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Extending the Supply Chain Horizon

Managing sustainability of suppliers with a multi-tier perspective

Master's Thesis in the Master's Programme Management and Economics of Innovation

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Abstract

Today's focal firms are expected to act sustainable, not only within their organisational boundaries but also within their entire supply chains, since consumers holds OEMs responsible for unsustainable practice along the supply chain. Therefore, it is important for OEMs to ensure sustainability of suppliers beyond tier one. This thesis has investigated how sustainability can be managed further upstream in supply chains from an automotive industry perspective. By including insights from other industries, the current practises, main challenges and benchmarking opportunities was explored. Hence, multiple case companies were interviewed and contributed to findings that has been analysed together with previous research on multi-tier sustainable supply chain management. It was found that companies tend to adopt the same mixture of management strategies and similar practises with only slight differences. Industries highly exposed to media did further appear to emphasise some managerial sub-supplier activities to a greater extent than others. In conclusion, this thesis provided various suggestions for how OEMs in the automotive industry could manage sustainability upstream in the supply along with its implications. Capacity building activities, a new build-up strategy, increased engagement in initiatives and developing a cascading certificate was further discussed as the main improvement suggestions. The discussed improvement suggestions are however resource demanding and companies ought to prioritise allocation of resources based upon risk. An effective implementation will primarily depend on the current context of both the individual firm and its related supply chain.

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Definitions

Direct supplier: Supplier with a contractual agreement towards the buyer and directly delivers products or services. Direct suppliers do generally operate one tier upstream from the buyer.

Focal firm: The firm that manufactures the final product and interact with consumers, either directly or through a retailer. In this thesis, focal firm is synonymous with OEM.

Indirect supplier: Refers to a supplier without direct contact to the buyer, instead intermediate suppliers have direct contact with these suppliers.

MT-SSCM: Multi-tier sustainable supply chain management, implies management of sustainability of supplier and sub-suppliers when considering several tiers in the supply chain.

OEM: Stands for "Original Equipment Manufacturer" and refers to the firm that manufactures the final products later bought by consumers. In this thesis, OEM is synonymous with focal firm.

SSCM: Sustainable supply chain management, refers to managing suppliers in regards of sustainability.

Sub-supplier: Refers to all suppliers in the supply chain upstream from a firm's direct suppliers.

Tier one supplier: Implies the supplier one level upstream from a firm, most likely a direct supplier.

Upstream the supply chain: Refers to suppliers earlier in the supply chain, i.e. towards the raw material.

1. Introduction

The following chapter describes the background of the thesis followed by a problem description. Further the purpose and the research questions are presented along with the delimitations. Lastly, a disposition of the remaining chapters is presented.

1.1 Background and importance

Historically, an increasing market demand has resulted in organisations struggling to be profitable without compromising either social or environmental aspects of production (Rajeev, Pati, Padhi & Govindan, 2017). With time, the need for sustainability has emerged, received increased attention and been incorporated in organisations practices. A widespread example of such incorporation is the concept of Sustainable Supply Chain Management (SSCM) that has been developed with the purpose to extend the traditional economical focus on supply chain management by including the socio-environmental dimension as well (Oelze, Brandenburg, Jansen & Warasthe, 2018).

According to Hartmann & Moellern (2014), consumers typically hold the Original Equipment Manufacturer (OEM) responsible for unsustainable practices along the supply chain, further referred to as the Chain Liability Effect. This is problematic for OEMs since most of the issues related to social- and environmental sustainability are caused by sub-suppliers beyond the first tier (Tachizawa & Wong, 2014). In fact, studies have shown that sub-suppliers in some supply chains contribute to 90 percent of the greenhouse gases. Therefore, it is not only important for OEMs to fulfil sustainability requirements themselves, but also to ensure that suppliers upstream are doing the same. However, companies are currently struggling with diffusing sustainability requirements upstream as supply chains in general are complex and subject to several tiers of suppliers (Sauer & Seuring, 2018). The difficulty is partly due to the non-contractual relationship with suppliers beyond tier two limiting the OEMs ability to influence (Wilhelm, Blome, Wieck & Xiao, 2016b). Further, Sauer & Seuring (2018) argues that the difficulty increases with factors such as cultural differences and long distances between suppliers in the supply chain.

Increased complexity of supply chains makes it even more difficult for OEMs to manage sustainability throughout the supply chain (Tachizawa & Wong, 2014). As a response to this growing complexity the concept of Multi-tier Sustainable Supply Chain Management (MT-SSCM) has emerged with the objective to reach suppliers further upstream, beyond first tier suppliers (Sauer & Seuring, 2018). Literature previously has focused on dyadic relationships between two parties, whereas often between an OEM and its direct supplier (Tachizawa & Wong, 2014). When considering multi-tier structures beyond dyad relationships new valuable insights and interactions can be identified. For instance, it provides new opportunities to influence supply chain members by recognising their characteristics and the overall context of the situation (Bastl, Johnson & Choi, 2013). Based on this discussion, this thesis will adapt a

multi-tier perspective due to the potential negative impact suppliers several tier upstream can have on OEMs. In figure 1, the vertical structure of a supply chain is illustrated across several tiers.

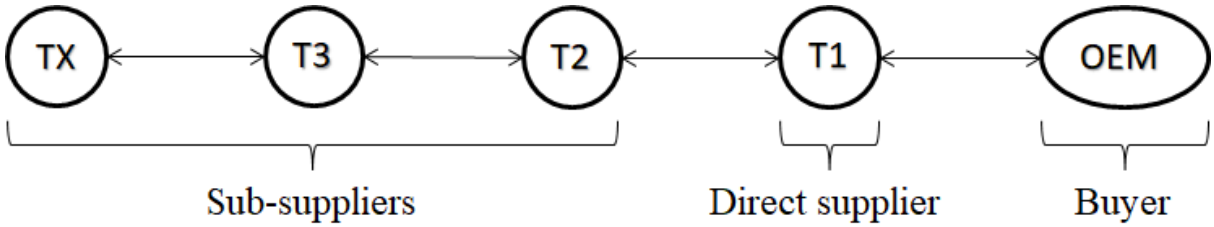

Figure 1. Relationship between buyer, direct supplier and sub-suppliers where "T" stands for tier

Adapting a MT-SSCM approach and establishing relationships with sub-suppliers have in previous studies shown to be challenging in terms of information sharing. Despite several benefits, companies generally do not share information beyond their direct suppliers or customers (Kembro, Näslund & Olhager, 2017). In addition, as suppliers further upstream in the supply chain easily can be replaced, any relationship to these suppliers often are unstable (Tachizawa & Wong, 2014). Moreover, Tachizawa & Wong (2014) describes that sub-suppliers are often located in countries with lower legal requirements, in turn adding further complexity to the situation. Overcoming these challenges and ensuring sustainable standards further up in the supply chain is highly relevant, especially for risk management (Giannakis & Papadopoulos, 2016), since small rather anonymous sub-suppliers allowing child labour or high level of pollution can result in huge scandals, in turn affecting the OEMs reputation and performance (Wilhelm et al., 2016b). Hence, MT-SSCM is used strategically by companies to ensure long-term profitability (Giannakis & Papadopoulos, 2016).

Adding further importance to MT-SSCM, the challenges of managing sustainability upstream the supply chain are experienced and managed in several industries, whereas Wilhelm et al. (2016b) have looked further into the practises used in the food-, apparel- and consumer electronics industry. The apparel industry in particular has received a lot of negative public attention due to being responsible for a big share of the child labour in the world (Moulds, n.d.). Further, Inditex, the parent company behind Zara, has several times been criticised for their sub-supplier's labour conditions, in turn resulting in a discussion of the extent OEMs should be held liable for the supply chains practise (Burgen & Philips, 2011). Once again, touching upon the concept Chain Liability Effect discussed by Hartmann & Moellern (2014), the outcome of the discussion was that OEMs are responsible for their sub-suppliers' actions as well. This can further be observed in the tragedy of Rana Plaza, where over 1000 people were killed when the clothes manufacturing building collapsed (Safi & Rushe, 2018), forcing the connected OEMs to take action. The toy making company Mattel provides another example of a supply chain suffering from to unsustainable practice since toxic paint used by a sub-supplier resulted in negative publicity (Wilhelm et al., 2016b). As a conclusion, implementation of MT-SSCM practises deserves and are receiving increased attention. This can be observed in the

paper by Giannakis & Papadopoulos (2016) addressing the shift of corporate strategies concerning local optimisation to strategies emphasizing supplier interactions.

The focus on sustainability are constantly increasing around the world and so also in the automotive industry (Günther, Kannegiesse & Autenrieb, 2015). Currently, the automotive industry is in a transitional phase between traditional combustion engines and electric engines which contributes to new challenges for involved actors. In addition, the scandal where Volkswagen installed a software that tampered the test results regarding emissions on their diesel engines, has increased the external pressure on the industry (Hotten, 2015). Adding the fact that the automotive industry is one of the largest manufacturing sectors worldwide with long and complex supply chains, makes investigating how to manage supply chain sustainability even more relevant (Mathivathanan, Kannan & Haq, 2018). Due to the widespread character of the challenges connected to MT-SSCM, gaining insight in other industries strategies and current practices can provide valuable findings. Industries that have been criticised for a long period of time, such as the apparel industry, have been pressured to invest and develop practices of good benchmark potential. For example, H&M has started to emphasise transparent supply chains by publicly sharing their first and second tier suppliers (SgT Group, 2017). In the company's sustainability report from 2017 it is revealed that 98.5% of H&M's tier one suppliers and 60% of their tier two suppliers are publicly disclosed (H&M Group, 2018).

Lastly, the importance of sustainability within supply chains is crucial for other reasons besides risk management. Today, eleven percent of the world's children are forced to work instead of going to school (Moulds, n.d) and in many workplaces, the working conditions and labour conditions are inadequate, as in the case with Inditex mentioned above (Wilhelm et al., 2016b). Simultaneously, the world is experiencing several environmental issues, e.g. global warming and reduction of the biosphere, partly due to companies around the world not taking enough actions to reduce their environmental impact (Knura, 2014). Therefore, the topic of MT-SSCM and the fact that OEMs can make a big difference in promoting sustainability throughout the supply chain can be considered to be important from a societal, ecological and ethical perspective.

1.2 Problem description

From observing available research within the last two decades, an increased interest of including sustainability with supply chain management has been identified (Rajeev et al., 2017). However, within this strive to improve sustainability, OEMs are struggling to manage sustainability upstream the supply chain in several different industries (Tachizawa & Wong, 2014). For instance, company X, supporting this thesis as a main case company do express this problem and is currently relying on cascading sustainability requirements upstream the supply chain. This approach of extending sustainability has been discovered to be insufficient, reaching nearly as far as tier two. Hence, there is an expressed need for new solutions on how to manage sub-suppliers upstream the supply chain. Being a common problem experienced in other industries for several years (Wilhelm et al. 2016b) MT-SSCM in automotive industry can

benefit highly from benchmarking opportunities of potential best practices used in these industries. Therefore, in order to find potential benchmarking opportunities, current practices and connected challenges needs to be identified in both the automotive industry and other industries. Since suppliers generally are involved in the process of managing sub-suppliers, their perception of MT-SSCM are highly relevant to consider for improvement suggestions. By identifying these different aspects, suggestions for how OEMs in the automotive industry better can manage sustainability in supply chains could be provided.

1.3 Purpose

Having the described difficulties of MT-SSCM in mind, the purpose of this thesis is to explore current practices for managing sustainability in multi-tier supply chains and find new practices enabling OEMs in the automotive industry to ensure sustainability beyond tier one. Further, in close collaboration with company X's purchasing department the objective is to provide insights on current practices and how OEM´s can improve sustainability throughout the supply chain. Complementary, insights from additional companies operating in various industries are used for the same reasons as company X. Although previous literature has been conducted on MT-SSCM and why it is needed, there is a gap in how to practically extend sustainability and its implications. The external companies facing the same issues, are regarded as a source for benchmarking opportunities that could be implemented in the automotive industry. Based on the described purpose above, the research questions are as follows:

1. What are the current practises OEMs use to manage sustainability in supply chains, and what main challenges prevents them from managing suppliers further upstream?
2. How does MT-SSCM practises in other industries differ from the automotive industry and what insights can be benchmarked?
3. How can OEMs in the automotive industry manage sustainability further upstream in the supply chain?

1.4 Delimitations

This thesis is focusing on supply chain management between OEMs and suppliers upstream, thereby excluding potential actors downstream. Further, the main input of the study is based on company X, thereby having the largest influence on the thesis. Input was also provided from external OEMs operating in various industries. The findings are therefore generalised with the purpose to be applicable for supply chains outside the automotive industry. Due to the limited timeframe and accessibility of suppliers, respondents upstream from tier one are not included. Moreover, the central focus of the thesis is on sustainability, emphasising foremost the social and environmental dimensions but also keeping the economical aspect in mind in order to present a reasonable solution.

1.5 Disposition

Chapter 2 - Theoretical framework
This chapter presents the theoretical framework starting with an introduction of SSCM followed by the extended concept of MT-SSCM. Different MT-SSCM strategies and some of its connected implications and challenges are further presented. Next, the factors to consider when choosing a strategy are discussed along with a description of various tools. Lastly, a summarising section of the theoretical framework is provided.

Chapter 3 - Research methodology
This chapter presents the methods used in order to fulfil the thesis' purpose and answer its research questions. Initially, the research approach is presented followed by the literature review, the chosen data collection methods and the data analysis. Lastly, the data quality in terms of validity and reliability is discussed.

Chapter 4 - Empirical findings
This chapter presents the empirical findings based on the data received from interviews, observations, internal documents and the questionnaire. Further, the empirical findings are structured around the research questions and will start with describing several OEMs current practices and related challenges. Following differences between the study's case companies are highlighted and illustrated. Lastly, expressed improvement suggestions are presented.

Chapter 5 - Discussion
In the following chapter, the empirical findings are discussed together with the theoretical framework. Initially, what appears to be the common strategy is discussed together with the main challenges preventing OEMs from managing sustainability at sub-suppliers. Following, the differences between the case companies MT-SSCM practices and activities are discussed, from which potential benchmarking opportunities are identified. Lastly, various improvement suggestions and implications for the automotive industry are evaluated and discussed.

Chapter 6 - Conclusion
In this final chapter, the research questions are addressed and provided with concluding answers serving this thesis purpose. Further, implications drawn from the findings in this thesis are suggested both for practitioners and for future research.

2. Theoretical framework

This chapter presents the theoretical framework starting with an introduction of SSCM followed by the extended concept of MT-SSCM. Different MT-SSCM strategies and some of its connected implications and challenges are further presented. Next, the factors to consider when choosing a strategy are discussed along with a description of various tools. Lastly, a summarising section of the theoretical framework is provided.

2.1 Sustainable supply chain management

As previously mentioned in the background, focal firms are experiencing an increased pressure and responsibility to manage sustainability in the supply chain. The underlying reason for this is explained by Krause, Vachon & Klassen (2009, p.19) saying that *"a company is no more sustainable than its supply chain - that is, a company is no more sustainable than the suppliers that are selected and retained by the company"*. Therefore, the concept of SSCM and its associated practices becomes highly relevant for companies wanting to reduce risk and improve profitability by using environmental and socially beneficial methods (Mathivathanan et al., 2018).

Elaborating on the term sustainability, this paper follows the definition comprised by the Triple Bottom Line (TPL) (Elkington, 2018). Since first developed by Elkington in 1994, the framework referred to as TBL has been widely adopted. The TBL concept describes sustainability as a combination of social, environmental and economic aspects used by companies to assess their impact. In addition, these three dimensions are often mentioned as people, planet and profit. For a supply chain to be considered as sustainable, Wilhelm et al. (2016) argue that it should fulfil a high level of performance in all three TBL dimensions. This can further be observed in Seuring & Müller (2008, p.1700) definition of SSCM being "*the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e. economic, environmental and social, into account which are derived from customer and stakeholder requirements".*

To put it simple, SSCM is about how firms can manage sustainability of their suppliers (Pagell & Wu, 2009) According to Seuring & Müller (2008), focal firms manage sustainability in supply chains due to external triggers from various stakeholders as well as internal incentives. As a result of the authors' research, two strategies are provided. The first strategy is used by firms with the purpose to avoid risk that could harm their reputation and it does consider the economical trade-off for enhancing environmental and social aspects in supply chains. The second strategy concerns sustainability of products' entire life cycle. In this material-based strategy, the communication between all involved actors are crucial as common requirements and standards needs to be established throughout the supply chain.

Previous literature on SSCM has mainly focused on dyadic relationships between focal firms and direct suppliers, i.e. across two levels of tiers (Grimm Hofstetter & Sarkis, 2014). Thereby,

the role and impact of sub-supplier in tier two, tier three and so on have been neglected. However, several researchers are starting to emphasise the importance of extending the reach and including management of sub-suppliers within SSCM (Grimm et al., 2014; Mena, Humphries & Choi 2013; Tachizawa & Wong, 2014; Wilhelm et al., 2016b) which is further discussed in the next chapter.

