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Building Sustainable Timber Supply Chains

Evaluating the Role of European Union Timber Regulation in Enhancing Sustainability in Timber Supply Chains of Swedish Companies

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Abstract

The aim of this research is to contribute to the understanding of the role of European Union Timber Regulation, introduced to combat illegal logging, in enhancing sustainability in timber supply chains. With the help of content analysis of 23 sustainability reports, 7 sustainability policies and transcribed interviews of five Swedish companies, sourcing timber or timber products as raw materials, this research presents the enablers of sustainable supply chain management in timber sector. The results show that environmental management, supply chain collaboration, social dimensions, and corporate strategy are of utmost importance. The coding of interviews show that strong sustainability agenda of a company, legal compliance, customer requirements, and sustainability reporting are key drivers of sustainability integration in supply chains. Whereas lack of sustainability knowledge, culture and top management commitment, lack of trustful relationships between suppliers and the companies, cost of conducting audits and hiring sustainability professionals are some of the major barriers and challenges they face.

The analysis of contents of the regulation presents the reference to sustainable supply chain management enablers. The regulation repeated themes related to information management the most. Analysis of interviews based on sentiment coding gives the perceptions of companies with regards to the role of regulation in building sustainable supply chains. All of the companies believe that the regulation has an important role in building sustainable supply chains but they have some concerns related to laws in the country of origin, the definition of sustainability and that it will take some time see the change.

Keywords: Sustainable supply chain management, EU Timber Regulation, Illegal logging

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Abbreviations (if required)

CDP	Carbon Disclosure Project
DDS	Due Diligence System
EUTR	European Union Timber Regulation
FLEGT	Forest Law Enforcement, Governance and Trade
FSC	Forest Stewardship Council
GFTN	Global Forest and Trade Network
GRI	Global Reporting Initiative
PEFC	Programme for the Endorsement of Forest Certification
SEDEX	Supplier Ethical Data Exchange

SFM	Sustainable Forest Management
SSCM	Sustainable Supply Chain Management
UN	United Nations
UNGC	United Nations Global Compact
WBCSD	World Business Council for Sustainable Development
WWF	World Worldlife Fund

1 Introduction

For the past decades, one of the major environmental policy concerns has been global deforestation and forest degradation with illegal logging being the key driver of this degradation (Leipold, 2017). Illegal logging is defined by World Wildlife Fund (WWF) and World Business Council for Sustainable Development (WBCSD) as: "harvesting of timber in violation of relevant forestry and environmental laws and regulations" (WWF & WBCSD, 2005). Nature Conservancy (2015) states that the suspicious origin of hardwood lumber and plywood traded globally accounts for approximately 30% of the total. Illegally harvested timber makes its way into the markets all over the world and into the hands of naive citizens, often under a legal label, regardless of all the efforts of governments, transnational communities and the public (Mammadova, 2015). It has been estimated by several studies that 40% of timber products coming from Southeast Asia and China entering the European Union (EU) are of illegal origin (Nurrochmat, Dharmawan, Obidzinski, Dermawan, & Erbaugh, 2016).

Illegal logging is a multidimensional concern by nature involving social, environmental and economic issues. It has not only demolished valuable forests around the world, endangering the survival of human being but also highly diverse ecosystems and habitats of plant and animal species (Mammadova, 2015; UNGC & BSR, 2014; Greenpeace, 2008). Furthermore, it has disturbed the natural phenomenon of carbon sequestration and water retention, accelerating climate change, reducing availability of drinking water for communities nearby and giving rise to landslides and soil erosion (Mammadova, 2015; UNGC & BSR, 2014; Greenpeace, 2008). In addition, illegal logging adds to the worries of local communities by affecting their livelihoods. This gives rise to a number of issues regarding poverty, human rights, corruption, indigenous people's rights, funding military and oppressive governments, making them more vulnerable (Mammadova, 2015; UNGC & BSR, 2014; Greenpeace, 2008).

Apart from above mentioned social and environmental impacts of illegal logging, there are a number of economic issues influencing the global timber markets. Illegal logging brings down the price of timber unethically leaving the sustainable and ethical companies at a disadvantage (Greenpeace, 2008). Furthermore, with the growing demand for timber products, oblivious consumers worldwide continue to buy illegal and unsustainable timber (Mammadova, 2015; Greenpeace, 2008).

'Sustainable Forest Management' (hereafter SFM) was identified as a significant approach towards the conservation and economic development of tropical forests globally during the 1992 Rio Summit. According to Brandt et al. (2016), SFM is regarded as "a key component of forest protection, biodiversity conservation, and income enhancement" and is defined as "the process of managing permanent forest land for timber production without reducing inherent values and future productivity". Policy and regulations supporting those who are involved in forest management are considered crucial among the tools available for SFM (MacDicken et al., 2015). Other crucial building blocks of SFM include forest management certifications, inventories, stakeholder involvement, monitoring and forest management plans (MacDicken et al., 2015).

An independent, third-party verification of commitment to a distinct set of criteria that measure and endorse SFM is provided by forest management certification (MacDicken et al., 2015). These are market-based initiatives (Siry et al., 2005), voluntary in most cases unless mandated by stakeholders, a company or investor policy, in order to get access to forest product markets which require third-party certification, generally drives the process. Forest

Stewardship Council (FSC) and Programme for Endorsement of Forest Certification (PEFC) are the two well-known certification schemes. Section 3.1 discusses these certifications in detail. Although these are not the only certification schemes when it comes to international forest certification, but these two schemes dominate in terms of total area covered (MacDicken et al., 2015). As of today, the total area covered by these international forest certifications (FSC and PEFC) is around 512 million ha (FSC, 2018; PEFC, 2017). While this number seems very satisfying and encouraging when it comes to tackling the issue of illegal logging, unfortunately it represents only a small fraction of global forests with the total area of around 3.9 billion ha up till 2015 (The World Bank, n.d.). Although during the last decade, the forest area certified by these schemes has increased to a great extent, 90% of total certified forests lies in the global north (Kraxne et al. 2017). This shows the success of certification in these regions while indicating that these schemes have not been established enough in the global south (Kraxne et al. 2017). It should also be noted that forest resources in the global north are generally not as much threatened by illegal logging or other sustainability-related issues as compared to the global south (Siry et al., 2005). This brings the attention towards the public sector initiatives to deal with the problem of illegal logging.

To ban the import of illegal timber and tackle the global problem of deforestation and forest degradation, the European Union (EU), the United States (US) and Australia have introduced legislation (Hoare, 2015; Leipold, 2017). In 2008, with the amendment of the Lacey Act, the US was the first to introduce such legislation. Australia introduced its very own legislation with enforcement in 2012 known as the Illegal Logging Prohibition Act (ILPA) and the EU Timber Regulation (EUTR) was introduced in 2010 and came into force in 2013 (Hoare, 2015). According to Bartley (2014), "the rise of a transnational timber legality regime is a remarkable, path-breaking event in the governance of forests" (p. 93) and requires the importers in these countries to implement due diligence or due care of their timber and timber product purchases or otherwise have to face the penalties of having illegal timber in their supply chains in the form of fine, confiscation or even imprisonment in special situations.

1.1 Problem Definition

World Economic Forum (n.d.) considers businesses to be a crucial actor in realizing the Sustainable Development Goals[1] (SDGs) through their engagement in solving sustainability-related issues globally as governments do not have the ability to manage this alone. Business sustainability can be defined as managing the triple bottom line - a process which manages the financial, social and environmental risks, obligations and opportunities of a business (Fisk, 2010). These three kinds of impacts are sometimes referred to as 'People Planet and Profits', as coined by Elkington (1997). Delivering profitable growth by creating a positive impact on people and the planet forms the basis of sustainability in business (Fisk, 2010). Many organizations are effectively incorporating sustainability standards into their business operations, as indicated by a McKinsey (2011) survey, and they are doing so by seeking objectives that go far beyond concerns for their reputation management (McKinsey&Co., 2011).

