Stora Enso, the overall perception is that scope 3 emissions are complicated, hence hard to manage in a sensible manner.

4.2.3 Senior leadership and resources

Strong leadership were mentioned by several companies as a key for effective management of scope 3. If the senior management is not committed, this might be reflected in the understanding and knowledge, internal engagement and resource distribution for emission reductions in scope 3, as discussed by Essity, HK Scan and Sveaskog. Not many of the interviewed companies stated that leadership was a barrier though, as most interviewees said that they felt support for scope 3 from senior management. On the other hand, there were differences in how strong support they felt. As Rothschild at H&M group stated, their vision of a climate positive value chain by 2040 came from the senior management, and therefore she also felt strong support for scope 3 from them. At AkzoNobel, the change of CEO in 2012 was one of the main reasons to why they started managing their scope 3 emissions with a more structured approach, according to Widheden “*He had a strong focus on sustainability, immediately understood the importance of the value chain and set comprehensive reduction targets*”. At Löfbergs, the change of CEO also reflected a change in how climate issues were prioritized “*... he also has a strong engagement for these issues, but he has a stronger need of connecting profitability to every step we take [...] If it becomes too expensive, he will say no*” (Eriksson, Löfbergs).

The decision to start managing scope 3 emissions at SEB came from the sustainability department in dialogue with customers, while Holm at Stora Enso mentioned that their board and senior leadership were the driving forces to why they started working with their emissions in scope 3, similar to AkzoNobel. According to Holm at HK Scan, scope 3 management has to be developed in symbiosis between the sustainability department and the CEO, “*He has to be on the same track of what we want to achieve*”. The issues of knowledge in senior management was also mentioned by some of the interviewed companies, “*Scope 3 emissions is one of those questions that, [...] very few actually know and care about*” (André, SKF). Eisenbeis at Essity, however, stated that even though the senior management may not understand the details of scope 3, they have the basic knowledge needed. The challenge is rather to show that business success and sustainability improvement can be combined (Eisenbeis, Essity), something that was echoed by all of the other interviewees as well. Looking specifically at managing emissions in scope 3, André at SKF said “*I cannot see any profitability in doing that as of today*”. Holm from HK Scan added, “*As long as you cannot show a substantial net profit margin, it is a large barrier. [...] This is not something done in two or three years, as is the normal time frame for a strategy. Instead, we are talking 5, 10, 15 or even 20 years*”. Because of short investment periods, Eisenbeis at Essity stated that a change in the time horizon of investments, and the return on investment, is required, “*These mindset changes in the*

leadership team is what is needed to keep us going, to keep us in the forefront and to really implement the necessary things early enough. That is the biggest change that we need to achieve”. Still, Elland at Castellum argued that the question of time horizon for scope 3 management is irrelevant, *“We are a publicly traded corporation and have the same required rate of return irrespective of which kind of investment we do”.*

According to Holm at HK Scan, there is no strong engagement for scope 3 emissions from the senior management as of today, *“They probably focus more on scope 1 & 2 as there are stronger economic incentives in regards to efficiency improvements”.* The same prioritization of scope 1 & 2 before scope 3 was mentioned also by Johansson at Sveaskog, yet, she still felt a strong support from the executive managers. Even though scope 1 & 2 stand for a small proportion of the company’s carbon footprint, they are given almost the same attention as the emissions in scope 3, according to Rothschild at H&M group. This is because these emissions have a large symbolic importance and that they can more easily be managed by the company, as agreed by Vattenfall and Castellum. According to Rothschild, there has been a shift in focus though after H&M group assessed their scope 3 emissions and decided on their vision of a climate positive value chain. This increased attention to scope 3 emissions during the last years is something that has been affirmed by all of the interviewed companies. At Castellum, scope 3 has gained priority as they think it is essential in order to have the best business in the future, both to attract new customers, and to keep the existent (Elland, Castellum). Eisenbeis at Essity and Andersson at SEB also agreed that senior leadership have started to understand the importance of scope 3, *“They understand that we must supply the products our customers demand, that’s how we stay relevant, [...] and if our customers demand this, we will have to solve that”* (Andersson, SEB).

The structure of governance and allocation of resources for scope 3 management were also discussed by several of the companies. Most companies stated that they have the resources needed for scope 3 management, still, when demanding more resources *“the discussions may not always be easy”* (Eisenbeis, Essity). At AkzoNobel, they have worked with life-cycle assessments for more than 20 years, hence measuring scope 3 emissions was not a question of competence or data, but one of initial resources to start measuring the whole company. For SEB, there were no additional costs of assessing their scope 3 emissions, saying that *“... in general, resources are a challenge, but not for us”* (Andersson, SEB). Holm at Stora Enso stated that *“We don’t use more resources, each function and division need to have the right procedures and use existing internal resources”.* On the other hand, André at SKF stated that they stopped accounting for their scope 3 emissions in 2016

because there simply were no resources available for it, as they saw no profitability. In order to overcome these resource challenges, H&M group and SKF both mentioned the importance of collaborating to make long term investments, stating that *“No one has enough capital to make the large investments on their own, it is something that you have to do together by collaborating across the value chain”* (Rothschild, H&M group). It is a challenge, nevertheless, to find the right ways of collaborating, according to Johansson at Sveaskog. A lot of stakeholders wants to start different partnerships, yet the challenge remains to find the best collaborations who also make good business sense (Johansson, Sveaskog).