2.2 Managing sustainability in multi-tier supply chains

When considering today's supply chains that are composed of suppliers scattered all around the world, only focusing on the link between a supplier and a buyer does not cover the actual complexity of the situation (Sauer & Seuring, 2018). Therefore, in order to capture an entire supply chain, the traditional dyadic focus needs to be shifted to a multi-tier perspective. Mena et al. (2013) explains multi-tier supply chain management (MT-SCM) as a mean to encompass some of the complexity otherwise neglected from a dyadic perspective, dyadic in this context implying a relationship between two parties in the supply chain. Expanding to a multi-tier approach is easiest done by analysing triadic relationships across three tiers as done in the paper by Mena et al. (2013). Notably, multi-tier relationships do also include arrangements with additional tier suppliers and could cover entire supply chains back to the provider of raw material (Sauer & Seuring, 2018). Tachizawa & Wong (2014) argues that existing strategies of MT-SCM mainly are developed with sustainability in focus, consequently known as MT-SSCM. Thereby, shifting focus from SSCM to MT-SSCM implies managing sustainability in the supply chain by reaching beyond dyadic relationships and including actors upstream tier one (Sauer & Seuring, 2018). In figure 2, an illustration of triadic and the dyadic structure are provided.

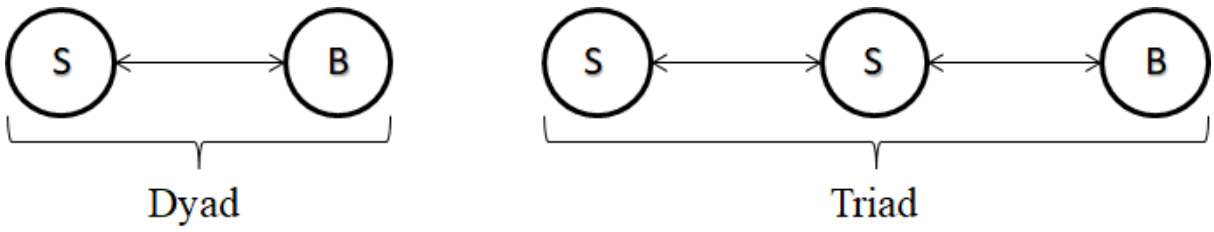

Figure 2. Illustration of a dyadic and a triadic structure (with inspiration from Mena et al. (2013))

An implication addressed by Sauer & Seuring (2018) of reaching further upstream in the supply chain, towards the supplier of raw material, is interacting with suppliers more likely to serve several different industries. For instance, mineral supply chains are connected to the automotive, jewellery and electronics industry. In interconnected settings, it is difficult for one single player to manage and improve sustainability on its own, instead the importance of collaboration and common standards from existing stakeholders are emphasised (Seuring & Gold, 2013). Therefore, one benefit of adapting a MT-SSCM approach is that a more realistic view of the supply chain is provided which acknowledge the influence of other stakeholders (Mena et al., 2013). However, with an extended focus the managerial difficulty increases

(Sauer & Seuring, 2018), especially since it involves new types of relationships with sub-suppliers without contractual agreements to rely on (Wilhelm et al., 2016b).

Furthermore, in order to manage sub-suppliers in the supply chain it is crucial to be able to track the product flow and identify involved actors (Egels-Zandén, Hulthén & Wulff, 2015). This is referred as traceability, further being a prerequisite for achieving transparency. To be more precise, traceability refers to disclosure of suppliers' and sub-suppliers' identity whereas transparency additionally includes disclosure of relevant information from these actors. However, the authors continue to discuss that many companies are in fact struggling in both naming supply chain actors and obtaining information about their sustainability practices. According to Grimm et al. (2014), this challenge is to a large extent due to the need of disclosing suppliers tier by tier as the success becomes dependent on several sub-suppliers' willingness to share information despite not having any obligation of doing so. This unwillingness to disclose suppliers might be due to suppliers' fear of being bypassed, in turn indicating lacking trust between the focal firm and its suppliers. To overcome these challenges and risks being mentioned above, an appropriate MT-SCCM strategy needs to be in place. Several strategies are available in literature and further discussed in the section below.

2.2.1 MT-SCCM strategies

From the rather sparse literature on sub-supplier management, the central focus has according to Grimm et al. (2014) been on either assessment or collaboration practises. Assessment practises entails methods such as audits and use of certifications, investigating the performance of the supplier in relation to the agreements made. In other words, assessment practices evaluate sub-supplier's level of compliance fulfilled. In contrast, collaboration practices imply adapting a more supportive approach in which the two parties are jointly working on improving sub-supplier's sustainability performance. This can be done with trainings, workshops and other collaborative activities.

However, in other recent MT-SSCM literature, the focus has been on various strategies for managing sub-suppliers (Tachizawa & Wong, 2014; Wilhelm et al., 2016b; Mena et al., 2013) rather than on assessment and collaboration practises. Following, four strategies are mentioned by Tachizawa & Wong (2014), these are referred to as indirect, direct, using third parties and don't bother. Notably, it is possible to apply a combination of different strategies in order to achieve the best result. The effectiveness of the strategies depends on the given situation and thus a best practice for one company does not automatically equal a best practice for another.

2.2.1.1 Indirect

Within an indirect strategy, there is no direct interaction between the focal firm and sub-suppliers (Tachizawa & Wong, 2014). Instead, direct suppliers play an important role in this approach since they become responsible for managing sustainability further upstream in the supply chain, see figure 3. Often, focal firms indirectly impose requirements on sub-suppliers by stating in their Code of Conduct that requirements ought to be cascaded. Hence, delegation of responsibility is a central part of the indirect strategy. Furthermore, the indirect approach

builds on the open strategy described by Wilhelm et al. (2016b) and Mena et al. (2013). One distinction Tachizawa & Wong (2014) makes is that the indirect approach covers indirect contact with any sub-supplier along the supply chain and not only with tier two suppliers as first suggested by Mena et al. (2013). Therefore, this paper will continue to use the term "indirect" when referring to this MT-SSCM strategy and thus include management of any sub-suppliers through tier one.

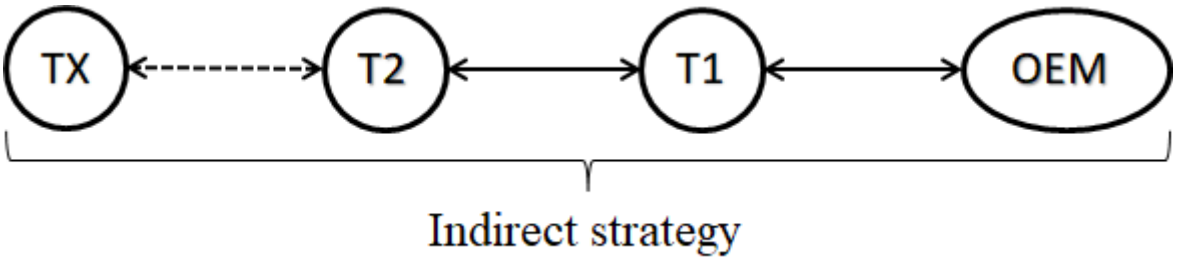

Figure 3. Management of sub-suppliers using an indirect strategy

Since a supply chain's overall level of sustainability is affected by interdependent firms' actions, sustainability challenges cannot be managed by one single actor (Seuring & Gold, 2013). Considering this, adopting an indirect strategy is beneficial as it will allocate responsibility between different tiers in the supply chain and thus gives rise to necessary cross-tier collaboration (Tachizawa & Wong, 2014). Wilhelm et al. (2016b) further highlights the importance of information sharing along the supply chain when the interaction of members are linear. This since focal firms will depend on tier one suppliers to obtain information about tier two, in turn tier one supplier will be dependent on tier two suppliers. Both assessment and collaboration practices (Grimm et al., 2014) are applicable to the indirect MT-SSCM strategy (Tachizawa & Wong, 2014). For instance, focal firms could support their direct suppliers on how to manage sub-suppliers by providing trainings. Certificates, being an assessment tool, can also be used to indirectly manage sub-supplier by influencing direct suppliers to make sure that sub-supplier possess specific certificates.

2.2.1.2 Direct

In contrast to the indirect approach, Tachizawa & Wong (2014) explains that a direct strategy implies a direct connection between a buyer and sub-suppliers, see figure 4. This strategy is based upon the closed strategy discussed by Mena et al. (2013) and Wilhelm et al. (2016b). One distinction between the closed strategy and the direct strategy is that the latter does not necessarily require a contractual bound (Tachizawa & Wong, 2014). A direct structure can simply be upheld by frequent contact between a buyer and its sub-suppliers, including relationships where improvement suggestions are given ad hoc. Within a direct approach, sub-supplier management are described to be provided through practises such as on-site audits and trainings (Tachizawa & Wong, 2014). Hence, both assessment and collaboration are applicable for managing sustainability with a direct approach (Grimm et al., 2014).

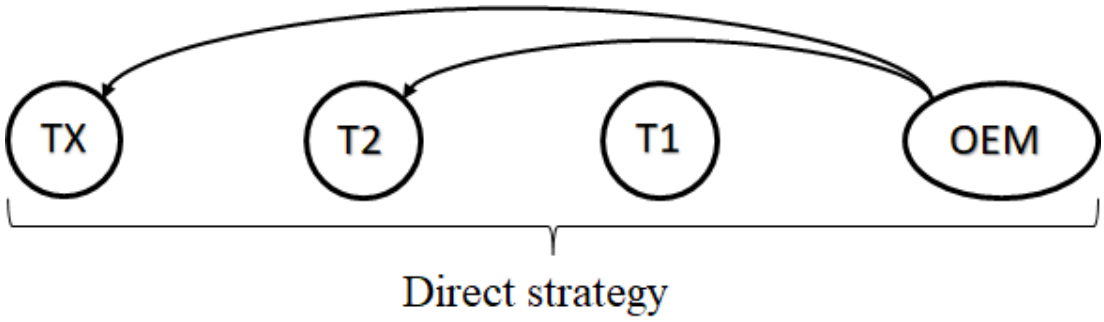

Figure 4. Management of sub-suppliers using a direct strategy

However, directly managing suppliers are resource demanding but arguably increase the focal firms control of sub-suppliers (Lee, 2010). Firms highly exposed to media and supply chain scandals therefore tends to use a proactive approach and directly manage sub-suppliers of critical components, i.e. components subject to high risk in terms of sustainability (Tachizawa & Wong, 2014). A real example of this is the case with Starbucks that was experiencing issues with unsustainable raw materials upstream in some supply chains (Lee, 2010). This problem was handled by establishing direct contact with raw material producers, resulting in better control of the raw-materials origin and improved sustainability in the supply chains.

2.2.1.3 Third parties

Another MT-SSCM strategy implies involving a third party to assist in management of sub-supplier (Tachizawa & Wong, 2014). In this approach, arrangements with third parties such as non-governmental organisations or competitors are made, see figure 5. For instance, audits and trainings of sub-suppliers could be completely delegated to an external actor in situations where the focal firm lacks sufficient resources and capabilities (Wilhelm et al., 2016b). Furthermore, collaborating with third parties can be useful for increasing a focal firm's negotiation power towards sub-suppliers, since standards and requirements jointly developed by competitors or industrial initiatives are more prone to be accepted (Tachizawa & Wong, 2014). Third parties can also be used to facilitate communication between different tiers in the supply chain which is seen to improve the exchange of valuable information (Cole & Aitken, 2019).

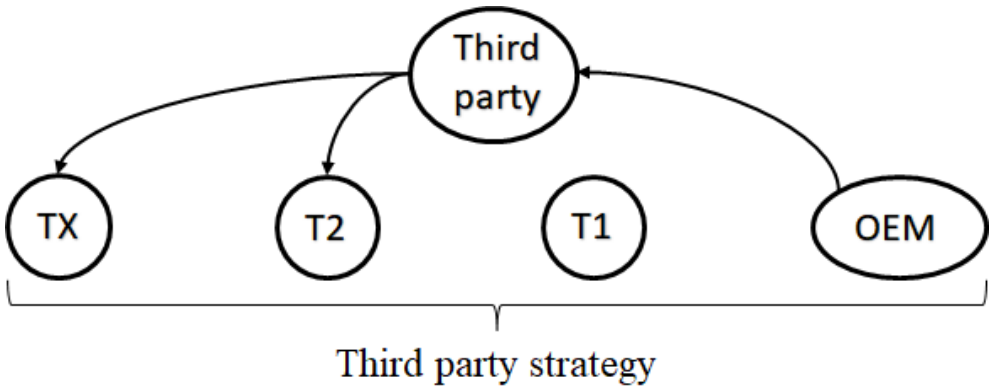

Figure 5. Management of sub-suppliers using a strategy including third parties

A challenge related to assigning a third party to manage sustainability in the supply chain is the focal firm's loss of control (Tachizawa & Wong, 2014). Therefore, it is crucial that the focal firm provide input to the third party and that results are communicated between them.

2.2.1.4 Don't bother

Tachizawa & Wong (2014) describe the "don't bother" approach as buyers merely focusing on sustainability within the company boundaries and their first-tier suppliers. In other words, the buyer does not have nor intend to receive information of suppliers beyond tier one. Thus, this is not a strategy for managing sustainability practises of sub-suppliers. According to Wilhelm et al. (2016b), the don't bother approach is an inferior version of the indirect strategy since delegation of requirements are not communicated. Thus, a big drawback connected to this approach is low influence on sustainability practises of sub-suppliers.

Furthermore, a don't bother approach is mainly used by companies with less complex supply chains or by companies with low connection to the end user (Tachizawa & Wong, 2014). This since companies further up in the supply chain are not as exposed as companies closer to the end user resulting in less risk of negative publicity. Therefore, these "invisible" companies can often rely on activities driven by companies closer to the end user.

2.2.2 Challenges connected to MT-SSCM

The previous mentioned MT-SSCM strategies are connected to several challenges. Given the external pressure firms face to ensure sustainability, not only within organisational boundaries but in the entire supply chain, it is important to acknowledge and overcome these challenges (Grimm et al., 2014). This is further discussed below starting with the issues experienced when delegating responsibility using an indirect strategy. Following, the difficulties of managing sub-suppliers directly are presented and further discussed. The challenges of working with third parties and adapting a don't bother approach will not be mentioned separately, instead these challenges were included in their respective sections describing the strategies above.

2.2.2.1 Challenges with an indirect approach

Generally, focal firms manage sustainability upstream the supply chain using an indirect approach in which direct suppliers function as a bridge to sub-suppliers (Mena et al., 2013). In these arrangements, the role of the first-tier supplier becomes of certain interest since besides internally meeting the sustainability requirements imposed by the buying firm, the direct supplier has the additional responsibility of passing these on to the next line of tiers (Wilhelm, Blome, Bhakoo & Paulraj 2016a). Utilising first tier suppliers in this double agency manner comes with several challenges, whereas some are addressed in agency theory. Wilhelm et al. (2016a, p. 43) describes agency theory to be *"concerned with problems that arise when one party - the principal - delegates work to another party - the agent"*. Some of these problems are related to the fact that direct suppliers are independent actors driven by self-interest and primarily need to consider their own interest. Due to this opportunistic behaviour it becomes complex and resource demanding to control the agents as they could have incentives to withhold certain information, especially when conflicting with the focal firm's requirements.

In line with the self-interest issue, Wiese & Toporowski, (2013, p.97) explains that *"problems occur because the goals of the principal and agent do not always coincide and the principal is not able to control the agent completely, which causes information asymmetries".*

Following, delegating responsibility to direct suppliers involves risk for the focal firm in terms of less visibility over costs, decreased source of innovation and greater difficulty of ensuring sustainable practice in the supply chain (Choi & Linton, 2011). Therefore, given the Chain Liability Effect previously discussed in the background, adapting an indirect approach may cause reputational damage for the focal firm (Hartmann & Moellern, 2014). Based on this effect, it arguably requires trust to utilise tier one supplier as an intermediary role, further acknowledge by Grimm et al. (2014) as a critical success factor for managing sub-suppliers.

To successfully implement an indirect strategy, Wilhelm et al. (2016a) emphasises the importance of developing necessary capabilities of tier one suppliers. This is further discussed by Grimm et al. (2014, p.162) arguing that *"Even if suppliers show a willingness to follow a firm's SSCM strategies, suppliers' low competence level may force the focal firm to put higher investments into the supplier relationship in order to develop respective competences at supplier sites".* Developing capabilities of suppliers can be done by providing trainings and other supportive measures (Wilhelm et al., 2016a). Furthermore, to develop capabilities for managing sub-suppliers, Wilhelm et al. (2016b) emphasise the importance of tier one appointing a sustainability manager. For that reason, direct suppliers in the absence of such role are considered to have low capabilities.

2.2.2.2 Challenges with a direct approach

To avoid agency theory related issues, OEM's would preferably use a direct approach and thereby manage all sub-suppliers independently (Wilhelm et al., 2016a). However, a strategy is subject to various challenges as well, especially resource wise since establishing and maintaining relationships with sub-suppliers requires managerial resources such as time, capital and knowledge (Mena et al. 2013). Other challenges related to direct management of upstream suppliers are connected to the focal firm's generally inadequate information and leverage towards them (Wilhelm et al., 2016a). In fact, Grimm et al. (2014) argue that a prerequisite for managing sub-suppliers using a direct approach is that direct suppliers agree upon disclosing its suppliers (Grimm et al., 2014). However, the challenges do not disappear once knowing who the sub-suppliers are since many companies, especially in developing countries, are sceptical towards sharing information (Lee, 2010). This is mainly related to the fear of being exploited and the risk losing bargaining power or competitive advantage. Therefore, it is of great importance for focal firms to communicate the purpose and benefits of transparency.