Ever-increasing competition is forcing companies to execute worldwide sourcing initiatives which significantly added to the number of organizations engaged in supply chains and hence complexity of supply chains (Seuring and Muller 2008). Apart from these changes, which not only increase the complexity of supply chains but also the challenges when it comes to

[1] Goal 15 of the SDGs puts great emphasis on the protection, restoration and sustainable use of land resources especially forests (UN, n.d.)

management and decision-making, there is "the paradigm shift from firm-level to supply-chain level competition and the challenge of incorporating comprehensive sustainability goals into corporate behavior due to worldwide growing environmental and ethical awareness" (Gold, Seuring & Beske, 2009). In timber sector, the environmental and ethical awareness in 1990's triggered the debate around the illegal origin of timber and the need to protect world's forest, especially the tropical forests (Bartley, 2014).

After decades of discussions, the global community still could not produce a single transnational agreement related to sustainable management of forests to combat illegal logging (Bartley, 2014). The combined hard work of campaigns by environmental activists, market demands by responsible companies, and dialogues between governments 'congealed into' an international timber legality regime mainly established on the principles of bilateral agreements (Bartley, 2014). This very reason makes it interesting to understand the role of such regimes in addressing sustainability-related issues in supply chains, especially outside the geographical borders of their formation.

The private sector, in the timber industry, has been leaning towards more transparent supply chains among other efforts with the purpose of inhibiting illegally or unsustainably harvested timber (Hoare, 2015). One of the reasons behind this change is considered to be the need to comply with the legality regime such as US Lacey Act and the EUTR. However, there are also some other reasons for this changing trend which include "lobbying by NGOs and consumers, companies' increased awareness of the relevance of environmental issues for their business, and the growing number of regulatory requirements on environmental standards and reporting" (Hoare, 2015, p. 49). There have been improvements and change in practices, for example, there is a substantial increase in number of companies implementing forestry Chain of Custody certification, both in producer and consumer countries (Hoare, 2015). As a result, companies are increasingly looking for opportunities to aid sustainable development, for ethical reasons as well as to improve their image and assure supply chain sustainability (Hoare, 2015).

The question regarding the role and impact of EUTR on reduction in illegal timber imports in EU and a shift in related industrial norms still remains critical (Hoare, 2015). Although the levels of legality verification and certifications have risen to a great extent in producer countries, it is difficult to determine that to what extent legal mandate was the reason behind this in addition to other factors including consumer demand for sustainable timber, other government polices (specifically on public procurement) and private-sector operations. Some informal data proposes that the regulation has had an influence. For instance, it has been reported by industry representatives that in response to the regulation, they have been going over their processes and striving to enhance supply chain management (Hoare, 2015). As companies are increasingly integrating sustainability activities in their supply chains due to a number of drivers: achieve cost cutting; better risk management; new ways of revenue generation; and an increase in brand value by working closely with their suppliers in developing 'sustainable supply chains' (Hanifan et al. 2012), it is important to understand and evaluate the role of policies designed to govern supply chains and their effectiveness in doing so.

1.2 Research Aim

The aim of this thesis is to understand the role of the EUTR in terms of enhancing sustainability in timber supply chains, which can be considered as an unintended outcome of the regulation. This research also focuses on the enablers of sustainable supply chains, apart from government policies, in timber sector as well as what role can be played by the regulation

and timber companies in the EU in improving the environmental, social and economic conditions in the global south, especially the timber producing countries.

The overarching aim of this research is:

To contribute to the understanding of the role of EU Timber Regulation in augmenting sustainability in timber supply chains through the analysis of the enablers of sustainable supply chains.

In order to reach this aim, the following research questions need to be answered

RQ1: What enables timber companies to move towards sustainable supply chains and what are the drivers and barriers they have to face in this regard?

In order to understand what enables companies to move towards sustainable supply chains, it is important to understand what these companies interpret from the term 'sustainable supply chains'. For this purpose, RQ1 was divided into the following three sub-questions:

RQ1a: What do timber companies understand from the term 'sustainable supply chains'?

RQ1b: What factors enable companies' sustainable supply chain management, and in particular, those in the timber sector?

RQ1c: What are the main drivers and barriers for timber companies when building sustainable supply chains?

RQ2: What is the role of EU Timber Regulation with regards to building sustainable timber supply chains?

With the intention of understanding the role of the EU Timber Regulation, RQ2 was further divided into following two sub-questions:

RQ2a: What factors that enable sustainable supply chains are referred to in the regulation, if any?

RQ2b: What are the perceptions of companies on the role of EU Timber Regulation with regards to building sustainable timber supply chains?

The steps taken to answer the above mentioned research questions are explained in detail in Chapter 2 of this thesis.

1.3 Limitations and Scope

In light of different policy initiatives, this research aims to focus on the EUTR which places certain obligations on the operators of timber and timber products in the EU regarding the legality as well as traceability of the timber and timber products. Although there are a number of stakeholders involved in timber supply chains and the EUTR, this thesis will only focus on the companies using timber and timber products in their product line. The geographical scope of this research is limited to companies operating in Sweden. Sweden is one of the most sustainable countries in the world (RobeccoSAM, 2015) and to see the knowledge of companies in Sweden and how they are practicing sustainable supply chain management gives examples for the rest to follow. Even though there are some multinational companies

analyzed in this research and all the data from those companies was considered applicable to this research unless otherwise stated.

1.4 Audience

One of the main audiences of this thesis is the academic board of Master in Environmental Sciences, Policy and Management (MESPOM) program. Moreover, this research is tapping into multiple topics and issues regarding sustainable supply chains in general and timber supply chains in specific. The research also tries to evaluate the role of a policy instrument to combat illegal logging and achieve sustainable supply chains. This might be of interest to all the key stakeholders involved. The research intends to provide insights to policy makers, timber operators, private companies, certification organizations, researchers with specific interest in sustainable supply chains, forest related NGOs and civil society members concerned about the issues of illegal timber and social and environmental practices in supply chains. The research is also under the Mistra Future Fashion II and therefore makes the researchers and other people involved in the project and important audience. The research will ultimately feed into this research project which focuses mainly on circular economy in Swedish fashion industry.

1.5 Ethical Considerations

This thesis aims to carry out all the research according to the Lund University guidelines. All the literature from published papers is properly referenced and cited and the rest are author's own views about the topic. Plagiarism has been avoided to maintain the academic integrity of this research. Furthermore, prior to each interview, the interviewees were informed that all the information provided by them is for the purpose of this research only and permission was asked before recording the interviews. The audio recordings allowed the author to transcribe all the interviews without missing any important information. None of the information provided by one interviewee was neither shared with another interviewee nor with any other personnel contacted for the purpose of this thesis. Additionally, this research was partially funded by Mistra Future Fashion II with the aim to ultimately feed into this research project. None of the arguments or choice of companies were affected by this program and the author was able to make independent choices with regards to the research aim and methodology.

1.6 Outline

Chapter 2 outlines the methodology used for this research as well as elaborates on the data collection methods used. It also explains how the collected data will be analyzed keeping in mind the research questions of this thesis. Chapter 3 gives an overview of the legality regime and also discusses the details of the EUTR. It also debates about legality vs sustainability. Chapter 4 explains the concept of sustainable supply chains and their management. It also discusses different works by researchers in sustainable supply chain management including the facets of sustainability and enablers of SSCM which later feed into the analytical framework established for the purpose of this research called Framework for Building Sustainable Supply Chains and explain the components of the framework and various assumptions. Chapter 4.4.8 presents the findings of this research and analyzes them. These findings are discussed in Chapter 6. Finally, Chapter 7 concludes this research and discusses opportunities for further research.