4.2.4 External uncertainties

Policy uncertainty was mentioned by several companies as another major barrier to management of value chain emissions. As scope 3 management often requires large investments, a clear policy framework is needed in order to know what to focus on, *“The political climate must remain stable over time so that the conditions [for development] won’t change”* (Johansson, Sveaskog). In addition, a majority explains the legal framework as an important foundation, *“If we don’t have the right legal framework, then we are stopped from doing the right things”* as stated by Eisenbeis at Essity. Castellum gave a deeper picture by explaining that legislation is important to establish a common framework, but it is often too slow to drive development. Policy uncertainty was also mentioned in the discussion of investment and timeline thinking as an important enabler as it is up to the politicians to make sure that investments for sustainability pay off (Johansson, Sveaskog). In order to overcome the challenges of policy uncertainty, a majority of the interviewed companies work with lobbying towards politicians in different ways. For example, AkzoNobel, Sveaskog, Löfbergs and HK Scan mentioned that they are members of the Haga Initiative, a Swedish business network pushing for stronger climate policy, as they see that it can be a way of gaining competitive advantages. This lobbying is done in many ways, through engaging directly with politicians, arranging seminars and lectures and publishing reports. At Essity, they work together with a number of trade associations in order to better understand policy development and where the company as a stakeholder can have a voice. Stronger stakeholder pressures and more stringent regulation are requested by several companies since there are large geographical variances between countries today. Holm at HK Scan, for example, described that there are stronger stakeholder pressures on sustainability in Sweden compared to other countries where they operate. André at SKF further explained that *“society have to catch up, potentially legislation as well, including the global view on these issues, in order for us to reach another level”*. On the other hand, SKF also mentioned that

they are limited when it comes to influencing their stakeholders, stating that they can only do a small part since they have to stay within the zone of what is reasonable.

4.3 Summary of key findings

Scope 3 management is driven mainly by profitability as it is perceived to save costs or increase revenues both in short and long time perspectives. Investor and business customer pressures also drive management of value chain emissions as it is connected to risk and better market opportunities. Taking responsibility, getting a full understanding of emissions and increasing knowledge were also mentioned as drivers by the interviewed companies. Regulation, on the other hand, was not perceived as a driver, even though it was acknowledged to be an important foundation for future development.

The main barriers to scope 3 management were related to the complexity of measuring emissions due to insufficient data and lack of knowledge, both internally and in the value chain. Lack of leadership or financial resources was not argued to be a large barrier by most companies, however, there were lot of discussions about the profitability of scope 3 management. Hence, external uncertainties in policy and stakeholder pressures was stated as major barriers for future development.

5. Analysis

The following analysis will look deeper into the answers from the interviews in attempt to derive important findings with support from the theoretical framework. By questioning the empirical results and comparing theoretical findings from previous research, we hope to provide an interesting and meaningful discussion from which the final conclusions will be drawn.

5.1 Drivers

5.1.1 Short-term profitability

The empirical evidence shows that profitability is the main driver for scope 3 management in all of the responding companies, reflecting the proposition presented by Hoffman (2004) and Okereke (2007) for carbon management in general. However, the view of how profitability is reached through scope 3 emission management varies between the responding companies. Efficiency seems to be the dominating reason, yet, it appears to be hard to actually measure the outcomes of efficiency efforts, both when it comes to cost savings and reduced emissions. This finding is interesting since it makes it hard to motivate that efficiency efforts in scope 3 really pay off. If the outcome of the efforts are not measurable, and the companies do not see any difference, then how can they know that the efforts yield increased profits? Further, what is the point of efficiency efforts if it is not possible to see actual reductions? This makes us question if efficiency really is the main driver for scope 3, or if their statements about efficiency can be derived from other drivers such as corporate reputation and long-term profitability.

The results further supports the claim by Hoffman (2004), stating that investments for carbon efficiency are only done if the costs are recovered by the generated savings. Even though some companies have a more ambitious vision for their scope 3 management than others, efficiency measures were in all cases motivated as a way to save costs, both for now and in the future. Furthermore, the complex cause-effect relations between efforts and outcomes, and disability to translate these into monetary terms is a question that seems to be tightly connected to insufficient knowledge of scope 3 emissions. Since both Matthews et al. (2008) and Huang et al. (2009) state that deep knowledge is crucial to make informed decisions in order to focus reduction efforts, this lack of knowledge might prove to be a challenge moving forward with scope 3 management.