Furthermore, extending focus from managing direct suppliers to selected sub-suppliers is a time-consuming change (Choi & Linton, 2011). In this shift of focus, the purchasing role becomes of certain interest due to additional responsibilities which can result in an increased need for resources such as manpower to manage an increased number of relations but also in

terms of knowledge and expertise. Such knowledge could be required due to interaction with new types of markets where for example cost trends in different commodities are relevant. On further notice, changing the role of purchasing does emphasise the support from top management. Another challenge with adopting a direct approach is the potential negative reactions from tier one suppliers as they are likely to feel threatened and be resistant to the change.

2.2.3 Choice of strategy

Which MT-SSCM strategy companies will choose are based on several factors often referred to as contingency factors, implying that the situations and context should be in focus rather than the strategy per say (Tachizawa & Wong, 2014). These factors have previously been studied in SSCM literature with respect to the conditions a strategy has shown to be effective. Continuing the authors describes several contingencies; power, stakeholder pressure, industry, material criticality, dependency, distance and knowledge resources. The notion of contingencies is closely related to theory on critical success factors investigated in the article by Grimm et al. (2014). In fact, some of the contingency variables described above overlap with the success factors described below. Notably, this is due to success, i.e. sustainability supply chain compliance in this context, being synonymous for effective strategy implementation (Grimm et al., 2014). Hence, in order to implement the most appropriate strategy for managing suppliers and sub-suppliers the context should be considered both internally by the firm and externally considering other actors. For that reason, critical success factors ought to be considered before choosing a strategy. In the following sections some of these factors are discussed in further detail.

2.2.3.1 Power asymmetry

In order to improve the sustainable environment throughout the supply chain and thus minimize the risk of being negatively exposed in media, focal firms attempt to influence supply chain members to adapt sustainable practises by various means (Grimm et al., 2014). It is however difficult to involve all tier-suppliers in sustainable initiatives due to power asymmetries (Wilhelm et al., 2016b). Power asymmetries are therefore considered as a critical success factor, further with respect to bargaining power since limited bargaining power of the lead firm results in less ability to influence suppliers (Grimm et al., 2014). For instance, in situations where a supplier in the supply chain has higher bargaining power than the focal firm it will be difficult to successfully impose requirements or new standards. The suppliers' engagement will be determined by the perceived value being further discussed in the next section. Moreover, bargaining power can be increased by adapting a direct management approach or by applying a third-party strategy to create a collective pressure towards powerful suppliers.

2.2.3.2 Value for suppliers

Even though focal firms often are perceived as responsible for the sustainability throughout the supply chain, they cannot do everything by their own (Grimm et al., 2014). Suppliers on every level in the supply chain have to contribute by taking responsibility for their own product as well as adapting to sustainable activities driven by focal firms. In this strive to diffuse

sustainability across tiers, the role of direct suppliers is important since they contribute to reducing the gap between focal firms and sub-suppliers (Wilhelm et al., 2016a). Hence, the perceived value for direct suppliers of being involved in sustainability activities becomes an important aspect to consider.

Perceived value typically refers to the financial value and whether there is a financial benefit of being involved in sustainability activities (Grimm et al., 2014). Thus, it can be difficult to get direct suppliers to participate in activities without financial incentives. However, with enough bargaining power, focal firms can pressure its direct suppliers into adopting sustainable practises despite not generating financial value, since otherwise they risk losing an important customer. The same logic applies to the perceived value of sub-suppliers since sub-supplier's willingness to adapt to corporate standards will depend on the perceived value.

2.2.3.3 Collaboration

Seuring & Gold (2013) underlines the difficulty of one actor not being able to manage sustainability by itself and stresses the need for actions that exceeds organizational boundaries. In fact, some issues concerning sustainability are even too complex for one single supply chain to manage alone and require collaboration together with other supply chains facing the same issues (Lee, 2010). This does also include jointly working with competitors in order to enable the best solution. However, working together with competitors entails extensive planning on how the collaboration practically should be carried out, including decisions on whether a third party should be assigned to facilitate the coordination. Furthermore, in order to achieve a successful collaboration, the participants need to be able to share resources, provide transparent information and have some interests in common.

2.2.4 Tools for managing MT-SSCM

Today's increased focus on sustainability in combination with the fact that lead firms are perceived responsible for the sustainability throughout the supply chain has increased the adoption of MT-SSCM tools (Egels-Zandén & Lindholm, 2015). Some commonly used tools for managing sustainability in supply chains are therefore described in more detail below.

2.2.4.1 Code of Conducts

Code of Conducts can be described as a set of guidelines for how a company should manage their business from a socio-environmental perspective (Egels-Zandén & Lindholm, 2015). These guidelines do often entail several requirements the suppliers must fulfil in order to establish and pursue a contractual relationship with the buyer. A Code of Conduct is used as a tool for ensuring a certain level of sustainability amongst a focal firms' supplier base. In addition, the guidelines provide assistance for how suppliers should behave in order to maintain a long-term relationship with the buyer.

There is however a split opinion regarding the effect of Code of Conducts (Egels-Zandén & Lindholm, 2015), whereas some researchers believe that the tool will have a positive impact on workers' rights (Zadek, 2004) whilst other researchers disregard this statement (Blowfield & Dolan, 2008). According to a recent study performed by Egels-Zandén & Lindholm (2015)

it is argued that Code of Conducts only have a limited impact on suppliers' practises. Therefore, complementary tools are suggested for managing sustainability in supply chains.

2.2.4.2 Audits

Similar to Code of Conducts, audits are performed with the purpose to improve suppliers' practises (Egels-Zandén & Lindholm, 2015). More specifically, audits are conducted by controlling supplier practises on site either by the buyer itself or by a third party. Audits are usually used as a complementary tool to Code of Conducts as it controls whether the suppliers comply with its stated requirements (Bartley, 2007). Egels-Zandén & Lindholm (2015) further describes audits as a SSCM tool performed at tier one suppliers whereas Tachizawa & Wong (2014) extend this view by arguing that audits can also be used as a MT-SSCM tool for assessing sub-suppliers beyond tier one.

Audits are used to assess compliance of different organisational aspects e.g. quality (Egels-Zandén & Lindholm, 2015). However, in this thesis it will solely refer to assessment of sustainability practises. Moreover, conducting an audit includes several different steps in order to capture any potential flaws in which inspections of documents and facilities together with interviews are the main steps. Audits effectiveness on working conditions has been discussed in previous literature where different opinions are expressed. For instance, Locke, Qin & Brause (2007) argue that audits do not have any notably effect on improving working conditions whereas Egels-Zandén & Lindholm (2015) states that the tool only provides limited impact. Although, other researchers' express a more positive view on audits and believe that it does positively affect working conditions (Wilhelm et al., 2016b; Ferreira, Lopes & Morais, 2006).

2.2.4.3 Trainings

Ignorance connected to employees' unawareness of working rights and managements' lacking knowledge about sustainable production methods, are one core issue causing unsustainable practices in supply chains (Grimm et al., 2014). Educating and training suppliers on how to pursue a sustainable organisation are therefore emerging methods for reducing supplies' negative impact on the sustainable climate in the supply chain. Trainings are also provided to foster collaboration between first tier suppliers and sub-suppliers with the intended purpose to improve sustainability along the supply chain (Wilhelm et al., 2016b). However, when using a direct strategy firms can choose to directly provide trainings to sub-suppliers in need, without involving tier one suppliers (Tachizawa & Wong, 2014).

An emerging form of trainings are online trainings which can be performed virtually through mobile phones or similar devices (Sendlhofer & Lernborg, 2018). Online trainings are less resource demanding and can be performed in a more flexible manner compared to the traditional form of trainings. Other advantages of online trainings being discussed in the article by Sendlhofer & Lernborg (2018) are that electrical devices can store data about test results and suggest additional trainings to people based on their current knowledge and expertise. Hence, online trainings can be customised down to the individual level and provide more

attention to employees with the greatest need. The different types of trainings, live trainings and online trainings, are complement to one another and in order to maximise the outcome a combination of these should be used.

2.2.4.4 Certifications

A common tool for ensuring companies' level of sustainable performance are by the use of certificates (Grimm et al., 2014). Certificates are often requested during the initial contact with suppliers to facilitate the selection of competent suppliers. In multi-tier settings, certificates can be used for management of sub-suppliers (Tachizawa & Wong, 2014). For instance, firms using an indirect strategy can utilize their influence over direct suppliers to make sure that sub-supplier possess certain certificates e.g. ISO 14001 and ISO 2600. Furthermore, González, Sarkis & Adenso-Díaz (2008) argue that imposing certificates do benefit the sustainable practices upstream in the supply chain.

With the purpose to increase transparency in the supply chain a new ISO certificate called "Chain of Custody" are being developed (SIS, 2016). This Chain of Custody solution intends to combine several standards since the current use of various traceability models has resulted in unnecessary complexity. Thus, transparency is assumed to increase by determining specific traceability requirements for companies to follow (NEN, 2016). In addition, agreeing on common standards would be beneficial in terms of resources since various SAQ, certifications schemes and audits currently are used in a conflicting and inefficient manner. For instance, a developed Chain of Custody standard could harmonise different companies' audit routine of the same suppliers and thus reduce costs. Moreover, the standard is providing a basis for claims made about approved or certified products where audits and other assuring practices are used to verify its compliance towards its requirements (ISEAL alliance, 2016).

2.2.4.5 Approved vendor list

Due to the chain liability effect, relying on first tier suppliers in a too great extent is disadvantageous for OEMs (Choi & Linton, 2011). Despite not eliminating the Chain Liability Effect connected risks, the authors stress the use of an approved vendor list (AVL) for indirect management of sub-suppliers. This tool comprise of a list of accepted sub-suppliers from which direct supplier can choose amongst. However, companies should still with an AVL in place carefully consider which sub-suppliers that should be managed directly, otherwise the tool can result in opposite effect. Merely selecting companies from an AVL does not equal sustainability in the supply chain.

2.3 Summary and analytical framework

Considering the information presented in this chapter, management of sub-suppliers can be done with three strategies; indirect, direct and by the use of a third party. Notably, the current MT-SSCM literature suggests a fourth strategy which can be called as "don't bother" strategy. However, since this strategy implies not attempting to influence sub-suppliers it will not be included as an alternative in this thesis. The interplay between context, strategies and tools are

developed to construct an analytical framework which is illustrated by figure 6. The choice of strategy will depend on the current context, including contingency variables and critical success factors that will affect the outcome of an implemented strategy. In this step it is important to consider both the individual firm and its related supply chain. For instance, the focal firm's power position should be considered in relation to other chain members and the overall sustainability practices of the firm. Once the contextual aspects have been considered, an appropriate MT-SSCM strategy should be selected. For this choice the implications and challenges of the indirect, direct and third-party approach should be analysed. Potentially, the best practise will comprise of a mixture of strategies. Furthermore, the selected strategy will influence the tools used to manage sustainability in the supply chains. Of course, many of the tools previously described can be used for different strategies but its significance will arguably vary. Given the context and current situation, a MT-SSCM strategy will be selected and pursued in combination with appropriate tools, this in order to achieve high social, environmental and economic performance.

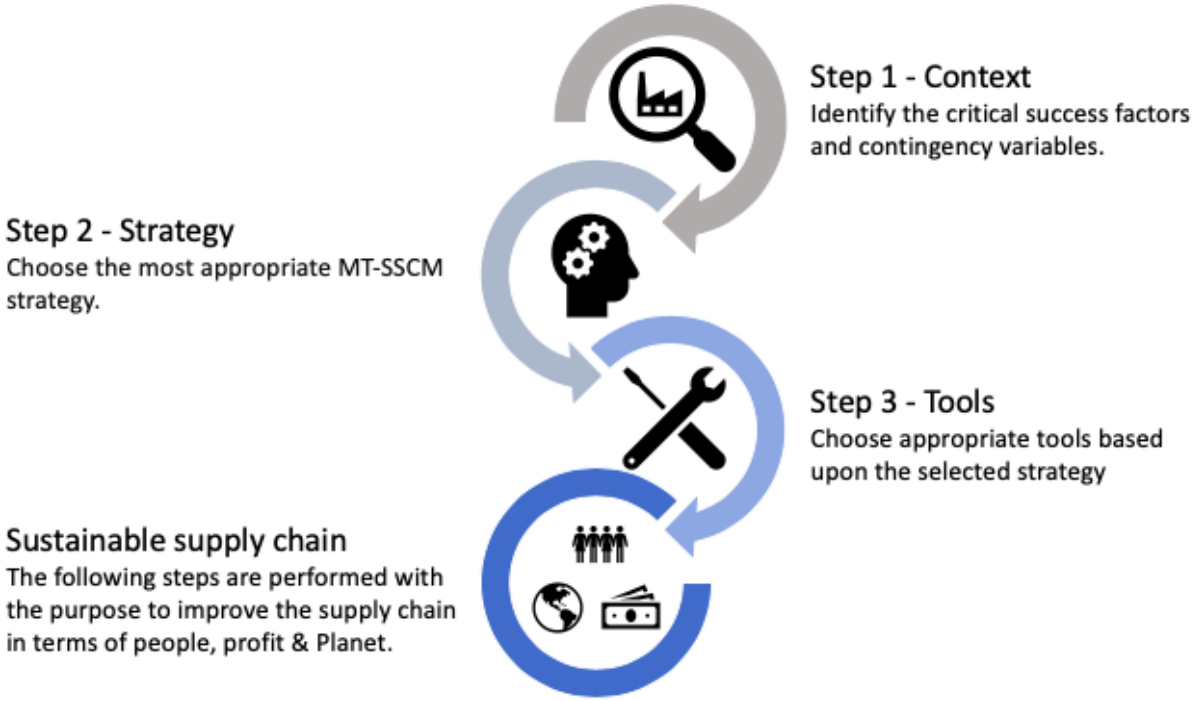

Figure 6. Summary of the analytical framework

3. Method

This chapter presents the methods used in order to fulfil the thesis' purpose and answer its research questions. Initially, the research approach is presented followed by the literature review, the chosen data collection methods and the data analysis. Lastly, the data quality in terms of validity and reliability is discussed.

3.1 Research approach

Initiating the study required understanding the problem and formulating applicable research questions. Based upon the research questions, the next step involved adopting an applicable research approach whereas Patel and Davidson (2003) described two main approaches; inductive and deductive. With an inductive approach data is gathered and analysed in order to develop theory explaining the empirical findings. A deductive approach on the other hand, start with developing a hypothesis from existing theory which is later tested by gathering data (Bryman & Bell, 2015). Since the purpose of the thesis is to understand how companies can manage sustainability further upstream in the supply chain, primary data did serve as a foundation for analysis and developing potential solutions. Hence, this thesis is characterised by an inductive approach, where findings are supposed to contribute to the already existing MT-SSCM theory and make modifications to previous knowledge. The research was further designed as a case study and more specific a multiple case study. However, the multiple case study used in this research differs from the traditional design (Bryman & Bell, 2015) since company X was used as the main case company and thus contributed to the majority of the data. In some parts of the text, company X will be referred to as the internal company. Companies from other industries were used for a comparable-, validating- and benchmarking purpose and are sometimes referred as external case companies. Yin (2009) argues that using a multiple case study enables a cross case analysis by adding a more general perspective compared to single case studies.

Despite prior research have been conducted on MT-SSCM, there are still some areas unexplored. For that reason, this study is characterised by an explorative nature involving open-ended research questions investigating current practices, challenges and improvement suggestions. Having an inductive reasoning combined with the explorative purpose made it possible to investigate aspects from an objective perspective and use the empirical findings to add value to existing literature. In order to answer the research questions, a qualitative approach was used which according to Easterby-Smith, Thorpe & Jackson (2015) is suitable for investigating explorative research questions. Since the research questions having an explorative formulation, open-ended answers are preferable which typically are derived from qualitative interviews and observations (Bryman & Bell, 2015). Contrary to quantitative data, qualitative data is not collected in numeric form and is often in need of being processed by the researchers. In line with Easterby-Smith et al. (2015), interviews were prepared beforehand by developing interview templates that were used as a foundation when performing the interviews. The interviews were further conducted and transcribed afterwards. In addition to interviews, questionnaires, observations, informal interviews, public company documents and non-public

company documents has been used to answer the research questions. Before going into further, the paper's overall research approach is presented in figure 7.