2 Methodology

In line with the aim of this research and the research questions mentioned in Chapter 1, this thesis involves both deductive and inductive analysis as per the definitions given by Thomas (2006). A systematic literature review was conducted to give an overview of sustainable supply chain management and the legality regime especially the contents of the EU Timber Regulation. This research is guided by a hypothetical assumption that EUTR being a government regulation is an enabler of SSCM in timber sector and that sustainability can be achieved through legality. To examine the different enablers of SSCM and its comparability with the regulation, the author merged the framework of SSCM given by Carter and Rogers (2008) with the list of enablers given by Dubey et al. (2016) to come up with a framework specifically used for this thesis. The framework, elaborated in Chapter 5, served as basis for the coding and analysis of sustainability reports, companies' sustainable supply chain policies and the interviews conducted. The elements described in the framework were used as nodes during the coding process and analysis of the content while using the software called Nvivo.

2.1 Data Collection and Triangulation

For the purpose of this research, various types of qualitative data including both primary and secondary, were collected such as, academic literature, policies including the EUTR and sustainable supply chain policies of companies, sustainability reports and interviews. For the validity of the findings of this research, triangulation was adopted which is helpful in not only confirming the validity of different data sources but also discovering and understanding profounder connotation of the data. This method also facilitates in avoiding intentional bias.

Primary qualitative data was primarily collected through in-depth interviews with representatives of the companies selected for this research. The companies were carefully chosen from the controlled list of operators in Sweden, provided on request from the Swedish Forest Agency (Skogsstyrelsen). Similar to research of Pagell and Wu (2009) and Tate, Ellram, & Kirchoff (2010), this research paid particular attention to companies that are comparatively advanced in their sustainability activities as well as are part of different forest related voluntary networks and projects for example the WWF Global Forest and Trade Network (GFTN) Sweden. It was also made sure that these companies are either importing timber or timber products from the global south or have operations in those countries.

Representatives from 5 companies were interviewed. Among companies that meet the above mentioned criteria, the ones interviewed were selected based on their availability during the period of this research as well as the potential contacts. The list of companies interviewed their main products, interviewee from the company, their position in the company, time and date of the interview and the mode used for the interview is outlined in Table 2-1 (for other details please refer to Appendix I). Before conducting the interview, the personnel working in the field of sustainability in respective companies were emailed explaining the purpose and focus of research. The interviews were conducted in semi-structured format (Appendix II). Prior to interview, **secondary data** about sustainability activities of these companies especially in supply chains was collected and analyzed with the help of content analysis of companies' sustainability reports and sustainability policies related to supply chains. The number of reports and policies analyzed for each company varied based on their availability on websites. In total, the author analyzed 23 sustainability reports with 11 sustainability reports of Stora Enso, 7 of IKEA, 3 of Tetra Pak and only 1 for Duni AB and Kahrs Group, and 7 sustainability policies (see details in The content analysis method is explained in the next section.

Table 2-1 List of Companies Interviewed

No	Company Name	Main Products	Interviewee Name and Position	Date, Time and Mode of Interview
1	Duni AB	Table top, packaging and take-away solutions for food	Gierow, Elisabeth. Corporate CSR & Quality Director	23 April, 2018 14:00-15:00, Phone interview
2	IKEA	Furniture	Mori, Oksana. Forestry Specialist/ Sustainability Compliance Auditor	07 May, 2018 14:15 – 15:00, Skype
3	Kährs Group	Wooden floors	Uhler, Bruce. Environmental Ambassador – Compliance/Sustainability	18 April, 2018 15:00-16:00, Phone interview
4	Stora Enso Paper AB	Pulp and Paper	Deinzer, Magnus. Manager Sustainability (Focus – Sustainable Fibre Sourcing) Öberg, Malin. Development Engineer Nordlund, Jonas. Communications Manager - Wood Supply	26 April, 2018 Answers received via email
5	Tetra Pak	Carton packages for food and beverages	Abreu, Mario. Vice President Environment	25 April, 2018 14:00-15:00, In person

2.2 Content Analysis

Content analysis as a research method is widely used by researchers and scholars (Afjei, 2015). One of the earliest definitions of content analysis given by Abbot and Monsen (1979) in the field of Corporate Social Responsibility (CSR) and is still applicable today. They viewed content analysis in CSR as "a technique for gathering data that consists of codifying qualitative information in anecdotal and literary form into categories in order to derive quantitative scales of varying levels of complexity" (Abbot and Monsen, 1979, p. 504). One of the reasons behind this widespread use is the flexibility it provides to the researchers (Afjei, 2015). The methodology has been regarded as rigorous, highly flexible, and systematic approach in research by White and Marsh (2006) while affirming that it "is applied in qualitative, quantitative, and sometimes mixed modes of research frameworks and employs a wide range of analytical techniques to generate findings and put them into context" (White & Marsh, 2006, p. 22).

Through content analysis, one can make the best out of data as "a central idea in content analysis is that the many words of the text are classified into much fewer content categories" Weber (1990, p. 12). Therefore, crucial themes and connotations of raw text can be identified through content analysis which may not appear otherwise, helping in systematic analysis and testing hypothesis (Afjei, 2015). According to Milne and Adler (1999, p. 237), "the research method that is most commonly used to assess organizations' social and environmental disclosures is content analysis". The use of this methodology in the field of operations and supply chain management is still not very common however is considered to be advantageous in improving the validity of results by triangulation (Tangpong, 2011).

Qualitative content analysis can be inductive or deductive, or can be a mix of both (Afjei, 2015). Three types of qualitative content analysis have been described by Hsieh and Shannon (2005) namely conventional, directed and summative. This research uses directed content analysis which tends to be a more deductive approach regardless of its qualitative nature (Afjei, 2015). It has been explained by Hseih and Shannon (2005) as

> *Sometimes, existing theory or prior research exists about a phenomenon that is incomplete or would benefit from further description. The goal of a directed approach to content analysis is to validate or extend conceptually a theoretical framework or theory. Existing theory or research can help focus the research question. It can provide predictions about the variables of interest or about the relationships among variables, thus helping to determine the initial coding scheme or relationships between codes. (p. 1281)*

2.2.1 Content Analysis of Sustainability Reports

In 2004, the Global 250 companies produced an annual sustainability report which incorporated environmental, social and economic concerns compared to the reporting in 1999 which focused mainly on the environmental issues; furthermore, issues concerning supply chains were discussed by almost 80% of these reports (Carter & Rogers, 2008). This gives a picture that companies' sustainability reports are a good source of information about their sustainability activities in supply chains. According to Tate, Ellram & Kirchoff (2010), "CSR reports serve as a rich source of secondary data to under-stand better the companies' intentions, strategies and activities, as well as the results of corporate social and environmental responsibility both at the corporate and supply chain level" (p. 20). All types of reports including sustainability reports, corporate social responsibility (CSR) reports or other environmental reports were considered for content analysis and are referred to as sustainability reports in this thesis. Although these types of reports may seem similar but vary in many aspects; the comparison of different types of reports available is outside the scope of this research.

As mentioned earlier, the framework presented in Section 5 provided the basis for content analysis of sustainability reports. With the help of brief literature review, different enablers of sustainable supply chain management have been described and explained. A number of researchers have studied these enablers in sustainable supply chain management across different sectors. The governing framework used is the Sustainable Supply Chain Management framework provided by Crater and Rogers in 2008, which mainly talks about the supporting facets of the triple bottom line namely Strategy, Risk Management, Transparency and Organizational Culture. To go a step further, the framework used in this research incorporated the list of enablers developed by Dubey et al. (2016) given in Appendix III. The new framework established based on the works of these researchers served as a basis for coding of sustainability reports and grouping of different enablers. The sustainability reports were scrutinized in search for themes that match with the codes and give a picture of enablers and sustainable supply chain activities practiced by those companies. EUTR as an enabler was also kept in mind during the coding process that if those supply chain activities were driven or enabled by the regulation.

The author chose to analyze all the sustainability reports available in order to not miss any significant information regarding the enablers. The trend in the presence of SSCM enablers for a particular company over time was not analyzed as the author did not consider it to be part of the scope but taking into consideration all the sustainability reports revealed other interesting results presented in Section 5.2.4.1 and Section 5.3.

Apart from the enablers mentioned in the new framework, the sustainability reports were read thoroughly in order to identify other themes that can be considered as other possible enablers of sustainable supply chains especially in the timber sector.