As according to theory (Porter & van der Linde, 1995; Hart, 1995), the majority of the companies see scope 3 management as a way to gain competitive advantages as they, by managing their scope 3 emissions, can attract stakeholders, which confirms previous research regarding carbon management strategies (Hoffman, 2004; Okereke 2010). The result does indicate that scope 3 management is to some extent driven by perceived market opportunities when looking at companies in business to business-markets. On the other hand, companies in consumer markets did not perceive scope 3 management as a way to attract new customers. While Peattie (2001) stated that the 'green consumer' is willing to pay more for products with lower environmental impact, it seems as if scope 3 is too complex to understand on an individual level. Still, as scope 3 management is a way to take greater responsibility for climate change, it could probably be used to indirectly attract environmentally conscious end-consumers through enhanced corporate reputation in the long run.

The results give a somewhat fragmented picture when it comes to looking at how market opportunities drive fundamental change. As Okereke (2010) state, market opportunities is not enough to drive a conversion to a low-carbon economy. Strong governmental regulation is needed in order to really convert to a sustainable society (Okereke, 2010). In this sense, the results have both shown cases where companies stay within the zone of what is ought to be reasonable, as stated by SKF, and where companies have made fundamental change without having regulatory pressures in mind. Since Okereke's (2010) research investigated carbon management in general and not specific scope 3 emission management, this could explain why our result differs.

5.1.2 Long-term profitability

Scope 3 emission management can be used to identify hotspots and foresee risks connected to GHG emissions in the value chain according to the GHG Protocol (2011). This proposition was affirmed by several companies, indicating that scope 3 management can be a way to gain knowledge of risks in the value chain and enable more informed decision making. Yet, this in turn does not necessarily lead to reduced emissions in the value chain as there might not be other alternatives available or reduction efforts might not pay off. Further, managing scope 3 emissions due to the physical risks associated with climate changes' impact on the business can be connected to the answers categorized as moral obligations. When first asking the companies why they engage in scope 3 management, the most common answer was getting knowledge and a better understanding of the business' climate impact, since they claimed that reducing emissions was a responsibility for the company. However, looking at what Lash and Wellington (2007) as well as Porter and Reinhart

(2007) suggest, it is more likely that the stated seeking for knowledge and understanding is a way to reduce risk as many assets are threatened by climate change. From a business perspective, it is logical to identify assets in the risk zone and take action to mitigate negative impact on these. Hence, scope 3 management can be driven by wanting to preserve assets in the value chain needed for survival.

Taking the financial perspective on risk management, the result is strongly supportive to theory, showing how the companies take into account for carbon taxes, regulation and energy prices. It does, nevertheless, remain hard to prove if scope 3 emission management actually have led to the benefits stated by Hofmann (2004) and the Scope 3 Accounting and Reporting Standard (2011). Since the interviewees discussed how their management of value chain emission *could* lead to future benefits, there is not enough information to determine whether it actually have led to avoided costs. This could also be explained by the fact that scope 3 management is still new and none of the companies have sufficient experience in order to see long-term outcomes. Problems regarding measuring the outcome of risk management efforts are the same as for efficiency efforts, making it hard to determine whether or not assessment of scope 3 emissions really helps companies to manage risks, and increase long-term profitability.

Securing an attractive future position, was not surprisingly mentioned as a driver for scope 3 management by some companies, as they see their corporate value chain as a part of the solution to combat climate change. In order to take a leadership role in sustainable development, attract future customers and stay profitable, the companies argued that management of scope 3 emissions is going to be an integral component. Companies facing fundamental conversions in their industry recognized scope 3 management as a way to lead the industry in the right direction. Instead of having to follow the progress, companies can be proactive forerunners and drive the progress themselves to gain an attractive future position. This finding supports theories suggesting future position to be a driver for carbon management strategies as stated by Hart (1995), Hoffman (2004) and the Scope 3 Accounting and Reporting Standard (2011). Still, the result indicates that even though the companies see scope 3 management as a tool to secure a future position, the efforts to get there still need to pay off. This shows how it is not entirely up to organizational capabilities and resources as suggested by Barney (1991) and Hart (1995), but also up to the external environment to provide the right market conditions.

5.1.3 Stakeholder pressures

Analyzing stakeholder pressures, the results indicate that investors' increased interest in how companies manage their value chain emissions is seen as a primary driver for why companies choose to manage their scope 3 emissions. This is an expected finding since investors are, according to Lee (2012), an important stakeholder whom companies are dependent upon. However, the increased interest is not necessarily due to ethical reasons, and is more likely connected to business risk. This is also confirmed by theoretical findings, suggesting that institutional investors and shareholders associate lack of disclosed emission data with greater business risk (Henriques & Sadorsky, 1999; Funk, 2003; Kolk et al., 2008; Okereke, 2007).