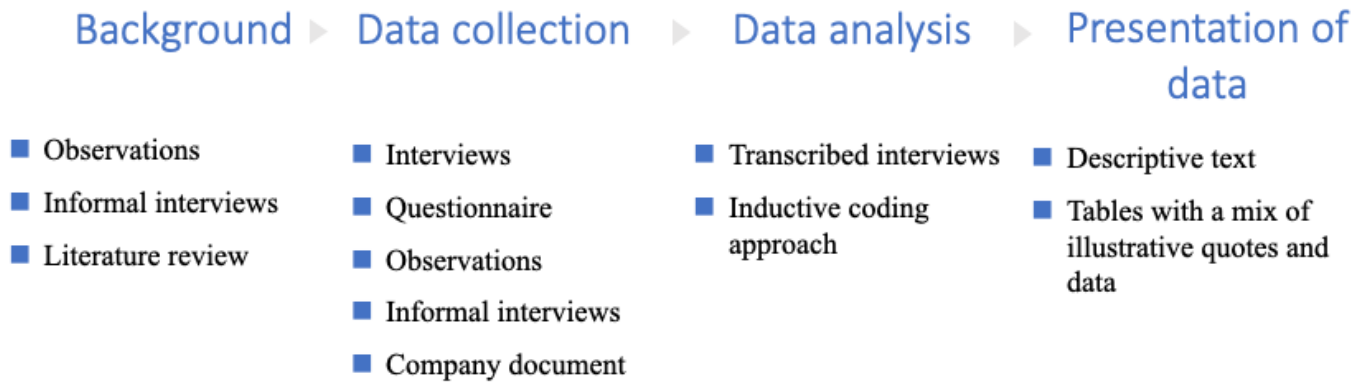

Figure 7. Visualisation of the overall research approach

3.2 Literature review

During the process, literature was used for different purposes. Initially, literature was used for creating an understanding of the problem and for developing appropriate research questions. Thus, the initial literature review was used with the purpose of setting the foundation for the paper. Later in the process, the literature review was focused on identifying current practices used for managing sustainability throughout the supply chain and its related challenges.

The theoretical framework is primarily based upon scientific papers, articles and books gathered from search libraries such as Google Scholar, ScienceDirect and Chalmers library. Relevant scientific papers and articles that was well cited was used. Since supply chain sustainability has received a lot of public attention the last decade (Oelze et al., 2018) recent papers was preferred in order to capture and contribute to the latest progress. In addition to searching articles and papers on websites, snowballing was used to find relevant literature. Snowballing in this context refers to citation searching where the researcher looks at cited publications (Easterby-Smith et al., 2015).

Furthermore, newspapers and other websites were used as a complement to scientific papers in order to capture the public perspective of the issue. Due to the fact that unsustainable behaviour along the supply chain has received a lot of public attention (Hartmann & Moellern, 2014), newspapers was a valuable source of information on the current perceived situation. Throughout the literature review, important keywords used was as follows: "sustainable supply chain management", "multi-tier supply chain management" and "MT-SSCM strategies".

3.3 Data collection

According to Bryman and Bell (2015) data can be categorised as either primary or secondary, depending on the person analysing the data. In situations where data is collected and analysed

by the same researcher, primary data is created. In contrast, secondary data implies data being analysed by someone uninvolved in the data gathering process. Thereby, the usage of secondary data involves data accessed from external sources. This thesis uses a mixture of primary and secondary data in order to answer the research questions. Primary data is derived from interviews, observations and a questionnaire whereas the secondary data is based on scientific journals, internal documents and other available literature. Primary data in the form of interviews have been conducted at OEMs, NGOs and with one supplier. In turn, the questionnaire was answered by individuals from various industries with the objective to receive insights on how sub-suppliers are managed. Questionnaires are often categorised as a quantitative data collection method (Bryman and Bell, 2015) but the questionnaires used in this thesis had mainly open-ended questions allowing the respondents to elaborate. This with the exception of a few classification-based descriptive questions that simplified the identification of MT-SSCM strategy and facilitated a more concise result. Therefore, the data derived from the questionnaires is considered as qualitative.

3.3.1 Interviews

The main source of primary data was gathered from interviews, conducted with the purpose to gain knowledge about how OEMs manage sustainability throughout the supply chain and how requirements are transferred further upstream. Therefore, interviews were conducted at several different OEMs in order to capture general insights about similarities and differences. Furthermore, investigating several OEMs within different industries provided benchmarking opportunities. In addition, a supplier's perspective was included in order to capture the existing challenges of diffusing requirements from two point of views.

Most of the interviews were semi-structured which is suitable when a specific topic is studied (Bryman & Bell 2015) and provides structure to the interview without inhibiting the respondent to elaborate (Easterby-Smith et al., 2015). The interviews were conducted by two persons, taking turn in asking questions and writing small notes. Before the interview, the interviewers asked for permission to record. Recording the interview enables interviewers to fully focus on follow-up questions rather than taking notes (Bryman & Bell, 2015) and is further a prerequisite for transcribing the interview afterwards (Easterby-Smith et al., 2015).

Three different types of interviews were conducted as illustrated in table 1. Thereby, three different interview templates were developed; one for interviews at the internal case company, one for interviews with external case companies and one for interviews at suppliers, see appendix 1-3. The reason for internal and external case companies being interviewed with different interview templates was due to the researches' pre-existing knowledge, since the current practice at company X was known beforehand. Therefore, these internal interviews aimed at validating the current practices and related challenges whereas the external interviews aimed at understanding current practises. In addition to these three interview types, two informal interviews about Chain of Custody was conducted with NGOs with the purpose to evaluate this as a potential solution. Since these interviews was conducted informally, no interview template was used.

Most of the interviews were conducted face to face due to the possibility of observing body languages, otherwise lost at phone interviews (Bryman & Bell, 2015). The majority of the interviews were performed in Swedish and needed to be translated to English. Translating transcribed material are however quite complicated and the translators personal experience and knowledge becomes crucial (Bryman & Bell, 2015). Bryman & Bell (2015) further argues that some words cannot be translated without changing its intending meaning. However, both authors are fluent in both English and Swedish resulting in less risk for misinterpretations.

Table 1. Data collection: interviews

Interview category	Description	Purpose	Number of interviews	Research questions
Internal	Interviews conducted at the internal case company.	Validate how company X work with sustainability in the supply chain and identify related challenges and potential improvement suggestions.	8	1, 2 & 3
External	Interviews conducted at external case companies.	Identify how companies in other industries work with sustainability in the supply chain, what challenges that exist and benchmark ideas to the automotive industry.	4	1, 2 & 3
Supplier	Interviews performed at a supplier to the internal case company.	To understand the existing challenges with diffusing requirements from a supplier perspective.	2	1

3.3.2 Sampling of interviews

Relevant persons at the internal case company were interviewed with the purpose to provide useful information for all research questions. The relevance was further determined by profession and network position, interview objects with some kind of interaction with suppliers were preferable. Each of the internal respondents were contacted by email with a short description of the background and the purpose of the study. Further, an invitation was sent to the respondent, and approximately one week before the interview was taking place the respondent received an interview template, later used as a foundation for the interview. The purpose for sending the interview questions beforehand were twofold. First, it was used as an assurance of the respondent's relevance. Second, it provided the respondents with the opportunity to prepare for the interview. Potential risk with this approach could be that the answers are influenced and biased. However, as the questions are not of business-sensitive

nature, the risk for biased answers was considered as low. Thereby, the benefits of sending the templates in advanced were estimated as higher than the potential risks.

The internal interviews were performed at various departments and with people of different professions that provided the paper with different perspectives on sustainability and insights on current practices. Snowball sampling or snowballing as suggested by Bryman and Bell (2015) was used to find new interviewees, implying a method where the interviewee suggests additional persons to interview. According to Wall Emerson (2015) snowball sampling is beneficial for increasing researchers' sample size but is in turn subject to higher risk of influencing the answers since respondents often will recommend persons with similar backgrounds. However, this thesis can be considered to have a diverse interview sample due to the various internal departments and external companies investigated.

Some industries outsides the automotive industry have received a lot of attention due to unsustainable supply chain practises (Wilhelm et al. 2016b), which arguably could have accelerated their work with implementing and managing sustainability along the supply chain (Tachizawa & Wong, 2014). Therefore, in order to answer the research questions, four OEMs from other industries has been interviewed in order to observe current MT-SSCM practices and potentially benchmark some of these. First, relevant companies were selected based upon five parameters; industry, progress within the field of sustainability, location, size and availability. Information about these parameters were collected from company websites, sustainability reports and newspapers. Second, in order to reach out to relevant persons at the selected companies, LinkedIn, company websites and the supervisor at the internal case company's contact network were used. The selected companies were from several different industries in order to increase the chances of finding a strategy to benchmark. However, due to the restricted access combined with limited time frame, there was only one conducted interview at each external company. The selected external companies were from the automotive industry, furniture industry, apparel industry and the manufacturing industry. The external interviews were conducted using the same procedure as described for the internal interviews.

Interviews at a given supplier was conducted to identify challenges from a supplier perspective. However, only one supplier was interviewed due to the limited time frame and lack of response from other suppliers. In order to reach out to this supplier, the supplier was contacted by a purchaser from the internal case company and further informed about the study and its purpose. The supplier was asked whether they were interested to participate in the study. Once again, the same procedures as for the internal and external companies was used for preparing, conducting and reviewing interviews.

Lastly, two informal interviews were conducted in order to follow up an improvement suggestion concerning Chain of Custody. The first interview was with two persons involved in the development of a Chain of Custody standards. These two persons were found on their project website and was later contacted regarding an informal phone interview. The second interview was also conducted over phone, this time with a project manager that recently had

published a study about Chain of Custody. A description of all respondents can be seen in table 2.

Table 2. List of interviewees

Role	Company	Department	Industry	Type
CSR Managers	U	-	Automotive	Interview
Sustainability director	Z	-	Textile	Interview
Responsible sourcing manager	Y	-	Manufacturing industry	Interview
Sustainability Developer	V	-	Furniture	Interview
VP Program & Business Office	X	1(a)	Automotive	Interview
Sustainability director	X	1(b)	Automotive	Interview
CR Manager	X	2	Automotive	Interview
Business developer, Director environment & Substance	X	3	Automotive	Interview
Sustainability Manager	X	4	Automotive	Interview
Director supplier development	X	5	Automotive	Phone interview
Purchaser	X	6	Automotive	Interview
Purchasing analyst, Director purchasing development	X	7	Automotive	Interview
Sales Manager	XS	-	Automotive	Phone Interview
Project Managers	N1	-	Standards organisation	Phone Interview
Project Manager	N1	-	Research institute	Phone Interview

3.3.3 Observations

Throughout the project, the researchers were stationed at company X for five months. Spending time at the main case company was beneficial since observations in terms of supervision meetings, daily conversations and other informal occurrences could be conducted. Observations were conducted with the purpose to get an understanding of company X's organisation and how sustainability practises were transferred throughout the organisation. In

order to capture the data derived from these informal observations, notes were taken either during or after new insights been identified.

3.3.4 Questionnaire

In addition to the above-mentioned data collection method, a questionnaire was used in order to investigate the issue of unsustainable supply chains in other industries besides the automotive industry. More specifically, the tool was used to gather valuable data on how OEMs manage sustainability beyond tier one and complemented the empirical findings derived from external interviews. The questionnaire was sent to companies being part of a cross border cooperation in which MT-SSCM related questions are discussed. The questions were mostly open ended to encourage own explanation. However, the questions were formulated and contextualised in order to simplify the respondents reasoning and make it easier to later analyse the data (Roberts et al., 2014).

Easterby-Smith et al. (2015) argue that questions in a questionnaire can be interpreted differently by the respondents and the one writing the questions, mainly due to lack of physical interaction. For that reason, the questions were co-created together with an expert on questionnaires and iterated several times. In addition, the questionnaire was tried out by a test-subject before officially being sent to the respondents with the purpose to prevent any potential misunderstanding. Moreover, the questions were developed with respect to the theoretical framework in order to easily categorise the data and further put it into context. Furthermore, the questionnaire content was connected to same theories as the interview questions which according to Easterby-Smith et al. (2015) are beneficial for comparing data.

The coordinator of the cross-border cooperation did send out the questionnaire to the group members. All respondents got the same email with a short background of the research problem and a description of the purpose with the questionnaire. Further, a hyperlink leading to the questionnaire was attached in the email. The questionnaire was sent to in total 16 company representatives. Out of these 16 potential responses, 12 representatives answered the questionnaire whereas 8 fully completed the questionnaire and thus 8 usable answers. Hence, the response rate was 50% which according to the questionnaire expert was considered as a good response rate for this kind of questionnaires. A description of the questionnaire respondents is shown in table 3.

Table 3. Questionnaire respondents

Company	Industry	Type
Q1	Manufacturing	Questionnaire
Q2	Other	Questionnaire
Q3	Manufacturing	Questionnaire
Q4	Other	Questionnaire
Q5	Financial and insurance services	Questionnaire
Q6	Conglomerate	Questionnaire
Q7	Other	Questionnaire
Q8	Healthcare	Questionnaire

3.3.5 Internal documents

Throughout the data collection process, documents such as Code of Conducts and sustainability reports from participating companies were used to verify data collected from interviews. In addition, documents from the internal case company about identified risk countries were used. Moreover, the documents were utilised to understand data that are too complex and detailed to be discussed during an interview. The document with identified risk countries was received from the supervisor at company X, the sustainability reports and Code of Conducts were collected from the different companies' websites. Further, these documents have been referred to as "Company document" with the purpose to uphold the anonymity of the concerned companies.

3.4 Data analysis

Throughout the interview process, all interviews were recorded and transcribed. Important content in the transcribed text was further highlighted in order simplify the process of transforming the raw data into empirical findings. Once data from the transcriptions was transformed to either descriptive text or direct quotes, the respective parts were colour coded indicating how it had been used. Thus, preventing the same data to be used multiple times as well as visualising excluded parts. In addition, this approach did function as a communication system between the authors and did contribute to a more holistic utilisation of derived data. Following, the data analysis was structured around the predefined research questions.

The empirical findings were presented in a mix of tables and descriptive text. The tables were structured in different themes and sub-themes using an open coding approach analysing the data bottom-up, meaning that meaningful concepts were identified from the data and not determined beforehand (Ellram & Tate, 2015). Some parts of the empirical findings were presented in descriptive text due to the comprehensive descriptions behind the answers that otherwise would be neglected in a table. This neglecting downside is further acknowledged by

Bryman & Bell (2015) arguing that coding does not encompass the context around the finding. On the other hand, coding is beneficial for clustering the data and visualising common subjects. This was done by including the number of respondents expressing the same opinions and experiences. The implications of coding were carefully considered beforehand in order to present the data in the most suitable form. In addition, the transcriptions of the interviews and other sources of data were reviewed and analysed numerous of times and the empirical findings was further developed using an iterative process.

As previously mentioned, the main body of data was derived from company X. Therefore, the main perspective when analysing data has been based on company X's situation where the other companies' input has been managed as benchmarking, validating and comparative potential. However, due to the common nature of MT-SSCM, several findings were analysed indifferent of its origin.

Besides the interviews, the questionnaires constitute a complementary part of the data collection. The answers derived from the questionnaire were analysed in an inductive manner as suggested by Bryman & Bell (2015) meaning that the researchers were looking for patterns when analysing the data. However, the questionnaires did not significantly contribute to new data but did add value by validating the current strategies and main challenges.

3.5 Research quality

When appraising the quality of a study, validity and reliability are crucial aspects to consider (Bryman & Bell, 2015). Validity and reliability have thus been considered when designing research methods in order to achieve high quality. Ethics is also important to consider and is discussed below together with the validity and reliability.

3.5.1 Validity

According to Bryman & Bell (2015), validity is assessed on the researchers' compliance of investigating what they actually say that they are investigating. Bryman & Bell (2015) further argues that both internal and external validity must be taken into consideration whereas internal refers to whether the conclusions made are reasonable or not and external refers to whether findings can be generalised or not. In order to improve the internal validity, triangulation has been used which is a method where the authors use more than one source of data for the same question (Jick, 1979). In this research, interviews have been complemented by documents such as Code of Conducts and sustainability reports to increase the internal validity. The findings derived from interviews were discussed with either the supervisor from Chalmers of from company X, this in order to confirm that reasonable conclusions were made which according to Ellram & Tate (2015) increases the internal validity. In addition, interviews have been performed at different departments at company X increasing the validation of the data gathered.

Throughout the process, several companies have been used which according to Bryman & Bell (2015) generates high validity since the findings can be generalised. Eight interviews were

conducted at the internal case company which according to Ellram & Tate (2015) increases the ability achieve general findings. However, only one interview was conducted at each of the external companies making these responses less generalisable. The problem investigated in this study is not unique for a single company or industry since several industries are facing the same challenge of unsustainable supply chains (Tachizawa & Wong, 2014), making the thesis' findings and conclusion relevant and applicable for various industries. Therefore, this thesis can arguably be considered to have high external validity. However, Hallórsson & Aastrup (2003) argue that transferring best practices from one context to another with different conditions implies risks of inadequate transferability.

3.5.2 Reliability

Reliability can also be categorised as either external or internal. External reliability refers to whether the study can be replicated or not whereas high external reliability indicates that the study could be replicated with the same result (Bryman & Bell, 2015). Continuing, the authors argue that external reliability is difficult to achieve since social constellations are not replicable. This implication must be further considered when discussing the reliability of this study as the findings are highly dependent on the interview settings. In addition, this thesis revolves around open ended questions with several potential solutions. By providing interview guides and a description of the research process, the research can to some extent be replicated with similar outcome and thus increases the external reliability (Ellram & Tate, 2015). Furthermore, internal reliability refers to whether different researchers have perceived the data from e.g. interviews and observations in the same way (Bryman & Bell, 2015). In order to prevent any potential misunderstandings during the interviews, both researchers did attend on all interviews. Further, to ensure the internal reliability, all interviews were recorded and transcribed to support objective interpretation of the data. As previously mentioned, the questions in the questionnaire was co-created together with an expert on questionnaires and later tested by a test subject to prevent any misunderstandings by either the researchers or the respondents. Thus, increasing the internal reliability of the questionnaire.