2.2.2 Content Analysis of Sustainability Policies

After the content analysis of sustainability reports, companies' sustainability policies applicable to supply chains and timber sourcing were analyzed and coded using the analytical framework (Section 4.4). Organizations have been integrating sustainability into their business strategies for more than a decade now (Dubey et al., 2016). All types of policies concerning supply chain sustainability were considered for the analysis whether they were company's code of conduct, forestry standards or timber sourcing strategies. The content analysis of the sustainability reports and sustainability policies provided the ground for understanding company's status on sustainable supply chains before conducting interviews and were also mentioned during the interview (see Appendix II, Q 10). The content analysis of these strategies also contributed towards the inner circle of the framework which includes the facets of sustainable supply chain management as strategy is one of the most important facet.

2.2.3 Content Analysis of Interviews

It is highly unlikely that companies state the particular reasons behind their sustainability activities in supply chains or mention that the EUTR was the reason behind these activities. For this purpose, individual in-depth interviews were conducted with the companies mentioned in Table 2-1. The scope of interviews was not just limited to the validation of the data they provide in their public platforms and sustainability reports but also to gain an understanding of their knowledge about sustainable supply chains and what does it mean for that particular company and what were the drivers and barriers for them in achieving sustainability in their supply chains. The coding process used for content analysis of interviews was the same as the content analysis of sustainability reports and strategies. As already illustrated in Figure 2-1, the content analysis of these interviews provided data which was helpful in answering all the research questions of this thesis. The content analysis of interviews also helped in understanding their views on the regulation and if they think that sustainability can be achieved through legality.

3 Legislative development regarding sustainable timber supply chains and European Union Timber Regulation

This chapter will highlight the public and private efforts to tackle illegal logging and deforestation and promote sustainable and responsible forest management. It will also look into the EU Timber Regulation, how the regulation came into being, and what are the main elements of the regulation.

3.1 An Overview of Legality Regime

The debate around the reasons behind present day deforestation driven primarily because of industrial consumption started with Geist & Lambin (2002) and Rudel (2005), who claim it to be different than the one in 1960's to 1980's mainly powered by human sustenance. In order to prevent forest loss, the introduction of an international forest agreement was attempted in 1990's but after years of discussions all these attempts failed to generate an agreement (Dimitrov, 2005). In the meantime, the international focus started to move towards a more carefully defined topic of 'legality' in the early 2000s (McDermott & Sotirov, 2018). According to some estimates approximately half of the wood harvested in some of the countries with greatest volume of standing forests in the world was cut down illegally (Lawson & MacFaul, 2010). This lead to an inference that an efficient approach to advance environmental and social sustainability would be to address the issue of illegality (e.g. EC, 2010; Kleinschmit, Mansourian, Wildburger, & Purret, 2016), and also that influencing the industrial practices can prove to be a meaningful answer to the issue of global deforestation (Mamadova, 2015). Due to a number of definitions available for illegal logging, it is difficult to develop a legality regime or policy instrument to fight illegal logging (Nurrochmat, Dharmawan, Obidzinski, Dermawan, & Erbaugh, 2016). Smith (2002) defined illegal logging as activities related to timber harvesting that are incompatible with the national or sub-national laws of the country of harvest. Nevertheless, Chan (2010) and Tacconi (2007) argue that illegal activities ranging from timber harvest and transport to conversion into products and finally trade could also be included in the definition of illegal logging.

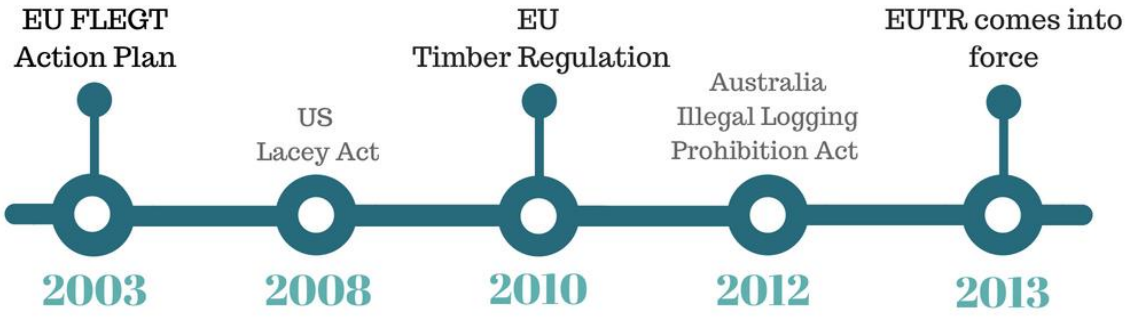

Figure 3-1 Timeline for major actions in the legality regime

Source: Own Illustration. Adapted from Jonsson et al. (2015)

The so-called legality regime started to rise when individual countries like Australia, the USA, in addition to the European Union (EU), realized their role in the global timber and ratified laws to ban the entrance of wood into these markets which is illegally harvested or traded (Mammadova, 2015). These laws include EU's Forest Law Enforcement, Governance and Trade (FLEGT) initiative (2003), US Lacey Act (2008), Australian Illegal Logging Prohibition

Act (2012) and EU Timber Regulation (2013) (**Error! Reference source not found.**). According to literature, the political drive behind initiatives for illegal logging grew because of various reasons. These go back to the decade of 1990 and 2000 when 16 million hectares of tropical forest per year was lost, thereby fueling agitation over these forests around the world (FAO, 2011; McDermott & Sotirov, 2018). Although, a considerable loss was a result of agricultural growth; a significant role was played by timber harvest as well (Meyfroidt, Rudel, & Lambin, 2010). The main aim of these regulations is to develop 'legality verification system', resulting from the collaborated efforts of timber exporting and importing countries would prevent the illegal wood and wood products' trade (Mammadova, 2015). However, the implementation of these regulations has not been very successful in developing countries as it is left to the national governments which not only lack implementation capital but are also full of corruption (Contreras-Hermosilla, 2001; Mammadova, 2015; Panjer & Greenberg, 2012).

EU being a main export market for the countries with excessive illegality and weak forest governance (Giurca & Jonsson, 2015) introduced its very first initiative to combat illegal logging in 2003 called the FLEGT Action Plan. According to this plan, EU being one of the biggest importers of timber products has the responsibility to change forest governance in these exporting countries with poor enforcement and corrupt governments. EU recognized that this can be accomplished by ensuring that there no incentives for illegally logged timber in the EU market (Saunders & Reeve, 2014). The action plan emphasizes on seven comprehensive areas with two of them being supporting the timber producing countries and promoting the trade of legal timber (Jonsson et al., 2015). While focusing mainly on trade, governance and implementation issues, the action plane identifies the mutual responsibilities of consumer and producer countries (Jonsson et al., 2015). The action plan includes two policy instruments (Figure 3-2): FLEGT Voluntary Partnership Agreements (VPAs) and the EU Timber Regulation (EUTR).