Kolk et al. (2008) and Okereke (2007; 2010) claim that some institutional investors and shareholders request GHG emission disclosures as they have the perception that the market will reward climate change performance. This is something that the empirical evidence both supports and rejects. As discussed previously, consumer markets does not seem to reward specific scope 3 management, while business to business markets tend to in some extent. Based on this, one can argue that scope 3 management will only be rewarded if it enhances climate change performance and is communicated in an understandable way. Market responses on climate change efforts will further be discussed in the section *5.2.4 External uncertainties*.

Interesting to notice is the perception of investors ignorance of the concept *scope 3* and its details, as described by Castellum. Scope 3 management is rather seen as a 'checkbox' than something investors actually know and care about. This lack of detailed understanding can hence threaten the development of scope 3 management since the performance might be overseen, allowing less ambitious companies' scope 3 disclosure to gain undeserved credit. Still, scope 3 emission management is relatively new which could explain the lack of detailed understanding. The focus should be directed to the fact that investors play an important role in the development of corporate climate change actions, where demanding scope 3 disclosure can be a tool to drive companies to take greater responsibility of their carbon footprints.

Customer pressures are also found to drive scope 3 management, showing that businesses between each other push for a greater engagement along the value chain. As many responding companies mentioned, their business customers request scope 3 emission information since they themselves are working with their own carbon footprints. In this way, scope 3 emission management can be seen as speeding like ripples, becoming a hygiene factor in order to survive on the market. This is also

confirmed by the theory presented by Lee (2012), stating that customer pressures force companies to develop less environmentally harmful products and to take larger responsibility for their carbon footprint. However, the theory is focused on adapting to customer pressures due to legitimacy threats, stating that companies might lose legitimacy if they do not respond to demands (Greeno & Robinson, 1992). Hrasky (2011) also support this finding and states that companies manage scope 3 in order to avoid a legitimacy gap between societal expectations and corporate performance. Looking at the results from this study, however, it seems clear that the concept of scope 3 is too complex for most stakeholders to understand. The impression is that society does not expect corporations to manage scope 3 emissions as of yet, which makes it reasonable to question if companies really do this in order to close a legitimacy gap. On the other hand, by being transparent and credible, companies seem to be able to gain increased legitimacy from stakeholders. Hence, scope 3 management should be seen not as a stand alone activity, but in the light of climate change responsibility, where it is only a small part of the larger picture.

5.1.4 Regulation

As mentioned in the empirical findings, regulation is not identified as a driver for scope 3 emission management. A majority of the interviewed companies does nonetheless acknowledge regulation and legal frameworks as an important foundation. This is an interesting contrast to the theoretical findings, stating that regulation and legislation are key drivers for carbon management development (Kolk et al., 2004; Hoffman, 2007; Okereke, 2007). The reason why regulation is not mature enough for scope 3 can be speculated in, but according to our findings, complexity and lack of knowledge seem to be one explanation. While our empirical findings do not confirm the theory of regulation as a driver (Tidy et al., 2016), they certainly support some theoretical benefits of having a proactive stance. As theory describes, being proactive in relation to regulation can lead to enhanced legitimacy, participation in development of new regulation, and gains of competitive advantages (Porter & van der Linde, Buysse & Verbeke, 2002). Our findings show that several of the companies are active on a political level in order to push for a faster development, and therefrom can gain competitive advantages. Still, this research is not sufficient to prove whether or not the companies have gained legitimacy from engaging in scope 3 management.

On the other side, even though regulation is not identified as a driver for scope 3 emission management specifically, it could be seen as a financial risk, as discussed in the section *Long-term profitability*. For example, a price on carbon emissions can be detrimental for some industries (Porter & Reinhart, 2007), which could be seen as an incentive to direct emission reduction efforts

in scope 3. Therefore it could be argued that regulation is a driving force for scope 3 management, even though regulation is not specifically directed to the concept of scope 3.

5.1.5 Moral obligation

All responding companies claimed that some kind of moral obligations made them engage in scope 3 management, which according to Kitzmueller and Shimshack (2012) is a possible driver for carbon management. However, whether or not these are the true reasons behind their engagement can be questioned. As Okereke (2007) points out, moral drivers can be very difficult to identify since it is hard to recognize which companies that truly act on climate change due to moral reasons, and the ones doing so in order to improve reputation. As discussed previously under risk management, moral obligations can be derived to some kind of long-term profitability. This would be something interesting to investigate further.