3.5.3 Ethics

Ethics is an essential aspect to consider when conducting a study, both with respect to the persons participating in the study and in regard to the outcome of the paper (Bryman & Bell, 2015). Before all interviews, the respondents were informed about the purpose of the study and its intended outcome. Regardless that the interview questions were considered as non-sensitive, the respondents were informed that he/she was allowed to avoid question or finish the interview, especially if any information were to be confidential.

The study was also performed according the General Data Protection Regulation (GDPR), meaning that the identities of respondents and companies were protected (EU GDPR, n.d.). No other information that could connect the data with the respondents was published. Following, the outcome of the study was considered as ethical since its purpose is to foster sustainability in the supply chain.

4. Empirical findings

This chapter presents the empirical findings based on the data received from interviews, observations, internal documents and the questionnaire. Further, the empirical findings are structured around the research questions and will start with describing several OEMs current practices and related challenges. Following differences between the study's case companies are highlighted and illustrated. Lastly, expressed improvement suggestions are presented.

4.1 Strategies

The following section covers the current MT-SSCM strategies and practises adopted by the investigated case companies. Thereby, findings identified in the automotive, furniture, manufacturing and apparel industry are presented along with a brief description of the questionnaire respondents' practices. More specifically, the focus is to describe the approaches used by companies for managing sustainability upstream the supply chain.

4.1.1 Company X

Starting off with company X, serving as the main case company of this thesis, sustainability is generally managed using an indirect approach. With the indirect approach the company's sustainability requirements are diffused in the supply chain through tier one suppliers, thereby being responsible for managing sub-suppliers. In practice, this is accomplished by requirements and aspirations stated in the Code of Conduct. Consequently, suppliers are obligated to cascade requirements and ensure compliance of their direct suppliers, i.e. company X's tier two suppliers (Company document 1, 2019). In addition, the Code of Conduct encourages suppliers to reach beyond its direct suppliers and manage sub-suppliers further upstream in the supply chain as well. Thus, requirements and agreements in the Code of Conduct are expressed to have been developed with the purpose to prevent the need of controlling tier one and two suppliers.

Before being able to enter a contractual agreement, direct suppliers ought to fill out a self-assessment questionnaire (SAQ) developed by a third party automotive industrial initiative with the objective to promote sustainability with common requirements. The questionnaire includes several questions regarding sustainability, some functioning as stopping parameters if not fulfilled. Thereby, the standardised form used by many OEMs in the automotive industry creates a joint pressure on sub-suppliers. In addition, company X use the SAQ to verify compliance of their Code of Conduct together with potential on site audits. The third party automotive industrial initiative has also developed common capacity building activities, including trainings and other supportive activities with the purpose to develop suppliers.

Although the main MT-SSCM approach used by company X is characterised by an indirect strategy, supply chains subject to high risk are sometimes handled differently. In these instances, a direct approach is observed to occur by writing contractual agreements with sub-suppliers. However, direct relationships can be formed due to other reasons than sustainability e.g. quality. For direct suppliers' subject to extensive risk, audits are conducted to assess their

practices and compliance to the Code of Conduct. In order visualise risk and facilitate the identification of high-risk suppliers, company X utilise risk maps in which countries are categorised with respect to social and environmental risk (Company document 2, 2018). Hence, adopting a direct approach is based on a risk assessment and is done in exceptional situations, whereas cascading tier by tier is the norm. Company X is currently experiencing some difficulties of knowing whether or not tier one cascade requirements further upstream and does not have any method to follow up this matter, except for directly asking first-tier supplier.

"What we have noticed is that our current approach is not the way to go, that the requirements tend to stop at tier one, but we are working on changing that. There is a difference between having requirements and actually controlling them" – X1b

Besides emphasising the Code of Conduct with well formulated and explicit requirements, company X value a close collaboration with tier one suppliers. Since the main strategy is highly dependent on direct suppliers, it is expressed to be of great importance to establish a strong relationship including mutual trust with these suppliers. For that reason, company X evaluate their suppliers in nine categories whereas collaboration is one category, the purpose of this evaluation is to develop the suppliers in different aspects including sustainability.

4.1.2 Company U

Similar to company X, company U is operating in the automotive industry and does also use an indirect strategy as their main MT-SSCM approach. Moreover, the company is part of the same automotive industrial initiative and therefore uses the same SAQ for an initial evaluation of potential suppliers. Furthermore, the same capacity building activities to develop suppliers are used and coordinated by the same third-party initiative. According to company U's Code of Conduct, suppliers as well as their direct suppliers are obligated to comply with the guidelines and uphold similar principles (Company document 3, 2016).

Sub-suppliers responsible for critical components are seen to be managed with a direct strategy. For these instances it is common that contractual relationships are established between company U and the critical sub-supplier. Furthermore, when sourcing critical materials of extensive risk, such as conflict minerals, the company is in the middle of developing another critical strategy in which the supply chain is "built up" from the supplier of raw material. Within this strategy, the company has together with a third party performed on site audits at different mines and selected raw material suppliers with accepted sustainability practises to work with. Following, contracts are to be developed that gives company U the right to decide the origin of raw material. Hence, the entire supply chain would need to comply with this added contractual section in order for the build-up strategy to succeed. Instead of managing sustainability upstream step by step, this approach aims to ensure sustainability from the raw material where great risk usually exist. However, this critical approach requires a lot of resources and is thereby not applicable for all supply chains. The build-up MT-SSCM strategy is further illustrated in figure 8.

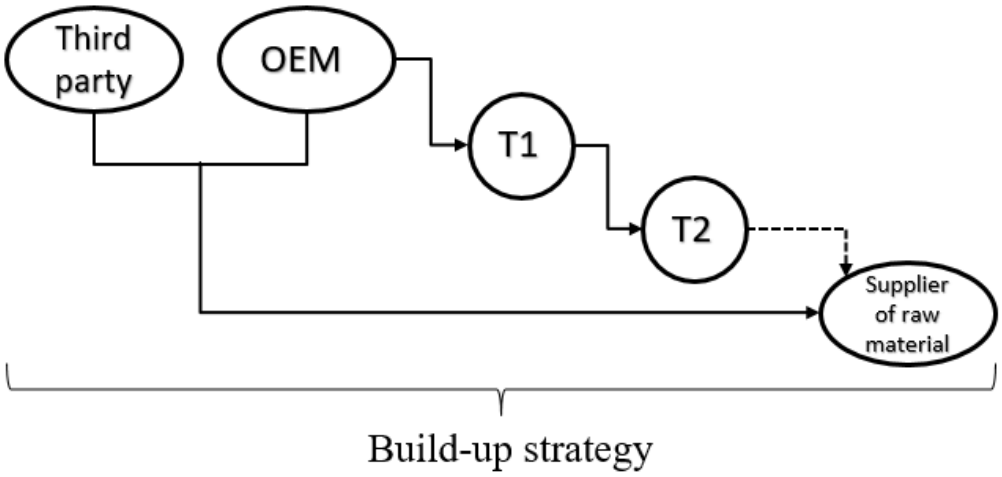

Figure 8. Build-up strategy for managing high risk supply chains

After all, company U's main strategy for managing sustainability in the supply chain is an indirect approach where tier one suppliers are responsible for cascading upstream. Within this approach, performance and compliance are assessed by audits at selected direct suppliers. This selection is further determined based on risk. Company U does not have any particular method for evaluating direct suppliers cascading efforts and does not have any interaction with non-contractual sub-suppliers. However, if they were to get in contact with sub-suppliers, tier one suppliers would be involved.

"*It is important for us to not bypass tier one. There have been discussions on whether to approach sub-suppliers directly or not, but we believe that doing so would harm our relationship with our direct supplier since they might feel bypassed" - U*

Thus, close collaboration with tier one suppliers is one important success factor emphasised by the company for their described MT-SSCM strategy. In addition, company U expresses the advantage of selecting and collaborating with actors having good insight of firms involved in the supply chain, and further creating long-term relationships with these actors.

4.1.3 Company V

Operating in the furniture industry, company V has in line with the above mentioned companies adopted an indirect MT-SSCM approach as their main strategy. With the indirect approach follows the direct suppliers' obligation to cascade requirements upstream in the supply chain. In more detail the Code of Conduct require that tier one suppliers shall communicate the requirements to all its direct suppliers and must verify compliance of those direct suppliers concerned to be critical (Company document 4, 2012).

With the purpose to control whether direct suppliers comply with basic requirements, company V conduct an initial audit before signing a contract. During the audit, a four-degree scale is

used to examine how well the supplier meets the requirements. A second audit is further conducted twelve months after the initial audit in which the supplier shall show that they meet all requirements in line with the agreements. In order to identify sub-suppliers, company V uses a mapping tool where tier one suppliers are expected to disclose their suppliers with information regarding e.g. how often they are used. The respondent however argue that the lack of contractual relationships makes it difficult to set requirements, further described in the following quotation:

"Any contact with sub-supplier does always involve our tier one supplier. This since our toer one suppliers are more capable to influence and put requirements on our sub-suppliers due to their contractual relationship" - V

Sub-suppliers assessed as highly critical are sometimes audited directly by company V. Hence, a direct strategy is utilised for sub-suppliers subject to extensive risk. Despite auditing of sub-suppliers being a strategy used for exceptions, the company emphasise its effectiveness for managing sustainability upstream the supply chain. Therefore, an expressed aspiration from the respondent was to increase the number of conducted audits both at tier one and tier two suppliers. However, due to limitations in terms of resources, this is difficult to achieve and the indirect strategy will continue to be the main approach.

4.1.4 Company Y

Company Y operates in the manufacturing industry and relies on direct suppliers to cascade sustainability requirements in the supply chain, i.e. an indirect strategy is being used. This is further managed by stating in the Code of Conduct that suppliers and sub-suppliers are expected to comply with their requirements (Company document 5, 2010). However, before signing any contractual agreements, suppliers need to develop an action plan for how to fulfil uncompleted requirements. The indirect strategy used by company Y are to a large extent similar to the indirect approach used by the above-mentioned companies, the main difference is how they work with action plans. Based upon risk, suppliers with a contractual relationship are audited and evaluated on a four-degree scale with the intention to develop suppliers. A follow-up audit is conducted 6-8 months after the first one where corrective action are expected for a continuous relationship. Furthermore, supplier development is highly emphasised by company Y, further described in the following quote:

"The purpose with controlling activities is not to find problems, the purpose is to make suppliers take care of problems and develop an action plan" - Y

As previously mentioned, company Y's main strategy implies relying on direct suppliers to cascade requirements upstream since contracts with sub-suppliers only are established for those regarded as critical. For instance, steel is excessively used in company Y's products which makes it important that the steel is produced in a sustainable way. For that reason, company Y establishes contractual relationships with accepted steel suppliers that tier one suppliers are supposed to buy from. Direct supplier thereby gets a sort of approved vendor list to use.

Moreover, with the purpose to influence sub-suppliers company Y are engaged in various country and industrial initiatives. For instance, the company has recently been part of a country initiative in India focusing on improving sustainability in scrap yards. More specifically this implies giving support and helping companies on how to work despite not having a commercial connection.

Company Y provides some of their suppliers with online trainings in order to increase their knowledge and thus improve sustainability in the supply chain. However, the respondent stressed that physical audits are more efficient, although more resource demanding in terms of time and resources.

4.1.5 Company Z

Company Z operates in the apparel industry and mainly use an indirect MT-SSCM strategy where direct suppliers are expected cascade requirements upstream in the supply chain (Company document 6, 2018). In order to control the compliance of these requirements, audits are conducted at tier one suppliers. Moreover, action plans are jointly developed together with the supplier for the purpose to improve environmental and social conditions in conjunction with the audits.

Unless supply chains are subjected to excessive risk, the company does not have the possibility to follow up if the requirements are passed on successfully to sub-suppliers. Since ensuring sustainability is resource demanding, company Z utilise risk categories to determine if they should get directly involved with sub-suppliers or not. Thus, a direct MT-SSCM strategy is used for critical suppliers. In the future, the ambition is to extend this strategy further and be able to collaborate with raw material suppliers to secure sustainability at the start of supply chains.

To overcome the difficulty of managing sub-suppliers, company Z seems to be emphasising development of their direct suppliers' capacity and sustainability performance. This is done by providing trainings to selected first tier suppliers, either physically or online. Supplier development is further emphasised since it is supposed to improve management of sub-supplier and thereby foster sustainability further upstream in the supply chain. However, this complementary strategy is resource intensive and therefore preferable as a strategy for companies with a small supplier base. The usefulness of capacity building is further discussed below.

"We make sure that our sustainability requirements not only are agreed upon but also complied with. In addition, we strive to increase the sustainability capacity at tier one implying that we do not settle with legislations but instead support suppliers in improving their sustainability practices" - Z

In addition, the interviewee at company Z highlights the importance of industrial initiatives and argue that the textile industry has made big progresses within sustainability due to its

engagement in several collaborations with different industry actors such as competitors, NGOs and suppliers. For instance, they are part of a big textile initiative managed by a third party that promotes diffusion of common requirements in the industry. The interviewee further argues the importance of industrial initiatives and the challenges that exist in both the textile industry and other industries:

"One single actor cannot influence an entire industry to work sustainable, a collective pressure is therefore needed. However, this implies a paradigm shift in which competitors are open to cooperate with each other. Additionally, when creating collaborative initiatives, it is important to use an inclusive approach allowing large as well as small companies to participate". - Z

4.1.6 Summary of strategies adopted

The companies' respective practises are in this section summarised and categorised by their current strategies and factors being emphasised, see table 4. All companies are seen to use a combination of different strategies which is further divided into main-, complementary- and critical strategy. This in order to more easily be able to distinguish in which situation the different strategies are used. Moreover, the various factors being emphasised by the companies are presented in the right column. In the section above, companies' strategies are presented in a descriptive and informative case study manner whereas this following section will present the findings in a more cross-case analysis structure. The reason for this is to be able to identify trends, similarities and differences needed to fulfil this paper's purpose of finding new solutions that enables companies to ensure sustainability beyond tier one.

Table 4. Summary of case companies' current strategies and emphasised factors

Company	Current strategy	Emphasised factors
X	**Main strategy**: Indirect **Complementary strategy**: Industrial initiatives (third party) **Critical strategy**: Direct approach by contractual agreement with sub-suppliers	- Explicitly stating cascading requirements in Code of Conduct - Collaboration with tier one suppliers to manage sub-suppliers
U	**Main strategy:** Indirect **Complementary strategy:** Industrial initiatives (third party) **Critical strategy:** Direct approach by contractual agreement with sub-suppliers and are developing a build-up strategy	- Establishing long-term relationships - Collaboration with tier one suppliers to manage sub-suppliers
V	**Main strategy:** Indirect **Complementary strategy:** Cross industrial initiatives (third party) **Critical strategy:** Direct contact by auditing sub-suppliers	- Increase number of audits at tier one and tier two suppliers

Y	**Main strategy:** Indirect **Complementary strategy:** Country initiatives (third party) **Critical strategy:** Direct approach by contractual agreement of sub-suppliers	- Supplier development - Country initiatives
Z	**Main strategy:** Indirect **Complementary strategy:** Industrial initiatives (third party) **Critical strategy:** Direct approaching sub-suppliers	- Industrial initiatives - Supplier development

By analysing current strategies in the various industries, it becomes clear that companies tend to manage sustainability in the supply chain using similar approaches. For business as usual, sub-suppliers are managed with an indirect approach where sustainability is cascaded upstream. Complementary to the main strategy, third party initiatives appeared to be used in various forms. Lastly, a direct approach is commonly used for high risk sub-suppliers. Although the current strategies are found to be more or less the same, the case companies are found to focus on different aspects in order to accomplish high level of sustainability in supply chains.

In addition to the input from the five case companies, answers from eight additional companies was provided from the questionnaire. From this, information about main strategies and their contact with sub-suppliers are summarised in table 5 below. As can be seen in the table, the indirect strategy is the most common strategy. One distinction is however that only three out of eight companies uses a direct approach towards sub-suppliers connected to high risk.

Table 5. Current practices of questionnaire respondents

Company	Main strategy	Contact with sub-suppliers
Q1	Indirect	Yes, when connected to high risk
Q2	Indirect	No
Q3	Indirect	No, due to lack of resources
Q4	Don't bother	No, due to lack of resources
Q5	Indirect	No
Q6	Indirect	Yes, when connected to high risk
Q7	Indirect	Yes, when connected to high risk
Q8	Indirect	No

4.2 Challenges with managing sub-suppliers

During the interviews with the investigated companies, several challenges with managing sustainability in supply chains were described. These findings have further been categorised into different themes and sub-themes along with some descriptions or explanatory quotes, see table 6. The respective respondent or respondents who expressed the challenges is found in the right column. For statements expressed by one single respondent, illustrative quotes are used and further written in italics.