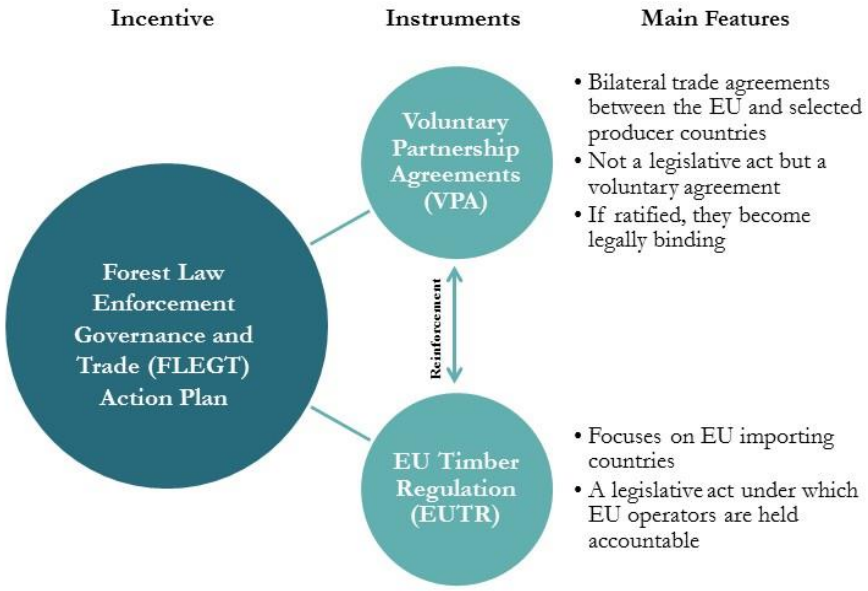

Figure 3-2 FLEGT Action Plan and its two main instruments

Source: Giurca and Jonsson (2015)

VPA is a bilateral voluntary agreement between the timber exporting country, agreeing to take part in the scheme, and the EU to make sure that only legally harvested timber enters the EU market (EC, 2017). Till now there are only 6 countries have signed the agreement including

Cameroon, Central African Republic, Ghana, Indonesia, Liberia, and Republic of Congo implementing systems and procedures to ensure the timber exports are legal (Jonsson et al., 2015). The EUTR, on the other hand, focuses on the operators[2] in the EU by prohibiting the placement of illegally harvested timber or timber products; demanding traders[3] to implement 'due diligence'; and requiring them to keep records of their suppliers and customers (EC, 2018). The regulation is further discussed in Section 3.2.

3.1.1 Private Forest Governance

Forest certifications were created in 1990's as a result of failure of governments to address the issues of illegal logging and forest degradation (Molnar, 2003). These are voluntary market-based instruments to ensure that wood comes from sustainably managed forests and is harvested responsibly (Molnar, 2003). Forest certfications are considered to be one of the most important tools existing today to measure the sustainability of forest management practices (Nurrochmat et al., 2016). A number of forest certification schemes exist but the two main certifications schemes are Forest Stewardship Council (FSC) and the Programme for Endorsement of Forest Certifications (PECF). FSC was established in 1993 with a focus on forestry practices in the tropics, whereas PEFC was established in 1999 mainly by forest owners and industry representatives (Vermeulen and Kok, 2012).

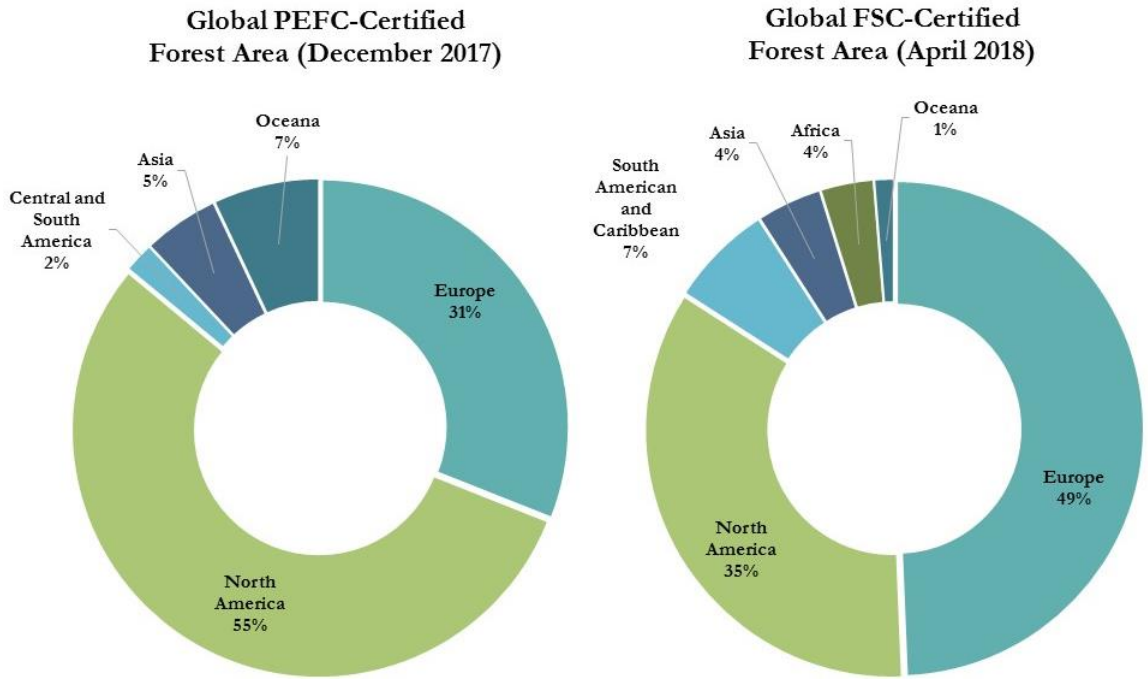

Figure 3-3 Regional share of total forest area certified by FSC and PEFC

Own Illustration: Source Data from FSC and PEFC

According to The World Bank (n.d.), the total global forest area up till 2015 was 3.9 billion ha. As of April 2018, the total forest area certified by FSC was around 199 million ha (FSC, 2018) whereas PEFC certified a total area of 313 million ha till December 2017 (PEFC, n.d.). Both

[2] "Any natural or legal person that places timber or timber products on the marker." (EC, 2010)

[3] "Any natural or legal person who, in the course of a commercial activity,sells or buys on the internal market timber or timber products already placed on the internal market." (EC, 2010)

certification schemes are mostly concentrated in the global north covering more than 80% of this area in the Europe and North America (Figure 3-3). Although certification schemes do promise sustainable management of forests, they also come with a number of issues with double certification being one of them. Since 2016, both certification bodies decided to collect data on double certification since they found out that almost 16% of the total certified forests under these schemes have been certified by both FSC and PEFC (PEFC, 2017). Their estimations for the period of December 2016 to June 2017 showed that the total area certified globally under these schemes increased by 3.7 million ha with almost 1 million ha covered by double certification, which makes 25% of the total certified (PEFC, 2018). This indicates that out of roughly 13% of the total global forest area covered by these certification schemes, 16.5% (almost 84 million ha) is under double certification. According to PEFC (2017), companies can help in avoiding this issue of double certification by accepting both certification schemes and not putting pressure on forest owners to double certify.

Apart from the above mention issue, Schouten and Glasbergen (2011) argue the role of private governance in combatting illegal logging and promoting sustainable forestry by stating that "additional complications arise when private (or international) governance initiatives designed in one part of the world address issues in another part of the world" (p. 1891). Conniff (2018) has criticized FSC and explained that how the certification has failed to slow deforestation in tropical forests where it was meant to make improvements originally. Around 85% of the area certified by FSC is in North America and Europe (Figure 3-3) and one reason can be the cost of certification which is affordable by logging companies in these developed regions than the ones in tropical regions (Conniff, 2018). As a result, these certification schemes are rewarding the forest management in the north where the condition is already better due to improved forestry laws as compared to the forests in the south (Conniff, 2018).

3.2 EU Timber Regulation

In efforts to eradicate illegal logging from supply chains globally, the EUTR is considered an important part of the group of international actions, mentioned in Section 3.1, focusing at advocating sustainable forest management and forest industries (McDermott & Sotirov, 2018). Governments, industries and environmentalists are extensively providing support for these initiatives to tackle illegal logging (Sotirov, Stelter, & Winkel, 2017). The EU played a prominent role in efforts to promote actions on an international scale which were in the "stalemate" in past decades (McDermott & Sotirov, 2018). The high amount of public concern regarding the legality of timber and timber products being imported into the EU market also pressurized the European Commission (EC) to do something to elevate the legality standards and requirements for these imports (Giurca, Jonsson, Rinaldi, & Priyadi, 2013, p. 730). To ban the placing of illegally harvested timber on EU markets and increase the efficiency of the FLEGT Action Plan, the Regulation No. 995/2010 or the EU Timber Regulation was approved in 2010 and came into force in March 2013.