5.2 Barriers

5.2.1 Evaluation and measuring

The difficulty in measuring emissions in scope 3 was mentioned as a barrier by all of the interviewed companies. Lack of emissions data, different methodologies, emission factors and complex information flows were all argued to be major challenges moving forward with their scope 3 management, reaffirming the results found by Downie and Stubbs (2011). The GHG Protocol Scope 3 Standard (2011) states that companies should map their scope 3 emissions out of relevance, completeness, consistency, transparency and accuracy across the value chain. It was clear, however, that most companies had large difficulties in actually living up to those criteria, stating that it is almost impossible to get complete and accurate emission data due to the large number and complex webs of suppliers, affirming the proposition made by Patchell (2018). This finding strongly connects to earlier stated profitability drivers, as measuring and evaluation is important to follow up on and monitor efforts to reduce emissions. In the section 5.2.3 *Senior leadership and resources*, this will be discussed more thoroughly.

In order to overcome this challenge, the interviewed companies tries to engage and collaborate with partners in their value chain to make them report and disclose their carbon emissions. This can be a way of exchanging information and gaining knowledge for a small cost (Schilling & Phelps, 2007). However, it is important that these collaborations are based on a common interest in order to be

successful according to Cao and Zhang (2011). The question of knowing which collaborations to engage in were also raised by Sveaskog in the context of scope 3 management, stating that even though many stakeholders would like to join forces in some ways, they have to find the collaborations that will be most profitable in the long term. This further points out the importance of knowledge and understanding for collaborations to be beneficial for all involved parts, and poses an interesting topic to further investigate which collaborations that actually can help to improve companies' management of scope 3 emissions.

In the Corporate Value Chain (Scope 3) Accounting and Reporting Standard (GHG Protocol, 2011), companies are urged to make a full assessment of their scope 3 emissions in order to understand their complete carbon footprint and direct reduction efforts. The fact that only four out of the eleven interviewed companies have made this full inventory according to the standard, could therefore be seen as most companies still not having a complete understanding of the emissions in their value chain. When asked about it, however, most companies stated that they had made a materiality assessment and then focused on the most important emission categories, gaining a good understanding of their carbon footprint. On the other hand, in the case of HK Scan, they have chosen to focus on the easiest categories to measure, even though these are probably not the most material concerns for the company. This could be the case also in some of the other companies, raising the issue of 'cherry-picking' the scope 3 emissions that are easiest to work with. If the proposition of *'what gets measured gets managed'* is true, it would imply that reduction efforts might become misdirected towards non-material issues if companies do not make a full inventory. Yet, both Vattenfall and Stora Enso, who made a full inventory, stated that the numbers are just estimations, and that it is impossible to know if they really reflect reality. Because of these difficulties in measuring, the argument raised by Patchell (2018) that *"a 'what gets measured gets managed' regime is not always appropriate"*, becomes increasingly interesting to investigate.

5.2.2 Planning

Looking then at how the interviewed companies choose to set goals for scope 3 management, it is evident that most companies see it as a large challenge because of measuring difficulties. As it was argued by some to be almost impossible to measure and follow-up on reduction targets, none of the interviewed companies had a specific goal for reduced emissions in scope 3. Four companies had overarching reduction goals for emissions in their value chain, however, and out of these, three also had made a full assessment of their scope 3 emissions. This can be connected to the findings of Kolk and Pinkse (2004) showing that companies who have not made a full emissions inventory had

neither developed targets nor methods for how to reduce their emissions. Still, when looking at the other seven interviewed companies, all had some kind of goals and activities for how to reduce emissions in their value chain, yet not specifically focused on scope 3 emissions. As the most common challenge was finding data and measuring carbon emissions, a majority of the companies set goals for their value chain that focused on other measures, such as energy efficiency or material choices. By doing this, they hope to reduce emissions in scope 3 without necessarily having to focus on ‘chasing numbers’. This aspect of target-setting is not discussed in the theory, but it might be seen as a creative way of overcoming the measuring challenges, while still gaining the benefits from having a target - such as improving steering and directing efforts to where they are most needed (GHG Protocol, 2011). Nevertheless, if these targets are not evaluated based on carbon emissions, companies can never be completely sure that projects or investments actually result in real emission reductions. This is a topic of great concern for effective management of scope 3 emissions, and further research should investigate the effectiveness of these goals for scope 3 that are not measured in carbon reductions.

Another interesting topic is the choice of absolute versus relative targets. As stated by SEB, absolute targets are difficult to use since an inflow of new customers would almost inevitably increase their carbon footprint, suggesting that relative targets might be a better option. Looking at the study from Bui and Villiers (2017), however, empirical results show that absolute targets are needed for real carbon reductions. This poses another difficult choice for companies when planning to set targets for their scope 3 emissions. Absolute targets may be preferred in order to ensure that the corporate carbon footprint actually decreases, however, if companies are in a rapidly expanding phase, absolute emission reduction targets may be in conflict with overarching business goals. On the other hand, the most important aspect may be to have a high level of ambition to actually reduce emissions, regardless of how goals are set.