Table 6. MT-SSCM challenges

Theme	Sub-Theme	Illustrative quotes and data	Respondent
Regulations	National regulations are not followed	Countries around the world have different regulations on sustainability which are often included in contractual agreements. However, some countries' inadequate control of its own national legislations can result in companies ignoring these.	Y, Z
	Less restrictive regulation in risk countries	Some countries have less restrictive regulations than others. Therefore, companies can follow the legal regulations but still have mediocre sustainability procedures.	X(1b), Y
	Fake certificates	When suppliers experience high pressure of possessing specific certificates, the use of fake certificates increases. In some countries, such as China this has become a common problem.	X(6), Y, Z
Inconsistency	Code of Conduct not applicable for all suppliers	The requirements stated in the Code of Conduct are not always applicable for e.g. small suppliers. Without making any adjustments for these suppliers it is difficult to achieve full compliance.	V, X(2, 4)
	Conflicting requirements	A common challenge is that suppliers have many different customers with conflicting requirements making it difficult for suppliers to comply with all of them.	U, X(2)
	Uncompleted cascading	Many OEMs cascades requirements through tier one suppliers with an indirect approach. However, audits have shown that many sub-suppliers are not aware of the requirements even though tier one supplier claims that they have cascaded them.	U, X(1b)
Organisation structure	Decentralised structure	*"Companies structured in a decentralised way are efficient from a business perspective. Company X is decentralised*	X(2)

		which is efficient from a financial perspective. However using this structure is inefficient for non-profit activities such as sustainability".	
Traceability	Dynamic supply chains	A great challenge of mapping supply chains is that they continuously change as suppliers frequently are included and excluded.	U, V, X
	Lack of tools	There is an expressed need for a tool that can be used for reaching entire supply chains. Since it is more like a supply network beyond tier one, with a large number of firms, you would need a tool capable of navigating through its complicated connections.	X(2, 3, 5), Y, Z,
	Suppliers unwillingness to disclose suppliers	Suppliers might be unwilling to disclose their suppliers due to a number of factors, but it is typically related to competition, fear of finding something they are not aware of, fear of being bypassed or that they simply do not know all of their suppliers. According to company XS, sub-supplier information is only provided to critical suppliers.	U, X(2, 4, 6), XS
Lack of resources	Resource demanding to conduct audits	It is resource demanding to conduct audits on suppliers, and therefore only suppliers of certain risk are audited. This does also hinder audits on sub-suppliers.	V, X(5, 6), Y
	Expensive to get certifications	Many companies require that their suppliers shall possess certain certifications. It is however expensive to get these certifications and small companies may not have enough resources despite having acceptable practises.	X(3,4)
Sustainability not in focus	Price focus	As purchasers' performance mainly are based on an economical perspective, there could be low incentives to choose the most sustainable supplier if it will negatively affect the purchaser.	X(1a, 3)
	Recession	*"In bad times, financially speaking, focus will not be on sustainability questions as we will adapt a more survival approach. Therefore, it is important to invest in sustainability during good times".*	X(5)
Power asymmetries	Order size	When being a customer with small orders it is difficult to influence suppliers and set requirements. The supplier will instead prioritise requirements from bigger customers and does not care if their noncompliance implies losing small orders.	X(3, 4, 5, 6), Y

	Low influence on sub-suppliers	There could be very few incentives for sub-suppliers to change their practise as focal firms do not have any direct impact on their profit or business model. In addition, this makes it difficult to receive information from sub-suppliers.	U, V, X(4)
	Crucial suppliers	Having one supplier for one component makes it difficult to change supplier even though they do not comply with requirements. In addition, it can be difficult to phase out supplier due to the need for spare parts.	X(3,5)
Risk management	Wrong focus when cascading	*"Many companies main concerned is to legally cascade requirement to their direct suppliers. They basically feel satisfied with a paper saying that the supplier commits on being responsible for supply chain practises rather than ensuring sustainability in the best way".*	Y
	Responsibility	*"Usually we do not have contractual agreements with suppliers beyond tier one since it puts us in an unfavourable position economically speaking and also makes us responsible for potential unsustainable practice".*	U
	Low risk for suppliers	Big companies are usually rather simple to involve in sustainability improvements since they have their own company to protect. However, it can be more difficult to incite small companies that are less publicly exposed.	V, X (1a, 3)

Most of the challenges expressed by a respondent was confirmed by additional respondents operating in another industry, indicating that the challenges to a large extent can be generalised. The factors preventing one company to reach further in the supply chain can therefore be expected to be experienced by other companies as well. Processing all of the above described challenges would be too comprehensive, and their respective significance needed to be assessed in order to identify the main challenges in line with the paper's purpose.

The challenges connected to regulations appears to be related to certain geographical areas subject to high risk, which companies are aware of and visualise with risk maps. Since companies already consider this challenge, it will not be regarded as a main challenge in this thesis. Challenges related to inconsistency on the other hand, especially regarding uncompleted cascading could be regarded to be of high significance. As cascading is a central part of the indirect strategy, after all being the main strategy of the case companies, the reasons behind its failure are important to overcome. Thus, uncompleted cascading can be regarded to be a main

challenge preventing management of sub-suppliers further upstream in supply chains. The challenge of having a decentralised structure will not be further investigated due to its major scope. Many of the respondents found activities related to traceability as difficult, including identifying and mapping supply chains. If supply chain members are not known, OEMs ability to influence and manage sub-supplier further upstream are limited. Therefore, traceability is another main challenge that will be further investigated.

Continuing to assess the identified challenges, lack of resources is a big issue but arguably a limitation that companies need to accept. For instance, auditing and managing sub-suppliers are resource demanding and cannot be done for more than a selected number of firms. Lacking resources will therefore not be considered as a main challenge in this thesis. Considering the challenge of organisations not having sustainability as a central focus, this is a big problem especially concerning purchasers' evaluations based on cost savings. However, this difficulty will not be considered as a main challenge due to being related to overall organisational strategy rather than the sustainability strategy and thus outside the scope of this thesis. Power asymmetries experienced in supply chains are expressed to be a troublesome due to OEMs' limited negotiating power towards sub-suppliers. Without solutions that overcomes these power asymmetries, management of sub-suppliers becomes challenging, thus this appears to be another main challenge. Finally, the challenges connected to risk management are important to consider when deciding what strategy to use. However, risk management is already shown to be considered by the case companies when choosing strategy and will therefore not be treated as a main challenge.

4.2.1 Questionnaire respondents' rankings of challenges

In addition to the above mentioned challenges, additional information on challenges was derived from the questionnaire answers. The respondents received a list of nine challenges and were supposed to rank the challenges from biggest to smallest. Table 7 illustrates the results where number one is equal with the biggest challenge.

Table 7. Ranking of MT-SSCM challenges

Ranking	Challenge
1	Difficulty in identifying and mapping actors involved in the supply chain
2	Difficulty in controlling that suppliers comply with sustainability requirements
3	Not receiving enough information from suppliers and sub-suppliers
4	Suppliers are located in countries with less demanding regulations
5	Power asymmetries within the supply chain
6	Lack of capabilities by supplier and sub-suppliers to act sustainable
7	Lack of long-term relationships
8	Lack of willingness from direct suppliers to act sustainable
9	Lack of trust between you and your suppliers/sub-suppliers

From the questionnaire responses it was found that the main challenge appears to be connected to traceability followed by compliance validation and information sharing. Combined with the findings derived from interviews, the ranking of challenges validates that both traceability and uncompleted cascading can be regarded as main challenges for MT-SSCM. Power asymmetries in the supply chain was ranked as number five and will still be regarded as a main challenge since this also can be a reason for lack of information sharing, above ranked as number three.

4.3 Tools

In table 8, the various tools currently used for managing sustainability in the supply chain are presented following the same structure as table 6.

Table 8. MT-SSCM tools

Theme	Sub-Theme	Illustrative quotes and data	Respondent
Management tools	Code of conduct	Code of Conducts are designed and developed with the intended purpose to facilitate the indirect management of sub-suppliers.	U, V, X(3), Y, Z
	Purchasing system	*"Our current purchasing system provides information on tier one suppliers. However, available information on sub-supplier is missing in the current system".*	X(1a)
	Approved vendor list	A list of approved sub-suppliers that direct suppliers are required to use.	Q(4, 7)
	Certificates	Relying on certificates, e.g. ISO certificates are an useful and simple way to ensure sustainability at suppliers and sub-suppliers.	X(2, 6), Y, Z
Evaluation tools	Self-assessment questionnaire	Purchasers use self-assessment questionnaires (SAQ) as a base for selecting suppliers. Several questions are included in the SAQ whereas some functioning as stopping parameters.	U, X(1a, 1b)
	Audits	Audits are an effective way to assess suppliers' and sub-suppliers' compliance of sustainability practices. The audits can be performed by either the buyer itself or by a third party.	Q(1, 3, 5, 6, 7, 8), U, V, X(1-7),Y, Z
	CSR Ratings	CSR ratings are used for evaluating supplier's performance in corporate social responsibility.	Q(3, 7)
Trainings	Third party trainings	*"By assigning trainings of suppliers to third parties, the buyer does not need to acquire competence for conducting the audits. It is*	X(3)

		therefore resource efficient to assign the trainings to a third party"	
	Public training sessions	*"Another way is to identify who your extended suppliers are and visit them. It does not have to be through an audit, it can be by training sessions or you can organise an event for companies in a certain area with seminars and trainings that are free to join".*	X(2)
	Reducing ignorance	Bad working conditions are often due to ignorance. Providing informative trainings could be done as a mean to improve poor working conditions.	Y, Z
	Number of participants	*"An experienced issue with trainings provided by our customers are the limited number employees it will reach. Trainings are often provided to our quality or sustainability departments and not to the workers that are in most need for it".*	XS
Online tools	Applications	*"The issue has been that the average knowledge of our targeted suppliers has been quite high, the tool was focused on workers with low knowledge and thus not developing for our suppliers. However, we see a big potential in the application, especially for areas where the knowledge level is low".*	Z
	Trainings	*"We provide online trainings to several suppliers in which we go through our Code of Conduct and ask the suppliers to make an evaluation of their compliance of the requirements. Further, we discuss the result along with some improvement suggestions".*	Y
Initiatives	Industrial	Industrial initiatives are beneficial for the purpose of setting industry standards by e.g. agree upon a common SAQ. However, in some industries such arrangements can difficult to accomplish due to competition.	Q(8), U, X(1b, 6), Z,

Several different tools are found to be used for managing sustainability in supply chains. Code of Conducts are a central tool used by all five case companies and important for the indirect diffusion of requirements. In addition, audits, trainings and initiatives are found to be commonly used tools for managing sustainability in supply chains. However, from the challenges found in table 6, there is an expressed need for new tools in order to improve management of sub-supplier. Hence, the current tools do not fully encompass the complexity of today's supply chains and some potential improvement suggestions for this matter are later described in table 9.

4.4 Comparison of MT-SSCM practices

It appears that all invested case companies in this study use the same main MT-SSCM strategy and overall similar approaches. However, somewhat differing are their focus, emphasised aspects and various level of commitment on activities performed to manage sustainability in supply chains. To further illustrate the differences and similarities amongst the case companies, figure 9 was created based on the insights derived from the data collection. In this table, the case companies' performances are assessed on four different MT-SSCM actions intended to foster sustainability at sub-suppliers. Further the performance is categorised, and colour coded in four different levels, from high to low.

The four sub-supplier management actions were selected since being central tools to the current strategy identified. Audits, industrial initiatives, Code of Conducts and capacity building activities, e.g. trainings, are provided by all five companies but differ in how they are being utilised. In other words, the case companies' current strategies for managing sustainability in supply chains are basically the same but their idea of how tools should be combined with the strategy varies. According to the "summary of the theoretical framework" the selected strategies will be combined with appropriate tools in order to achieve a high level of sustainability. Therefore, it becomes interesting to investigate how these four MT-SSCM actions differs and if they in some industries are utilised more successfully.

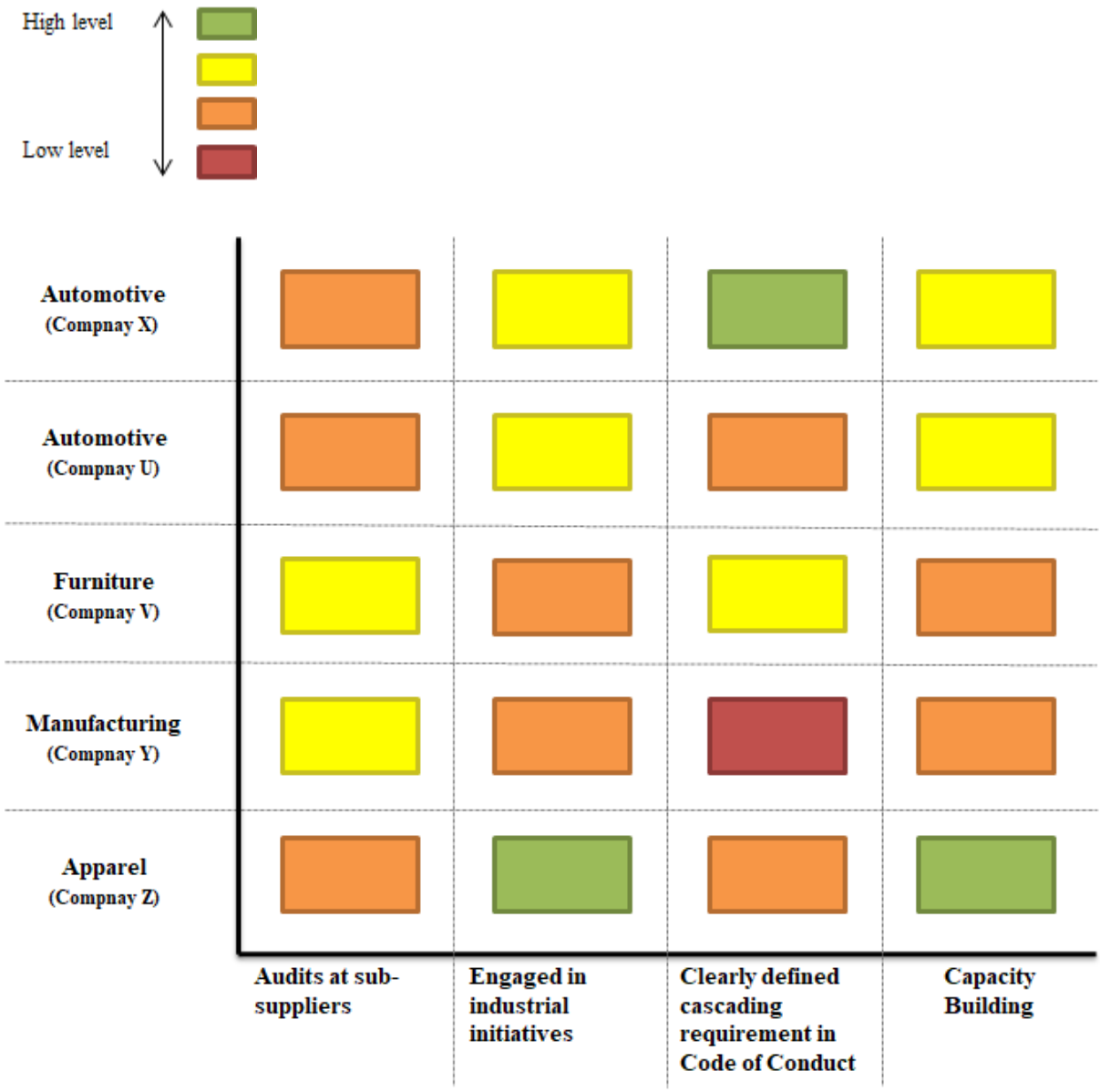

Figure 9. Comparison between the investigated industries in regards of MT-SSCM actions

In general, all five case companies put similar effort in auditing sub-suppliers. Since audits are considered as a resource demanding activity, this sort of assessment practise is typically limited to critical sub-supplier with an established contractual agreement. The reason for company V and company Y being evaluated with a higher performance is due to given extra attention to audits at sub-suppliers. For instance, company V's has an aspiration of increasing the number of audits at tier two. Moreover, company Y is already able to audit both tier one and tier two of their steel suppliers, which in turn are beneficial since being a critical component used excessively.

All of the companies were to some extent involved in industrial initiatives, often coordinated by third parties. Within the automotive industry such initiatives have provided the companies with a common SAQ that is promoting common standards. Moreover, company Z did perform

exceptionally well in this collaboration aspect and was estimated to have a high level of performance due to being part of several initiatives. What did also distinguish company Z from the rest was their focus on having an inclusive approach that enables more participants, in turn resulting in more value of the initiatives.

During the interview with company XS, the expressed challenge of conflicting requirements was dismissed. Instead, the supplier stated that their customers in the automotive industry did more or less have the same sustainability requirements stated in their Code of Conducts. However, from browsing the investing companies' respective Code of Conduct, it was noticed that some requirements did differ, especially concerning management of sub-suppliers. In fact, company X was the only company that explicitly stated that cascading requirement to the next tier in line was an obligation for all tier one suppliers. Thus, they were evaluated to have a high performance in this activity. Company V was also considered to perform quite well in this aspect but was somewhat less clear in their description compared to company X. This since only critical tier two supplier are needed to comply with the cascaded requirements.

In terms of capacity building, company Z was considered to be superior from the rest due to their great emphasis on developing direct suppliers. Company X and company U does also provide suppliers with capacity building activities such as trainings and network activities through their joint industrial initiative. However, from the interview conducted with company XS, the provided capacity activities were not considered to improve their capacity. Most likely this depends on company XS already being a well-developed supplier with high sustainability capabilities.