Unlike VPAs, the EUTR is a binding and requires mutual responsibility and multidimensional collaboration among the EU institutions and the member states (McDermott & Sotirov, 2018). Just like the US Lacey Act and Australia's ILPA, the EUTR prohibits the entrance of illegal timber into the EU market that has been harvested in violation to the laws of the country of origin (EC, 2010). The regulation applies to the twenty-eight member states and calls for a translation and enforcement within their individual national legal frameworks (McDermott & Sotirov, 2018). Contrary to VPAs which focus at the supply (export) side of the timber trade, the regulation is very much aimed at the demand (import) side (Jonsson et al., 2015). The regulation defines the terms 'legally harvested' as harvesting practices compliant with the applicable legislation in the country of harvest and similarly defines 'illegally

harvested' as the one noncompliant with the applicable legislation in the country of harvest (EC, 2010). Therefore, considering that there is no internationally agreed definition of illegal logging, the legislation in the country of harvest forms the basis (Giurca & Jonsson, 2015). A variety of timber products are covered by the regulation including roundwood, sawn wood, pulp and paper, flooring, wooden furniture, and other primary and secondary processed timber products (EC, 2010), whereas musical instruments, recycled products and printed paper including magazines, books and newspapers (EC, 2018).

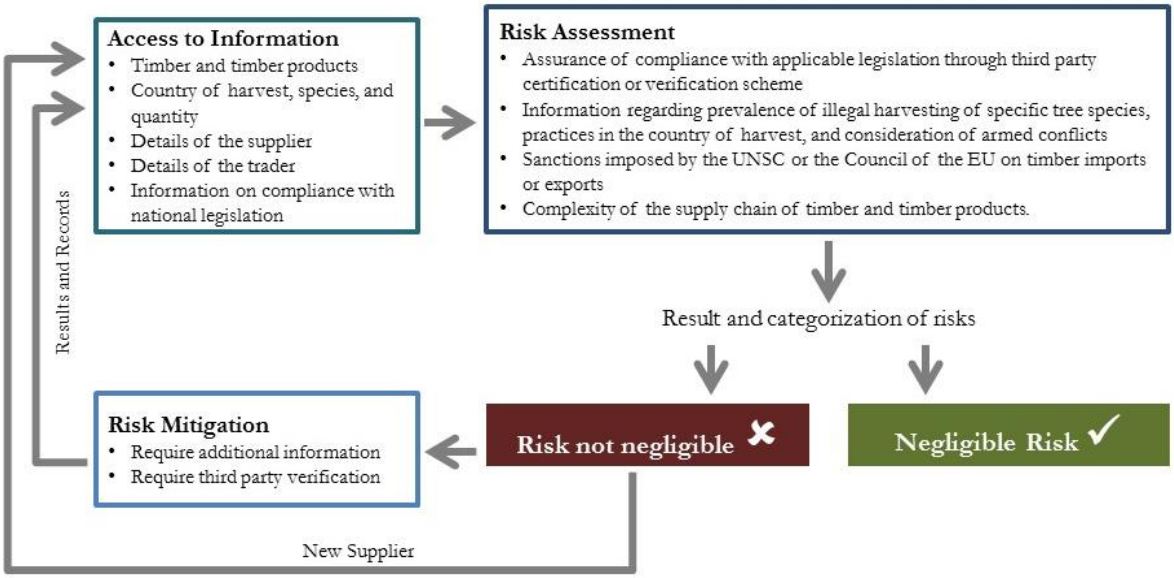

Figure 3-4 Due Diligence System

Own Illustration: Adapted from EC (2010) and BM TRADA (2013)

Under the regulation, the operators and traders in the EU are required to have proper procedures to reduce the risk of illegality in their timber imports. They are also held responsible for the timber products they place onto the EU market and are mandated to have a due diligence system (DDS) (Figure 3-4) that is based on three key elements: access to information; risk assessment and risk mitigation (EC, 2010; Jonsson et al., 2015). Lastly, they need to keep information of their suppliers and customers after placement of timber products on the EU market for the first time. All in all, these form the three obligations for the EU operators: prohibition; a due diligence system and a traceability requirement (Giurca & Jonsson, 2015). While the prohibition and traceability obligations are easy to understand, the most challenging one is the DDS (Trishkin, Lopatin, & Karjalainen, 2015). The regulation also states exemptions of timber products that are covered by the permits of FLEGT or the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In other words, the regulation gives a competitive advantage to such products (Giurca & Jonsson, 2015).

The five key actors in the operation and implementation of EUTR are: the European Commission (EC); Member States (MS); Monitoring Organizations (MOs); Competent Authorities (CAs); Operators; and Traders. Their roles and responsibilities are illustrated in Figure 3-5. Other important stakeholders of the regulation include businesses, political actors, non-governmental organizations (NGOs), media, trade-related organizations, and academia (Giurca & Jonsson, 2015).

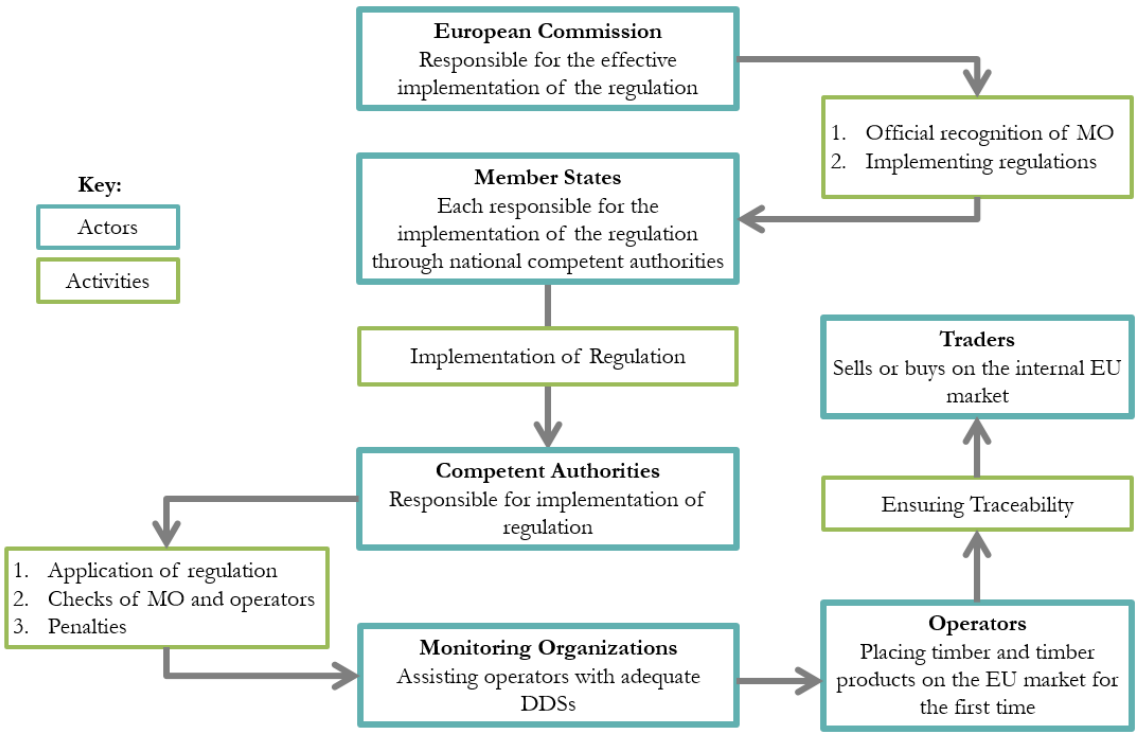

Figure 3-5 EUTR Implementation structure with key actors and their roles

Own Illustration: Adapted from Levashova (2011), Giurca and Jonsson (2015), and EC (2010)

The success of regulation in controlling illegal timber from entering into EU markets is still unknown given the amount of cases of illegal timber import after the regulation came into force. The most recent cases have been in Sweden, Germany, Netherlands and the United Kingdom (ClientEarth, 2018). But in one way these cases are setting a precedent for other companies and countries in the EU to be very careful with their timber imports and ensure a proper due diligence system (TTF, 2018).