As stated in the theoretical discussion, management systems are needed in order to focus efforts and prioritize investments, something that was reaffirmed by several of the interviewed companies. This study did not focus on the incorporation of scope 3 emissions into different management systems, yet it was evident from the interviews that most companies still are in the beginning of working with emissions in their value chain and lack tangible plans for how to integrate scope 3 into everyday management systems. The internal knowledge was one challenge for doing this, and seeing that these kind of management systems should be designed to the company’s human and

financial capital (Epstein & Buhovac, 2014), the adaptation to other measures than carbon emissions might be seen as a way to overcome these knowledge gaps.

The internal engagement is crucial for a strategy to be implemented effectively according to Mazhar et al. (2017), echoed by the companies in this study. Most of them stated that they have the engagement and knowledge needed, however, the result also clearly shows that the complexity of scope 3 hinders internal understanding and communication of the issue. It seems as if, even though companies work to educate their employees on scope 3 management, the concept seems to be too complex to create engagement throughout the whole organisations. Even when data is available, there are difficulties in assessing the quality of the data and using it for steering purposes when the internal knowledge is missing. As several of the interviewed companies had extensive experience of working with life-cycle assessments, they argued that this helped driving the internal understanding of scope 3 emissions. However, differences in competence between departments in the company was seen as a challenge moving forward. Earlier, climate issues might have been dealt with mostly by a company's sustainability department, yet, it is clear that in order to effectively manage scope 3, more or less all departments of a company have to understand the concept. For example, an important activity such as demanding information from suppliers in procurements, often handled by the purchasing department, requires a certain level of understanding for how scope 3 emissions can be taken into consideration. If procurers lack this knowledge, how can they make the right decisions leading to reduced emissions? This question further proves the importance of how crucial it is for the whole company to have a good understanding of scope 3 in order to effectively address emissions in the value chain.

While demand of data was stated as an important activity by a majority of the companies, no one said that carbon emissions were the decisive criteria when choosing a supplier. As mentioned by Vattenfall and Sveaskog; local suppliers might not have data on their emissions, but they are preferred because of other reasons. The most climate-friendly suppliers are not necessarily the ones with the best measurement systems, making it hard for companies to choose between suppliers. Should one choose a transport service provider running on petrol that has quality emission data, or one running on biofuels that cannot show any numbers? As companies want to get a better understanding of their scope 3 emissions, this might produce results opposite to what the standard wants to achieve, further reflecting the importance of internal knowledge in order to make the right decisions.

5.2.3 Senior leadership and resources

When looking at the aspect of leadership, most interviewees claimed they felt engagement and support from the executive team for scope 3 management. Even though the perceived support varied between the companies, lack of leadership was not mentioned as a significant barrier by any of the interviewees. Rather, the senior management team was mentioned by several companies as a main reason to why they started working with scope 3 emissions, supporting the proposition by Epstein and Buhovac (2014) that an engaged and committed CEO is a key aspect for a strategy to be implemented effectively. These results indicate that leadership is important in order to *start* managing scope 3 emissions, however, this study does not investigate the relationship between the quality of scope 3 management and leadership. Theoretically though, engagement from senior management is argued to reflect funding and allocation of resources for carbon management strategies according to Mazhar et al. (2017), something that will most likely affect the quality of management. This reflection were seen clearly at HK Scan as Holm stated that the senior leadership was not very committed to working with scope 3, which meant that these activities were given less resources than reduction efforts in scope 1 & 2. The main reason being that they did not see as strong economic incentives for working with scope 3, something that was emphasized by several of the other interviewed companies. This sheds light upon the important question regarding if scope 3 management really is profitable or not. As it is very hard to measure, set targets and evaluate effects in scope 3, it seems that this might be a barrier hindering more ambitious management of corporate value chain emissions. A shift from the short-term economic thinking to a longer time perspective is argued to be needed for effective carbon management strategies according to Paul et al. (2017). This claim was supported by Eisenbeis at Essity who stated that it was essential for scope 3 management to be successful, however, Elland at Castellum argued that time-horizon was not of relevance. This discord of opinions presents an interesting conflict that should spur further research in the area.

As leaders might have insufficient knowledge of environmental issues (Paul et al., 2017), this might also pose a hindrance to development. Based on the empirical evidence from this study, however, it seems as if even though senior management may not completely understand the complex issue of scope 3 management, they comprehend the importance of working with it and allocate enough resources in most companies as of today. Again, senior leadership might not need specific scope 3 emission knowledge, rather, they need to understand the corporation's climate impact through the value chain. In the interviewed companies with a extensive experience of working with life-cycle assessments, the issue of knowledge and resources were not mentioned as an issue. At HK Scan, on

the other hand, who just recently started measuring scope 3 and had no experience in working in this way, both knowledge and resources were mentioned as an issue. From these interviews, it seems clear that scope 3 management should be viewed as a learning process, where companies who have longer experience of working with corporate value chain emissions might face different barriers than companies who just recently started working with scope 3.