4.5 Improvement suggestions

Following the same structure as table 6 and 8, expressed suggestions for improving sustainability in supply chains are described in table 9 below. The improvement suggestions are a mixture of hypothetical ideas and already existing actions wished to be emphasised more.

Table 9. Improvement suggestions

Theme	Sub-Theme	Illustrative quotes and data	Respondent
New practices	Build up strategy	*"We are testing a strategy where we for critical products are auditing raw material producers together with a third party. Tier one suppliers are forced to use raw material that origin from the selected supplier(s) in their product. In that way, we can build up the supply chain from top to bottom".*	U
	Cascading certificate	*"By developing a new certificate acknowledging suppliers with accepted methods for cascading requirements to the next tier, I believe that the challenge of*	X(1a)

		lacking resources could be solved. Within such strategy a new certificate would need to be developed and authorised by a third party. This could be done with inspiration from a similar progress that quality assurance has been made the past years. The cascading certificate would investigate whether or not requirements are diffused successfully and by referring to the certificate, OEMs would no longer need to audit suppliers to the same extent".	
Collaboration	Cross industry collaboration	Cross industry collaboration is one good way forward to achieve sustainable supply chains.	X(2), Z
	Industrial initiatives	It is difficult for one single firm to make a difference, industrial initiatives are therefore important in order to create common standards and jointly influence suppliers' and sub-suppliers'.	U, X(6), Y, Z
	Inclusive approach	*"It is important to choose an inclusive approach for initiatives letting all companies, big as small, to participate".*	Z
	Collaboration with direct suppliers	Close collaboration between suppliers and OEMs is crucial to reach further in the supply chain. Especially for the process of identifying and mapping out involved actors. In addition, bypassing tier one suppliers can have negative effects. Contacts can be made with sub-suppliers, but tier one supplier is the one that set requirements on their direct suppliers.	U, V, X(1a, 5, 6)
	Collaboration with raw material supplier	*"I wish for more initiatives, both from the OEMs side and from the raw material side and that we for instance could agree upon a reasonable level of sustainability for different materials".*	U
	Collaboration between organisational departments	The requirements on suppliers are constantly increasing. Therefore, buyers have to share knowledge internally and develop a common strategy for how to improve suppliers' sustainability practices.	X(3, 5)
Use of third parties	Industrial initiative coordinators	*"Given the unnatural action of collaborating with competitors, third parties could be assigned to manage these initiatives as done in the automotive industry".*	X(2)
	Ad-hoc collaboration with NGOs	It is beneficial to use specialised NGOs as input when working with different areas e.g. children's rights. However, you cannot have several specialised NGOs as permanent members of collaborative initiatives, these	U, X(2)

		third parties should therefore be used on an ad-hoc basis.	
	Local partners	*"Let's say that no one in the organisation have knowledge about local realities in a critical area. NGOs with knowledge in that area can then be used as your eyes on the ground".*	X(2)
Supplier management	Capacity building	Investing in suppliers by providing trainings and other activities will improve their capabilities in e.g. cascading requirements and workers' rights.	U, X(1b), Z
	Development of suppliers	Besides identifying deviations and evaluate suppliers' performance, it is important to actively work with supplier development.	V, X (3, 5), Y, Z
	Encourage sustainability	*"By actively selecting suppliers working with sustainability, we can with small actions improve the sustainable climate in the supply chain."*	X(6)
	Actionable targets	KPIs and other sustainability targets are important for measuring improvements. These targets should further be used as a basis for actions.	X(2, 3), Y
	Prioritisation	Since audits are resource demanding, a risk assessment should be used for deciding suppliers that should be focused.	X (1a,1b, 2)
Internal communication	Communication between purchasers and sustainability managers	*"Purchasers are the person responsible for the choice of supplier. Therefore the internal communication between purchasers and sustainability managers becomes crucial. For instance, the purchaser has to know the relationship between price and sustainability when choosing suppliers."*	X(3)
	Management involvement	*"Corporate management must be engaged in sustainability questions and communicate the importance of sustainability throughout the organisation*"	X(3)
Organisational structure	Responsible sourcing	By including responsible sourcing in the purchasing department, responsible sourcing will be a part of the purchaser's daily work and thus in focus.	X(1b), Y
	Centralised purchasing department	*"We have a centralised purchasing department which facilitates a sustainable focus in all decisions".*	Y
	Integrated CSR strategy	*"Big companies need one integrated CSR strategy instead of every department having one by their own".*	X(2)

Map supply chains	Blockchain	Traceability is a common problem in order to manage sustainability throughout the supply chain. The blockchain technology is one possible solution for this problem, enabling companies to map supply chains and identify where issues arise. However, blockchain is not yet fully tested and it is currently discussed whether or not it is a sustainable solution since it requires a lot of energy.	X(2), Y, Z
	Chain of Custody	Chain of Custody is a new standard being developed with the purpose to increase sustainability by validating claims made about a certified product or process. The standard will also benefit traceability by documenting the organisations that take responsibility for the product during its process in the supply chain. By following a "mass balance principle" of certified material the standard can ensure that no more sustainable material can come out of the chain than what has been included. Such system has been successfully developed in the forest industry. The standard initially aims to harmonise different definitions and models used. Thus, it does not provide a specific solution on how sustainability is diffused in the supply chain.	N(1, 2), X(2)

Taking the above described improvement suggestion into consideration, there are several interesting solutions to discuss that might enable OEMs to manage sustainability further upstream in supply chains. In order to reach further upstream in the supply chain, a solution need to overcome some of the current identified challenges. The implications of new practises, involving build-up strategy and cascading certificate, would for instance be interesting to investigate in order to observe what challenges that would be improved together with the potential new challenges that would arise. Furthermore, new tools for improving traceability in the supply chains appears to be under development. However, both blockchain and Chain of Custody are complex tools that needs to be further investigated. Besides the new solutions, respondents did believe that management of sub-suppliers could be improved by doing more of the same, for instance increased collaboration and third-party initiatives. In addition, more support to tier one suppliers are believed to benefit sustainability further upstream along with improved internal communication and increased sustainability focus in the organisation.

5. Discussion

In the following chapter, the empirical findings are discussed together with the theoretical framework. Initially, what appears to be the common strategy is discussed together with the main challenges preventing OEMs from managing sustainability at sub-suppliers. Following, the differences between the case companies MT-SSCM practices and activities are discussed, from which potential benchmarking opportunities are identified. Lastly, various improvement suggestions and implications for the automotive industry are evaluated and discussed.

The empirical findings provided in the previous chapter are intended to add value to the existing literature on MT-SSCM by contributing with knowledge on current strategies, challenges and improvement suggestions. A discussion divided in three sub-chapters are therefore presented below, one for each research question. In the discussion, information from the theoretical framework are included to describe the findings, elaborate on the underlying reasons and support potential solutions. Serving as the thesis' main contributions, the discussion addresses the mix of strategies that constitutes a commonly used practise, the three main challenges preventing firms for managing sub-suppliers, benchmarking opportunities for reaching further and the implications for potential solutions.

5.1 Current practices and main challenges

It appears that companies in general use a combination of different MT-SSCM strategies and tools for managing sub-suppliers. The current practise can further be divided into three categories; main-, complementary- and critical strategy, whereas the indirect approach discussed by Tachizawa & Wong (2014), Mena et.al (2013) and Wilhelm et.al (2016b) serves as the main approach used for practice as usual. In this strategy, the Code of Conduct are for some companies an important tool for communicating how requirements ought to be cascaded. In addition to the indirect approach, various initiatives coordinated by third parties to facilitate collaboration (Lee, 2010) are often used as a complementary strategy. Notably, initiatives are seen to be used for purposes where one single firm's actions are not enough (Seuring & Gold, 2013) and the intention is to increase negotiating power (Tachizawa & Wong, 2014). Furthermore, direct approaching sub-suppliers is used as a critical strategy. Direct management of sub-suppliers increase the focal firm's level of control but does simultaneously require an increased amount of resource (Lee, 2010). This trade-off makes the direct strategy an approach used for particularly critical situations.

There are several challenges experienced when managing sustainability in supply chains. Arguably, a few of these challenges can be considered to be more important to focus on in order to reach further in the supply chain. First of all, central to the main indirect strategy is delegation of responsibility to direct suppliers and thus the activity of cascading (Tachizawa & Wong, 2014). Inevitably, this strategy's success is dependent on the actions performed by direct suppliers as well on sub-suppliers' response to these actions. The inconsistency challenge of uncompleted cascading can therefore be regarded as a main challenge. Suppliers fail in cascading requirements to sub-suppliers either because they adopt opportunistic behaviour

(Wilhelm et al., 2016a; Wiese and Toporowski, 2013) or simply because they lack skills and capabilities (Grimm et al., 2014). Furthermore, suppliers may lack the financial resources as controlling upper tiers are as much resource demanding for suppliers as it is for focal firms.

OEMs possibilities to manage sub-suppliers are limited by not knowing the involved members in a supply chain. Thereof, traceability can be regarded as another main challenge including the difficulty of identifying and mapping actors in the supply chain. Mapping the supply chain requires information from several tiers and from suppliers without any connection to the focal firm (Grimm et al, 2014). Therefore, disclosure of supplier can be challenging due to lack of incentives. Suppliers' fear of being bypassed is another explanation to unsuccessful mapping since withholding supplier information are perceived to increase bargaining power for many firms (Lee, 2010). Further, this belief could be a result of OEMs' failure of communicating the benefits of a transparent supply chain.

Management of sustainability in the supply chain is basically about influencing suppliers and sub-suppliers to adopt sustainable practices. However, in supply chains involving large power asymmetries this can be particularly challenging. For instance, there might be less incentives for a supplier to cascade requirements and accept initiatives driven by focal firms with less negotiating power than themselves. According to Tachizawa & Wong (2014) suppliers with high bargaining power should be approached with a don't bother or third party strategy. However, a don't bother approach is arguably not an actual MT-SSCM strategy since it does not attempt to reach beyond tier one and mainly focus on dyad relationships (Sauer & Seuring, 2018). Instead it is desirable to find solutions to overcome unfavourable negotiating situations and simultaneously have a focus going beyond dyadic relationships.

5.2 Differences and benchmarking opportunities

From analysing the different MT-SSCM practices used in the different industries, it becomes obvious that similar activities to a large extent are being used. Only slight differences are identified which in turn are connected to various levels of commitments of sub-supplier managerial activities, see chapter 4.4. For instance, company Z operating in the apparel industry is considered to be in the forefront regarding several MT-SSCM activities such as capacity building and industrial initiatives. A plausible explanation for this could be that the apparel industry has been negatively exposed to media over the years and thereby have been pressured to take proactive actions (Tachizawa & Wong, 2014). In terms of capacity building, including trainings and other supportive activities (Wilhelm et al., 2016a), company Z was considered to be superior from the rest. Unsustainable practices are in many instances due to suppliers' lack of knowledge and capabilities (Grimm et.al, 2014) which could be mitigated by OEMs investing in supplier development. Providing supportive activities does also foster collaboration in the supply chain by allocating sustainability efforts and responsibility across tiers (Wilhelm et al., 2016b). Thereby, emphasising capacity building activities could be regarded as a benchmarking opportunity for the automotive industry since their current practices could be improved.

Another distinction being experienced in the apparel industry is the large scale of third-party initiatives and its focus on inclusiveness. Third party initiatives are proven to increase OEMs bargaining power by adding a collective pressure towards suppliers (Tachizawa & Wong, 2014) which also was confirmed during interviews. In the automotive industry, the industrial initiatives have successfully resulted in common standards and tools such as the widely adopted SAQ. These current automotive collaborations might benefit from benchmarking the inclusive design seen in the apparel industry and thereby be able to increase the effectiveness of developed solutions. This since greater emphasis of inclusiveness could imply more initiative participants and more companies able to take part of the result.

Audits could be seen as another benchmarking opportunity for the automotive industry since companies in other industries to a greater extent are focusing on auditing sub-suppliers. However, the effectiveness of audits is critically discussed in the article by Locke (2007) where monitoring suppliers' level of compliance did not seem to notably improve the situation. In addition, Egels-Zandén & Lindholm (2015) did only find audits to have little positive effect. Thereby, one could argue that an increased focus on audits might not be a success factor for managing sustainability in the supply chain. By also considering the amount of resources required to conduct audits it could arguably be better to use these resources for alternative solutions.

Besides providing managerial guidelines for direct suppliers' sustainability practices (Egels-Zandén & Lindholm, 2015), Code of Conducts are for some companies seen as an important tool for indirect management of sub-suppliers, especially for company X. The various formulations of cascading requirements give rise to an interesting aspect to investigate. Since the usefulness of Code of Conducts has been criticised with respect to working conditions (Egels-Zandén & Lindholm, 2015), one could question whether or not this is an appropriate MT-SSCM tool to emphasise. However, previous literature has mainly focused on Code of Conducts in a dyadic perspective, meaning that it mainly has been a tool for managing direct supplier and thus neglected the potential sub-supplier management implications. Therefore, the explicitly written cascading requirement that some focal firm's use to diffuse sustainability upstream deserves further attention. Consequently, company X has developed a perspective of Code of Conducts that could be valuable for other companies to benchmark.

5.3 Improvement suggestions

Several improvement suggestions were provided for how OEMs could manage sustainability further upstream in supply chains. Arguably, effective MT-SSCM solutions need to resolve, or at least mitigate, some of the identified main challenges that currently prevents OEMs to influence sustainable behaviour in the supply chain. With this in mind, reasonable improvement suggestions should tackle the challenges of uncompleted cascading, traceability and/or power asymmetries. Therefore, the following sections will from an automotive industry perspective discuss some of the most promising improvement suggestions derived from the empirical findings. Although, due to the general nature of the problem the discussed suggestions will to a large extent be applicable for other industries as well.

Starting off, a new critical strategy referred to as build-up strategy was suggested for managing sustainability in high risk supply chains. Thus, this strategy is supposed to be used in combination with other strategies and only for exceptional situations. A build-up strategy is currently being developed for managing conflict minerals where it presumably will mitigate the experienced challenge of uncompleted cascading. This since a direct relationship is established with critical suppliers at the beginning of the supply chain which has shown to improve sustainability in real life cases such as Starbucks (Lee, 2010). Thereby, regardless of the level of cascading compliance the OEM can be certain of the raw materials origin. Of course, this does not ensure that requirements are fulfilled across the entire supply chain as intermediate members might not comply with the desired level of sustainability. However, it gives rise to a foundation for creating a sustainable supply chain that is managed from two fronts. Especially effective in situations where the raw material involves high risk (Tachizawa & Wong, 2014). Thereby, the challenge of uncompleted cascading becomes not really resolved but rather irrelevant in this new strategy.

Furthermore, suppliers' scepticism for revealing sub-suppliers (Lee, 2010) might reduce with a build-up strategy since the OEM's responsibility would be extended. Given a situation in which the raw material would be subject to a scandal it would arguably affect the focal firm negatively as they more or less have forced the supply chain members to use this supplier. Thus, traceability would improve but to the cost of increased responsibility and thereby greater legal risk. In addition, using a strategy where the supply chain is build-up is presumably extremely resource demanding considering that establishing a relation with raw material suppliers corresponds to a direct management of sub-suppliers (Tachizawa & Wong, 2014). Needless to say, it is not reasonable to use an excessive amount of resources to all supply chains and a prioritisation need to be made.

Developing a cascading certificate was another suggested solution for mitigating the current challenges preventing OEMs to manage sustainability further upstream in the supply chain. This new practise would be considered as a complementary strategy, used in parallel with other strategies. A standardised certificate in place would facilitate focal firms' indirect management of sub-suppliers as they could pressure direct suppliers to only select suppliers with the certificate (Tachizawa & Wong, 2014) and in turn promote sustainability in the supply chain (González et al., 2008). Furthermore, a cascading certificate would benefit decision makers (Grimm et al., 2014) by distinguish suppliers with appropriate diffusion methods from the rest. Thus, a cascading certificate would arguably tackle the challenge of uncompleted cascading or at least give an indication of the current practises in a supply chain. In addition, common standards audited by a third party are likely to simplify the management of sub-supplier with high negotiation power (Tachizawa & Wong, 2014). This since cascading requirements no longer would be perceived as one single firm's demands but instead as a collective industry pressure. Assigning a third party to audit is also resource efficient for the single company (Wilhelm et al., 2016b) and suppliers cascading practices do not need to be audited several times by different OEMs.

Even though the cascading certificate solution is expected to be resource efficient once in place, it does not currently exist. Developing the certificate would require engagement, resources and other efforts. Surely, there are certificates in progress such as Chain of Custody that aims at creating common standards and reduce complexity (NEN, 2016). However, exactly what will be included in the Chain of Custody standard is not fully determined but based on the informal interviews a cascading perspective will not be included. Still, this standard could potentially be an improvement suggestion for other sustainability aspects, especially with respect to traceability (SIS, 2016). Nevertheless, if a cascading certificate did exist, some already existing challenges would be relevant to look further into. First, if the industry pressure of possessing a cascading certificate becomes too high, the notion of fake certificates is likely to increase. Second, suppliers with accepted cascading practises but with limited resources will suffer since it generally is expensive to be certified.