3.2.1 Legality vs Sustainability

According to Young (2011), "the state is a positive force in managing natural resources and regulating pollution in domestic settings, the anarchic character of international society treated as a society of sovereign states constitutes a barrier to successful governance at the international level" (p. 19853). Yet the EUTR considers the concept of sovereign states[4] and has a much narrower focus on legality instead of sustainability like other initiatives to combat illegal logging, hence making it different from the previous international policies (Sotirov, Stelter, & Winkel, 2017). Apart from the narrow focus of these initiatives, the scope is limited to national or reginal level instead of global, therefore easing the process of achieving a mutual agreement (McDermott, 2014). These initiatives concentrated on aiding states in strengthening their laws more willingly than challenging their sovereignty with a burden to satisfy a mandatory global agreement. These not only gained interest among industry with timber companies who can effortlessly conduct legality verification holding competitive concern to fight against illegal logging, but also among environmentalists who "saw new leverage" to object the catastrophic forest related activities (McDermott & Sotirov, 2018, p. 180).

[4] Definition of sovereign states

With regards to the questions of sustainability in these legality-based initiatives, Nurrochmat et al. (2016) while referring to van Heeswijk and Turnhout (2013) argue that "the term legality mostly addresses the role of the state and focuses on law enforcement; however, a broader interpretation of legality can include issues of participation and sustainability" (p. 55). Which means that it can be assumed that legality-based initiatives like the EUTR include broader issues of sustainability but the question still remains if sustainability can be achieved through legality or not.

4 Sustainable Supply Chain Management

This section will look into the literature available about the Sustainable Supply Chains, their management, different frameworks that govern the concept, and what are the factors that enable them. This will feed into the analytical framework for this research which is presented in later in this chapter (Section 4.4).

4.1 Sustainable Supply Chains Management

Companies are increasingly going beyond their fiscal targets in order to incorporate broader objectives in their supply chain decisions, often forced by the rising environmental issues like global warming and social concerns like human rights (Varsei, 2016, pp. 412). Sustainable supply chain management (SSCM), also considered as "an extension of traditional supply chain management" (Varsei, 2016), is a research field and a practitioners field at its early stages but developing at a fast pace (Ansari & Kant, 2017; Tachizawa & Wong, 2014). Chen and Paulraj (2004, pp. 121) proposed that the "traditional" supply chain management (SCM) is "a network of interdependent relationships developed and fostered through strategic collaboration with the goal of deriving mutual benefits".

According to a literature review done by Ansari and Kant (2017), the ever-increasing social and environmental problems have pressurized academicians and practitioners to focus on these issues in supply chains and find a sustainable solution. Due to this, a significant rise in the number of research publications on SSCM was seen during the years 2014 and 2015 (Ansari & Kant, 2017). Although environment has been the initial focus of supply chains, generally identified as 'green' SCM, social aspects were also deemed significant by some researchers. On the other hand, developing countries are gaining interest lately due to the fact that a large portion of population is affected by a range of adverse consequences of unsustainable production processes (Gold & Schleper, 2017).

The discourse of sustainability, which refers to 'an integration of social, environmental, and economic responsibilities' started to appear in the business management and operations related literature more than a decade ago. Furthermore, the term is being embraced by companies on a rapid basis (Carter & Rogers, 2008). According to the review of SSCM literature done by Seuring and Müller (2008), the articles which truly address sustainability were only 31 out of 191 reviewed. Moreover these first started to appear in 2002 (Redekop, 2011). Carter and Rogers (2008) also had the same opinion, and stated that before Carter and Jennings' work in 2002, "most logistics and supply chain management research examined issues such as environment, safety, and human rights in a standalone fashion, without consideration of the potential interrelationships among these and other aspects of social responsibility" (Carter & Rogers, 2008). Seuring and Müller (2008) emphasized the prospects of this subject for future research considering the shortage of literature that truly addresses sustainability (Redekop, 2011). Seuring and Müller (2008), while recognizing the various elucidations of the concept of sustainability, propose that the fundamental concept that aids in operationalizing sustainability is the 'Triple Bottom Line' (TBL) approach by Elkington (1997). Considering this approach they define SSCM as

> *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.*

Carter and Rogers (2008) also agree with the significance of the TBL approach, which is "the intersection of environmental, social, and economic performance" (Carter & Easton, 2011) and propose SSCM as

> *The strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains.*

More recently, Ansari and Qureshi (2015, pp.26) describe the concept of SSCM as

> *Maintaining a balance among social responsibility, environmental stewardship and economic viability along the entire supply chain, improving the long-term economic performance of an individual and the company and also meeting the customers' need competitively throughout the life cycle of goods and services.*

The definitions given by Seuring and Müller (2008) and Ansari and Qureshi (2015) consider the requirements and needs of customers while Seuring and Müller (2008) also extend it to other stakeholders. Whereas this aspect of meeting stakeholder needs is not considered by Carter and Rogers (2008) but they mention other very important aspects of sustainable supply chain which are the strategy and transparency. Seuring and Müller (2008) also highlight the collaboration among companies along the supply chain which is not mentioned by Carter and Rogers (2008) and Ansari and Qureshi (2015) as well as many other researchers (e.g., Wittstruck & Teuteberg, 2012; Pagell & Wu, 2009; Seuring, 2008; and others) while defining sustainable supply chains. However, Wolf (2011), while defining supply chain sustainability, emphasized on the strategic collaboration of a company with its suppliers. So, for the purpose of this thesis, a combination of all three definitions given above will be used where sustainable supply chains is the strategic and transparent integration of environmental, social and economic aspects into a company's supply chains through collaborative efforts along the supply chain in order to meet the needs of customers and other stakeholders.

'Responsible supply chain' (Boström et al., 2015; Vaaland & Owusu, 2012; Oelze & Habisch, 2017) is also a concept significantly being used in research as well as in practice. The concept focuses on corporate social responsibility[5] (CSR) while holding the business actors responsible for the related activities in the supply chain (Owusu and Vaaland, 2012). It is hard to completely exclude this concept as well as all the related terms like green supply chains (Andiç, Yurt, & Baltacıoğlu, 2012; Sarkis, Zhu, & Lai, 2011; Yeh & Chuang, 2011) and ethical supply chains (Dubey et al., 2016) while talking about sustainable supply chains and therefore, for the purpose of this thesis, companies part of this research focusing on responsible, environmental and ethical sourcing activities are considered under sustainable supply chain management.

Many organizations are attracted by the fact that SSCM gives them a competitive advantage in the market and thus to make their supply chains sustainable, they have already begun to work towards increased engagement in sustainability practices (Ansari & Kant, 2017). This requires them to integrate different practices like disseminating eco-friendly approaches at every stage of supply chain; product return at end of its life; treating these returned products in an environmentally sound manner; offering improved working environment and fair wages; ensuring human rights and cultural diversity. Therefore, in order to change traditional SCM to SSCM, organizations have to face some major pressures in meeting sustainability requirements to transform their supply chains (Ansari & Kant, 2017).

[5] *Management of stakeholder concern for responsible and irresponsible acts related to environmental, ethical and social phenomena in a way that creates corporate benefit* (Owusu and Vaaland, 2012, p. 155)

4.2 Sustainable Supply Chain Facets

The sustainable supply chain management framework by Carter and Rogers (2008) was used to understand the relationship of sustainability and triple bottom line with sustainable supply chains. The framework is illustrated in Figure 4-1, showing the four supporting facets of the TBL: risk management, transparency, culture and strategy. These facets are not envisioned to be 'mutually exclusive' but rather working on one facet often improves the situation in the other. For example, in order to improve transparency, stakeholder engagement can play an important role, it can also reduce risk by decreasing probability of 'consumer boycotts' and NGO protests and can also be included in the strategy (Carter & Rogers, 2008). This framework was chosen based on the facets of sustainability which relate to the components of the EUTR, especially that of the DDS (see Section 3.2).