The size of a company was also discussed in several of the interviews, and seem to be both a benefit and a disadvantage in different aspects. As theory states, larger companies are more probable to implement advanced carbon management strategies since they usually have more slack financial resources (Lee, 2012; Weinhofer & Hoffmann, 2010). This theoretical proposition could be seen somewhat reflected by the companies interviewed in this study. While all of the interviewed companies have a turnover greater than 1.5 billion SEK, there is a notable difference between the largest interviewed company and the smallest. Some tendencies could be seen that some of the smaller companies mentioned resources as more of a constraint than the larger ones, however none stated that lack of resources was a decisive factor for management of scope 3 emissions. This could also be connected to the fact that as of now, most companies that report on their scope 3 emissions are large cap. On the other hand, larger companies might often have a greater number of suppliers, making measuring and management increasingly more difficult. As seen in the case of Vattenfall with more than 25 000 suppliers, just demanding emission information from all suppliers requires substantial human resources. This question of size and the connection to scope 3 management is something that would be interesting for further research to examine closer, especially investigating smaller companies that are not part of this study.

5.2.4 External uncertainties

As a majority of the companies mentioned, policy uncertainty and lack of a long-term framework for future development hinders necessary investments to be done. This is in line with the theory presented by Okereke (2007) and Hoffman (2004), stating that a long-term policy framework is needed to facilitate for companies to make necessary investments. Interestingly to notice, however, is some companies' perception that politicians are responsible for providing the right conditions for carbon reduction efforts. According to theory, companies can have an ability to influence policy decisions and geopolitical processes to their advantage (Hoffman, 2007; Paul et al., 2017), making us question if it is legitimate for companies in general to refrain from responsibility. Especially if legislation is too slow to drive development, as stated by Elland at Castellum, which further indicates that companies really need to push for change. With this said, even though politicians

have the uttermost responsibility for the establishment of policies and frameworks, companies cannot sit around and wait for it to happen. Even if a majority of the companies engage in several ways to overcome the challenges of policy uncertainty, either by lobbying, participation in associations or meetings with politicians and governments, the results are not clear how this affects the specific management of scope 3.

The result also shows that some companies want to see more stringent regulation to even out geographical differences when it comes to environmental performance standards. However, it was not only regulation that was pointed out in the discussion of geographical variance. Other stakeholder pressures such as public concerns, associations and organizational networks were identified. This connects to what Okereke (2007) refers to as market uncertainty, meaning that the market must reward actions for climate change. In order to make the market reward companies' efforts, there must be an awareness for how companies contribute to climate change, and what they can do to prevent it (Paul et al., 2017). As SKF stated, society must catch up on these issues. In the end, this goes back to the discussion of knowledge, where the problem lies in scope 3 as a concept being too complex to understand, hence hard to reward on the market. By communicating with stakeholders though, companies can enhance awareness in order for the market to respond in their advantage according to Mazhar et al. (2017) and Paul et al. (2017).

6. Conclusion

The aim of this study was to gain a deeper understanding of the drivers to why companies choose to manage their emissions in scope 3, as well as the barriers hindering further development of scope 3 emission management. By conducting in-depth interviews with eleven Swedish companies, we found that the main driver to scope 3 management is a perceived opportunity to increase profits, through increased efficiency in the value chain, improved risk management, attraction of new customers or securement of an attractive future position. However, the notion of profitability was also questioned by several companies, stating that the market does not reward scope 3 management enough. Lack of knowledge among stakeholders and uncertainties in policy development were seen as major barriers for further development. Still, this must be seen as an interplay between senior leadership in companies and policy makers, in order to provide the right conditions for the development to prosper. This highlights the importance of strong senior leadership, who needs to see through these uncertainties and pave the way for the rest to follow. This connection between external uncertainties and profitability in scope 3 management, is an important finding that should be of great interest for both researchers and policymakers. As long as there is no regulation and scope 3 management is not seen to be profitable enough, most companies will probably stick to scope 1 and 2, slowing down the transition to a low-carbon economy. If scope 3 management is profitable or not, and in what ways, remains a subject left for future studies to investigate.

The main barrier for scope 3 management was found to be the difficulty of measuring emissions in the value chain, an immense challenge raised by all the interviewed companies, confirming earlier research by Downie and Stubbs (2011), Patchell (2018) and others. This lack of knowledge in turn was seen to affect planning, target-setting and allocation of resources, which makes it a major barrier for further development. Seeing that not even some of the forerunners in sustainability have clear plans for emission reductions, it is evident that scope 3 management is far from what the standard claims to achieve. In order to overcome the aforementioned barriers, the companies try to focus their targets on other measures than carbon emissions, which presents another topic suited for future research. Do these abatement activities really reduce emissions in scope 3? And if so, which activities are the most efficient?