A third potential MT-SSCM improvement suggestions is to invest in capacity building activities. Developing direct suppliers in this manner would imply a complementary strategy used for suppliers with lacking capabilities since this is a normal cause for both uncompleted cascading and bad working conditions (Grimm et al., 2014). However, building capacity at suppliers implies spending resources on collaboration activities. The adoption of this improvement suggestion will therefore be limited by the OEM's resources and the number of suppliers in need of support. This improvement suggestion serves as a benchmarking opportunity from the apparel industry where the number of first tier suppliers probably are fewer than in the automotive industry and thereby can be handled to a greater extent. Drastically reduce the number of suppliers is not an option for OEMs in the automotive industry since the vehicles' components have different attributes and function. Making a risk assessment and working with capacity building for suppliers subjected to extensive risk could possibly be more resource efficient. Moreover, one could argue that spending resources on suppliers with an already developed sustainability procedure, such as company XS, are unnecessary and the focus should rather be on suppliers with more development potential.

Another activity to consider when discussing how OEMs in the automotive industry can manage sustainability further upstream in the supply chain is third party initiatives. This since collaboration with other organisation can contribute to increased bargaining power (Tachizawa & Wong, 2014), improved exchange of information (Cole & Atken, 2019) and new capabilities and resources (Wilhelm et al., 2016b). Industrial initiatives are already developed within the automotive industry with the purpose to improve the sustainability. However, the benchmarking opportunity derived from the apparel industry about a more inclusive initiative design could add further value to the automotive industry initiatives. By continuing to develop common practices, industry standards are to be set which will increase the bargaining power towards suppliers (Tachizawa & Wong, 2014). Hence, increasing the number of participants is likely to increase the collective pressure and thereby OEMs influence on supply chains.

Since the build-up strategy is an approach under development and the cascading certificate only an undeveloped idea, the discussed implications are merely hypothetical. Even though capacity building activities already exist in the automotive industry, it is not a widespread MT-

SSCM action yet. Therefore, further development of these suggestions are needed. Moreover, these improvement suggestions are described as complementary and critical strategies in need of a main strategy to be considered as a complete solution. To put it simple, reaching further up in the supply chain can be done with methods that increase control such as direct management of sub-suppliers, investments in industrial initiatives or development of new certifications. However as previously stated, all of these methods are resource-intensive (Lee, 2010) and the complex supply chain structures within the automotive industry (Mathivathanan et al., 2018) makes it impossible to increase the control of all supply chains and at the same time be efficient in all dimensions of the triple bottom line (Elkington, 2018). Consequently, prioritisation needs to be made. In order to choose an appropriate strategy, the context need to be considered (Tachizawa & Wong, 2014; Grimm et al., 2014) in relation to the triple bottom line trade-off (Elkington, 2018). The data collection did however indicate that keep combining different strategies seems to be most applicable for a company's management of supply chains.

6. Conclusion

In this final chapter, the research questions are addressed and provided with concluding answers serving this thesis purpose. Further, implications drawn from the findings in this thesis are suggested both for practitioners and for future research.

6.1 Research questions

The vast majority of all the investigated companies use an indirect approach as their main MT-SSCM strategy. In more detail, the current practise does consist of a combination of several strategies and various aspects emphasised. Commonly, critical situations are treated with extraordinary measures in order to better ensure sustainability practises in the supply chain. To be more precise this is often managed by more resource demanding direct approaches. By comparing the current MT-SSCM practices undertaken by the investigated firm, it becomes clear that there are no significant differences. The responding company operating in the apparel industry are although considered to be in the forefront in terms of initiatives and capacity building.

Three main challenges are identified that prevents the diffusion of sustainability standards upstream the supply chain. First, there is a challenge of uncompleted cascading that makes the indirect strategy fail. Second, suppliers' unwillingness to disclose supplier are seen to limit OEMs' efforts in managing sub-suppliers. Third and last challenge constitute of the power asymmetries experienced when dealing with suppliers or sub-suppliers with high negotiating power in the supply chain. This since the ability to influence such actors' sustainability practices will be negatively affected.

With the intended purpose to investigate how sustainability can be managed further upstream in the supply chain, two complementary strategies and one critical strategy are discussed as improvement suggestions for the automotive industry. These are referred to as build-up strategy, cascading certificate and capacity building. In different ways these approaches will resolve, or at least improve, some of the current experienced challenges. However, its implementation does also give rise to new challenges which needs to be considered beforehand. Therefore, in line with the theoretical framework, the context should be analysed before selecting appropriate strategies and tools. The choice should further take into account the economic trade-off of enhancing socio-environmental practices. Consequently, resource demanding strategies ought to priorities supply chains subject to excessive risk. Therefore, an OEM within the automotive industry should use a mix of different strategies when managing sustainability at sub-supplier based upon the given situation. Lastly, industrial initiatives should continuously be emphasised in the automotive industry due its proved positive effect in other industries.

6.2 Implications for practitioners

This thesis proposes several different strategies companies can use for managing sustainability further upstream in the supply chain together with its respective anticipated implications. It is stressed that these implications should be considered before selecting a strategy and that such decision should be based upon the given situation and context. Thus, a company ought to mix several strategies since supply chains can be very different from one another. The thesis further identified a common strategy used for MT-SSCM adopted in several strategies together with three main challenges for managing sustainability beyond tier one. Considering these findings, practitioners are suggested to focus on overcoming these challenges by first analysing the context including contingency variables and critical success factors. Consequently, both the individual firm and related supply chains has to be considered.

This study also indicates that there are opportunities to benchmark ideas from one industry to another, especially from industries who have had a distinct focus on sustainability for several years. However, the practises used in the industries investigate was found to be very similar and it is incremental improvements that are discovered. Nevertheless, practitioners should be aware that benchmarking best practises from one industry might not result in success once put in a new context. Thus, it is recommended that improvement suggestions gradually are implemented in order to avoid risk connected to a potential misfit.

6.3 Implications for future research

Considering the central focus on company X and the limited data collected at the external companies the benchmarking opportunities found could probably be improved and extended. This by conducting additional interviews with several persons at each external company in order to capture different perspectives as done for company X. Thereby, future research could contribute to the identification of benchmarking opportunities initiated in this study.

Moreover, it does not seem reasonable to exchange the current main indirect strategy due to resource related reasons. Therefore, it should be beneficial to focus on the experienced problem from a supplier and sub-supplier perspective. For instance, where do the cascading fail and for what reason could be further investigated in future research.

Furthermore, as many of the improvement suggestions are based on speculations, a lot of uncertainty are involved. For instance, the idea of a cascading certificate and the ongoing development of a build-up strategy are not currently existing solutions. The practical development process and implementations of these suggestions therefore needs to be further investigated.

Lastly, two new tools were identified that potentially could improve sustainability in supply chains. These were the Chain of Custody standard that has been a success in the forest industry and the block chain technology that could facilitate mapping of supply chains. Starting with Chain of Custody, despite not including the cascading perspective this tool's potential impact

on sustainability would be interesting to investigate. Furthermore, several of this thesis' interview subjects did express an interest in the blockchain technology. Therefore, both of these supply chain management tools call out for further research.

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Internal documents

Company document 1: Code of Conduct of company X. (2019)
Company document 2: Risk maps of company X. (2018)
Company document 3: Code of conduct of company U. (2016)
Company document 4: Code of Conduct of company V. (2012)
Company document 5: Code of Conduct of company Y. (2010)
Company document 6: Code of Conduct of company Z. (2016)

Appendix I- Internal interview template

1. Introduction

1.1 Thank the interviewee(s)

First of all, thank you for taking the time for this interview, we do really appreciate your input on this subject.

1.2 Introduction of ourselves and give a summary of the thesis

Our names are Gustav and Ebba and we are writing this master thesis in collaboration with Company X with the purpose to understand how sustainability can be managed and ensured upstream the supply chain. Therefore, we will use this input to gain insight on current practice, challenges and potential improvement suggestions. This is a semi structured interview so feel free to elaborate on the questions that will be asked.

1.3 Confidentiality concerns

- We will not publish any names or other information that can be traced back to you.
- We would also like to ask if it is okay that we record this interview, the recording will be transcribed and further analysed by the two of us.

1.4 Practical information

- Time frame of approximately 1 hour
- Sustainability definition- triple bottom line including all three dimensions of social, economic and environmental. Emphasises in our work are however put on the social and environmental aspects and not as much on economics.
- If there are any questions that you do not like to answer these will be skipped.

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2. Main interview questions

2.1 Opening questions

- What is your job title and its relation to supply chain management?

2.2 Current practices

- Our understanding is that company X mainly ensure sustainability by relying on cascading requirements in the supply chain, that a requirement to become a direct supplier, a tier one supplier, is to “take responsibility for their sub-suppliers for deploying these requirements through their supply chain”. In other words, your work with ensuring sustainability in the supply chain is done through tier one and by the SAQ.
    - Would you agree that this true?
    - What do you think about your department’s currents way of working with sustainability, is it efficient?
    - What challenges/flaws exist with your current approach?

        - How are you working with improving your approach and overcoming your challenges/flaws?
        - How do you ensure/control that tier one suppliers extend these requirements?
        - Do you provide support to your tier one suppliers in managing sub-suppliers? (E.g. workshops or trainings).
            - If yes, describe how
            - If no, why not?
- Are tier one suppliers typically motivated to be engaged in enhancing the sustainability in the supply chain?
    - *Why?*
    - *How can you increase their motivation?*
- Why is it important to ensure sustainability upstream the supply chain from your perspective?
    - *How far upstream do you tend to focus?*
    - *How do you set limitations?*
- Do you have direct contact with any suppliers beyond tier one?
    - *Why these? (of certain risk, power dimension etc.)*
- Do you use third parties for managing suppliers or to encourage sustainability in any situations? (e.g. non-governmental organisations, industry agreement)
- What techniques or tools do you use to facilitate sustainability within the supply chain?
- How well "mapped" are your supply chains?
    - *How do you identify actors in the supply chains?*
    - *What challenges exist for mapping the supply chain?*
- In which situation do your first tier suppliers disclose your sub-suppliers?
    - *Does it require trust between you and direct suppliers?*

2.3 Evaluation of suppliers

- Do you evaluate your suppliers and sub-suppliers? (E.g. how they work with sustainability, their power in the supply chain or geographical/cultural distance)
    - *Do you have a list of approved suppliers that your direct suppliers are supposed to use? (approved vendor list)*
- How do you manage and evaluate suppliers in risk countries?
    - *Do you have another strategy when managing suppliers in risk countries? E.g. direct contact, closer relationship. visits on site*

2.4 Follow up

- How do you follow up on sustainability in your supply chain?
    - *Do you conduct audits?*
- Do you set up any sustainability targets and if so, how do you measure sustainability improvements made?
- What consequences does unsustainable behaviour have for your suppliers?

3. Final questions

- Do you have any suggestions on how sustainability can be improved in your supply chains?
- Any aspects missing in the interview?
- Feedback regarding the interview?
- Anyone you believe that we should talk with next?

Appendix II- External interview template

1. Introduction

1.1 Thank the interviewee(s)

First of all, thank you for taking the time for this interview, we do really appreciate your input on this subject.

1.2 Introduction of ourselves and give a summary of the thesis

Our names are Gustav and Ebba and we are writing this master thesis in collaboration with company X with the purpose to understand how sustainability can be managed and ensured upstream the supply chain. Therefore, we will use this input to gain insight on current practice, challenges and potential improvement suggestions. This is a semi structured interview so feel free to elaborate on the questions that will be asked.

1.3 Confidentiality concerns

- We will not publish any names or other information that can be traced back to you.
- We would also like to ask if it is okay that we record this interview, the recording will be transcribed and further analysed by the two of us.

1.4 Practical information

- Time frame of approximately 1 hour
- Sustainability definition- triple bottom line including all three dimensions of social, economic and environmental. Emphasises in our work are however put on the social and environmental aspects and not as much on economics.
- If there are any questions that you don't like to answer, these will be skipped.

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2. Main interview questions

2.1 Opening questions

- What is your job title and its relation to supply chain management?
- Why is it important to ensure sustainability upstream the supply chain from your perspective?

2.2 Current practices

- How are you currently managing sustainability throughout the supply chain?
    - *Are you working actively with reaching further in the supply chain?*
    - *How far upstream do you tend to focus? How to set limitations?*
- What are the biggest challenges you experience when managing sustainability in a multi-tier supply chain?
- Which sustainability requirements do you have on your suppliers and sub-suppliers?
    - *Which tier suppliers are expected to follow these requirements?*

    - *How do you communicate your requirements regarding sustainability upstream the supply chain*?
- How does your relationship with your tier one suppliers look like?
    - *Are they involved in managing your sub-suppliers sustainability standards?*
    - *(If they rely on tier one to cascade): How do you ensure that tier one have the capabilities required to manage sustainability at sub-suppliers?*
        - *Any assigned sustainability roles at tier one?*
        - *Workshops or training provided by you?*
    - *What are the incentives for tier one suppliers to be involved in sustainability initiatives?*
- Do you have direct contact with any suppliers beyond tier one?
    - *Why these? (of certain risk, power dimension etc.)*
- Do you use third parties for managing suppliers or to encourage sustainability in any situations? (e.g. non-governmental organisations, industry agreement)
- What techniques or tools do you use to facilitate sustainability within the supply chain?
- What do you think about your company's currents way of working with sustainability, is it efficient?
    - *Have you identified any potential flaws?*
- How well "mapped" are your supply chains?
    - *How do you identify actors in the supply chains?*
    - *What challenges exist for mapping the supply chain?*
- In which situation do your tier one suppliers disclose sub-suppliers?
    - *Does it require trust between you and your direct suppliers?*

2.3 Evaluation of suppliers

- Do you evaluate your suppliers and sub-suppliers? (E.g. how they work with sustainability, their power in the supply chain or geographical/cultural distance)
    - *Do you have a list of approved suppliers that your direct suppliers are supposed to use? (approved vendor list)*
- How do you manage and evaluate suppliers in risk countries?
    - *Do you have another strategy when managing suppliers in risk countries? E.g. direct contact, closer relationship. Visits on site?*

2.4 Follow up

- How do you follow up on sustainability in your supply chain?
    - *Do you conduct audits?*
- Do you set up any sustainability targets and if so, how do you measure sustainability improvements made?
- What consequences does unsustainable behaviour have for your suppliers?

3. Final questions

- Do you have any suggestions on how sustainability can be improved in your supply chains?
- Any aspects missing in the interview?
- Feedback regarding the interview?
- Anyone you believe that we should talk with next?

Appendix III- Supplier interview template

1. Introduction

1.1 Thank the interviewee(s)

First of all, thank you for taking the time for this interview, we do really appreciate your input on this subject.

1.2 Introduction of ourselves and give a summary of the thesis

Our names are Gustav and Ebba and we are writing this master thesis in collaboration with company X with the purpose to understand how sustainability can be managed and ensured upstream the supply chain. Therefore, this interview will be used to get your insight and perspective of the problem. This is a semi structured interview so feel free to elaborate on the questions that will be asked.

1.3 Confidentiality concerns

- We will not publish any names or other information that can be traced back to you.
- We would also like to ask if it is okay that we record this interview, the recording will be transcribed and further analysed by the two of us.

1.4 Practical information

- Time frame of approximately 1 hour
- Sustainability definition- triple bottom line including all three dimensions of social, economic and environmental. Emphasises in our work are however put on the social and environmental aspects and not as much on economics.
- If there are any questions that you do not like to answer these will be skipped.

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2. Main interview questions

2.1 Opening questions

- What is your job title and its relation to supply chain management?

2.2 Current practices

- Our understanding is that company X ensure sustainability by relying on cascading requirements in the supply chain. That one requirement you have is to comply with all the requirement stated in the Code of Conduct yourself and also ensure that your direct suppliers (tier two suppliers) do the same.
    - Would you agree that this is true from your perspective?
    - How do you work with cascading these requirements to your direct suppliers?
    - Do company X set any requirements on you to manage regarding sub-supplier management that not are stated in the Code of Conduct?
    - From your perspective, what do you think of this cascading approach to manage sustainability?
- Do you manage sub-suppliers beyond your direct suppliers?

- *If yes, how?*
- *If no, what prevents you from doing so?*

2.3 Challenges

- What are the main challenges for you when cascading requirements from customers to your suppliers?
- How do you manage situations where different customers have conflicting requirements?
    - *Who will you priorities?*
- What general challenges do you as a supplier experience with sustainable supply chain management?

2.4. Customer relationship

- Do you collaborate with customers in order to improve sustainability upstream in the supply chain?
- Describe your role in company X's' sub-supplier management approach.
- Are company X in some way involved in your management of suppliers/sub-suppliers e.g. by providing support or trainings?
- Do you disclose your direct suppliers to your customers?
    - *In what situation do you do this?*
    - *In what situations do you not do this?*
- Do you believe it is beneficial for companies to have any sort of contact or relationship with your direct suppliers?
    - *How important is it that you are involved in such contact?*
    - *How important is it for your direct suppliers that you are involved in such contact?*
- How do you feel about sustainability initiatives arranged by your customers?

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3. Final questions

- Is there something that you would like to change with the current approach?
- Do you have any suggestions on how sustainability can be improved in your supply chains?
- What can company X do different to simplify your situation?