What remains clear is that the recent emergence of scope 3 as a concept is here to stay. While there is still a lack of knowledge and external pressures, it should be seen as a process where companies are starting to take a larger responsibility for their carbon footprint. However, the question remains

if the progress towards a carbon neutral economy is fast enough to meet the imminent challenges of climate change.

6.1 Further research

In order to improve and develop management of scope 3 emissions, we have identified several areas suited for further research to investigate:

- Can scope 3 management be profitable? And if so, in what ways?
- Does scope 3 management actually reduce GHG emissions in the value chain? Which activities and goals are most efficient for reducing emissions?
- How does company size relate to management of scope 3 emissions? What drivers and barriers can be found for scope 3 management in smaller companies?

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Appendix 1. Interview Guide

Since most interviews were held in Swedish, the questions and themes are here presented in its original language, with English translation in *italics*. It should also be noted that the questions were not necessarily asked in the exact way and order presented in this interview guide.

Introduktion av oss och uppsatsen - *Introduction to us and the thesis*

Fråga om inspelning och citering - *Ask about permission to record and quote*

Tema 1 - Generella frågor & motiv - Theme 1 - General questions and motives

Berätta om dig själv och din roll på företaget. *Tell us about your position at the company.*

Varför började ni hantera era scope 3 utsläpp? *Why did you start managing your scope 3 emissions?*

Vilka drivkrafter finns det för att hantera utsläpp i scope 3? *What drivers are there?*

Ser ni någon lönsamhet i det? *Do you see any profitability in it?*

Ser ni att det finns krav från intressenter? *Are there any stakeholder pressures?*

Är lagstiftning en drivkraft? *Do you see regulation as a driver?*

Förebyggande syfte? *Proactive to legislation?*

Hur ser ni på arbetet med riskhantering kopplat till scope 3? *Risk management?*

Ser ni några fördelar i kontakten med leverantörskedjan? *Advantages from working with the supply chain?*

Har ni gjort en bedömning över hela scope 3 eller bara de kategorier ni rapporterar inom?

Have you completed a full scope 3 assessment, or only the categories reported?

Har dessa mätningar av scope 3 förändrat ert klimatarbete? *Have these assessments changed your CMS in any way?*

Tema 2 - Detaljer om arbetet - Theme 2 - Details about management

Hur arbetar ni med era scope 3 utsläpp? *How do you work to manage your emissions in scope 3?*

Vad har ni för mål? *What goals do you have for scope 3?*

Hur planerar ni att nå målen? Ge exempel. *How do you plan to reach these goals? Give examples.*

Hur inkluderar ni scope 3 i existerande system? *How do you incorporate scope 3 into existing management systems?*

Hur ser kommunikationen kring scope 3 ut internt? *How is the internal communication on scope 3?*

Hur upplever du att scope 3 prioriteras av ledningen? *How prioritized do you feel scope 3 is from senior management?*

Finns det tillräckligt med resurser för hanteringen? *Are there enough resources for management?*

Finns det tillräckligt med kunskap internt? *Are there enough knowledge internally for scope 3?*

Finns det något engagemang för dessa frågor? *Is there any engagement for these issues?*

Tema 3 - Utmaningar och hinder - Theme 3 - Challenges and barriers

Vad ser ni för utmaningar med scope 3? *What challenges do you see with scope 3?*

Vilka hinder finns? *What barriers are there for more effective management?*

Upplever du att det finns tillräckligt starkt ledarskap? *Leadership?*
Upplever du att det finns tillräckligt med resurser? *Resources?*
Upplever du att det finns tillräckligt med kunskap? *Knowledge?*
Upplever du att det finns en stabil politisk grund? *Policy uncertainty?*
Finns det några problem med själva standarden? *Problems in the standard?*

Är det något som saknas för att ni ska kunna nå längre? *Is there anything else that is needed for further development?*

Hur hanterar ni dessa svårigheter? *How do you deal with these barriers?*

Finns det något ni kan göra för att ta er an dessa utmaningar? *Is there anything you can do to overcome these challenges?*

Är ni med i några branschorganisationer? *Do you take part in any trade organizations?*

Samarbetar med externa partners? *Do you collaborate with external partners?*

Påverkar politiken? *Do you lobby towards politicians?*

Lobbying mot ledningen? *Do you lobby towards senior management?*

Vad behöver företaget för att dessa resurser ska läggas? *What is needed for further development?*

Behövs mer efterfrågan från kunder? *Is more demand from customers needed?*

Behövs det lagkrav? *Do we need more stringent legislation?*

Behövs en bättre förståelse från företaget? *Is a better internal understanding needed?*

...annat att tillägga? *Do you have anything else to add?*