Figure 4-1 Sustainable Supply Chain Management Framework

Source: Carter and Rogers (2008)

4.2.1 Strategy

Strategy can be defined as the path and scope of a business over a longer period of time which facilitates in accomplishing competitive advantage, through arranging its resources and capabilities, in order to satisfy requirements and anticipations of stakeholders (Johnson, Scholes, & Whittington, 2009). With regards to SSCM, Carter and Easton (2011) state that a strategy should be "holistically and purposefully identifying individual SSCM initiatives which align with and support the organization's overall sustainability strategy" (p. 49). Dubey et al. (2016) also emphasized on the importance of corporate strategy in the success of SSCM. Carter and Rogers (2008), while discussing their framework (Figure 4-1), emphasize that the corporate strategy and sustainability activities of an organization must be thoroughly aligned with each other and should not be managed separately. Forementini and Taticchi (2016), while referring to Skinner (1969), call it 'strategic alignment perspective' which is a very old concept concerning the relation of company's operations with corporate strategy, and has now been expanded to supply chain management. Kim (2006) and Hofmann (2010) also highlight the significance of strategic alignment with supply chain operations in order to develop integrated meaningful strategies.

4.2.2 Risk Management

Environmental and social problems along the supply chain appear to be risks which ultimately effect the whole chain but there is a lack of knowledge in this regard and how these risk can result in losses for the companies (Hofmann, Busse, Bode, & Henke, 2014). The sustainability risks in supply chain caused mainly due to the reactions of various stakeholders like government, investors, customers, NGOs, employees, etc. are extremely challenging to handle, contrasting to usual supply disturbances, as the companies have to deal with all these stakeholders at the same time (Chen & Kitsis, 2017). Apple Inc. provides a very concrete example as the company is famous for managing its very complex supply chain and was still considered at fault for substandard working conditions at its suppliers' premises (Hofmann et al., 2014), a rising sustainability-related risk to deal with (Chen & Kitsis, 2017).

Risk management includes "contingency planning for both the upstream and downstream supply chain" (Carter & Easton, 2011, p. 49). In terms of SSCM, risk management must comprise interruptions instigated by the various stakeholders mentioned above apart from the usual troubles related to material and/or economic flow (Chen & Kitsis, 2017). Many researchers have definitely argued that the fundamental purpose of SSCM is to enforce actions in order to evade or mitigate the risk (Seuring & Müller, 2008; Chang, Ellinger, & Blackhurst, 2015). Increased transparency in supply chain and frequent examination of supply chain with regards to sustainability-related issues are considered crucial methods for effective management of sustainability-related risk (Carter & Rogers, 2008; Hofmann et al., 2014).

4.2.3 Transparency

Carter and Easton (2011) explained the facet of transparency "in terms of proactively engaging and communicating with key stakeholders and having traceability and visibility into upstream and downstream supply chain operations" (p. 49). Transparency has also been considered crucial in upholding legitimacy and building reputation and has been demanded increasingly by stakeholders (Carter & Rogers, 2008). The drivers and enablers of transparency, as mentioned by Carter and Rogers (2008), vary from speedy communication through internet to the exchange of information through software leading to globalization of supply chains, what Friedman (2005) referred to as the 'flat world'. Due to this, it has become very risky and difficult to keep the corporate misconducts a secret now. The wrongdoings of a company or its supplier in one part of the world becomes a very big news in another part of the world within a day (Carter & Rogers, 2008).

Transparency in supply chains is not only limited to the reporting of information to stakeholders but also includes active engagement with stakeholders in order to get their opinions and learn from them. It can be enhanced with the help of both vertical and horizontal coordination in supply chains and networks respectively. For instance, if a group of companies form a coalition to conduct audit for suppliers' sustainability, this will not only enhance transparency and supplier sustainability but also decreases the transaction cost for both the companies planning to do business with those suppliers and the suppliers themselves (Carter & Rogers, 2008).

4.2.4 Organizational Culture

An organizational culture as facet of SSCM is explained by Carter and Easton (2011) as the one "which is deeply ingrained and encompasses organizational citizenship, and which includes high ethical standards and expectations (a building block for SSCM) along with a respect for society (both within and outside of the organization) and the natural environment"

(p. 49). For organizations to become fully sustainable, integrating sustainability activities into corporate strategy is not enough. They have to change the culture as well as the mindsets of their employees in order to achieve their sustainability goal (Carter & Rogers, 2008).

4.3 Sustainable Supply Chain Enablers

As mentioned earlier, the TBL concept governs the SSCM literature focusing on measuring environmental, social and economic performances as basic pillars with four key dimensions of strategy, risk management, transparency and culture (Dubey et al., 2016). For effective application of the concept of SSCM, motivational actions called enablers should be taken into account by organizations (Ansari & Kant, 2017). Grzybowska (2012) defines enablers, also called critical success factors (CSFs), as "one that enables another to achieve an end". One of the most challenging parts of framing policy is to recognize these enablers (Matos & Hall, 2007). Hervani et al. (2005) have debated that these enablers can be both internal and external factors, affecting an organization from the inside and outside. Zhu et al. (2013) have also considered these enablers to be internal and external and called them drivers. They gave examples by categorizing eco-design and environmental management within an organization to be internal drivers while inventory optimization, collaboration on environmental requirements with customers, green purchasing to be external drivers.

Dubey et al., (2016) conducted a literature review related to enablers of SSCM and compiled a list of enablers which includes supply chain collaboration, environmental management, green procurement, and others (see Appendix IV). Remanufacturing has been considered a key instrument for competitive advantage by Svensson (2007) and Gupta and Palsule-Desai (2011). They have recommended that existing supply chain networks need to be reformed to incorporate reused and recycled products. A practical framework for SSCM was introduced by Closs et al. (2011) by incorporating educational and ethical aspects together with economic and environmental ones, hence suggesting a variation from typical 3P's (people, planet, profit) and 3E's (environmental, economic and equity) theories. Contingency variables like distance, power, industry, dependency and knowledge resources were considered for sustainable multi-tier supply chain framework by Tachizawa and Wong (2014). Life cycle assessment, stakeholder management, technological integration, supply chain collaboration, and the TBL have been emphasized by Beske and Seuring (2014), while claiming that SSCM is an expansion of traditional SCM. Stronger supply chains have been claimed to improve social sustainability and environmental performance of a country (Dubey et al., 2016), consequently contributing towards the SDGs.

4.4 Analytical Framework

As mentioned in Section 4.3, enablers are contributing to driving sustainable supply chains. Government Rules and Regulations is mentioned as an important external factor by Dubey et al. (2016) and as an enabler by Georgiadis & Besiou (2008) and Gold et al. (2010). This makes EUTR one of the external factors potentially enabling sustainable supply chains but the question of its effectiveness still remains. On the other hand organizations integrate sustainability into their supply chains due to a number of other factors and as the regulation is quite recent, chances are that most of the responsible organizations have been practicing SSCM long before the EUTR came into force.

The analytical framework (illustrated in Figure 4-3) tailored to the research aim of this thesis has been developed by the author on the basis of SSCM Framework provided by Carter and Rogers (2008) and the list of sustainable supply chains enablers given by Dubey et al. (2016). It not only shows the link between all the elements of the framework but also provides basis for

the analysis of data collected for this research. The reason behind combining these two works by different authors and merging into one was to integrate the basic elements of the regulation covered by DDS as they very much overlap with the four facets of sustainable supply chains given by Carter and Rogers (2008) and also to see how these enablers are incorporated by the regulation as well as by the companies. By doing so, the framework provided the "codes" for the content analysis. The enablers of SSCM are illustrated in the outer circle whereas the facets form the inner circle. The facets are not mutually exclusive (Carter & Rogers, 2008), therefore they form four parts of the inner circle hence showing that SSCM is not fully achievable if any of the facet is absent. The enablers of SSCM in the outer circle are generally feeding into the whole SSCM rather than just one facet. Although it is difficult to categorize each enabler within a specific facet, however, during interviews with the companies they were challenged with a question to categorize their sustainability activities in supply chain under the four facets of SSCM. The author believes that it is hard to ignore the facets when building sustainable supply chains.

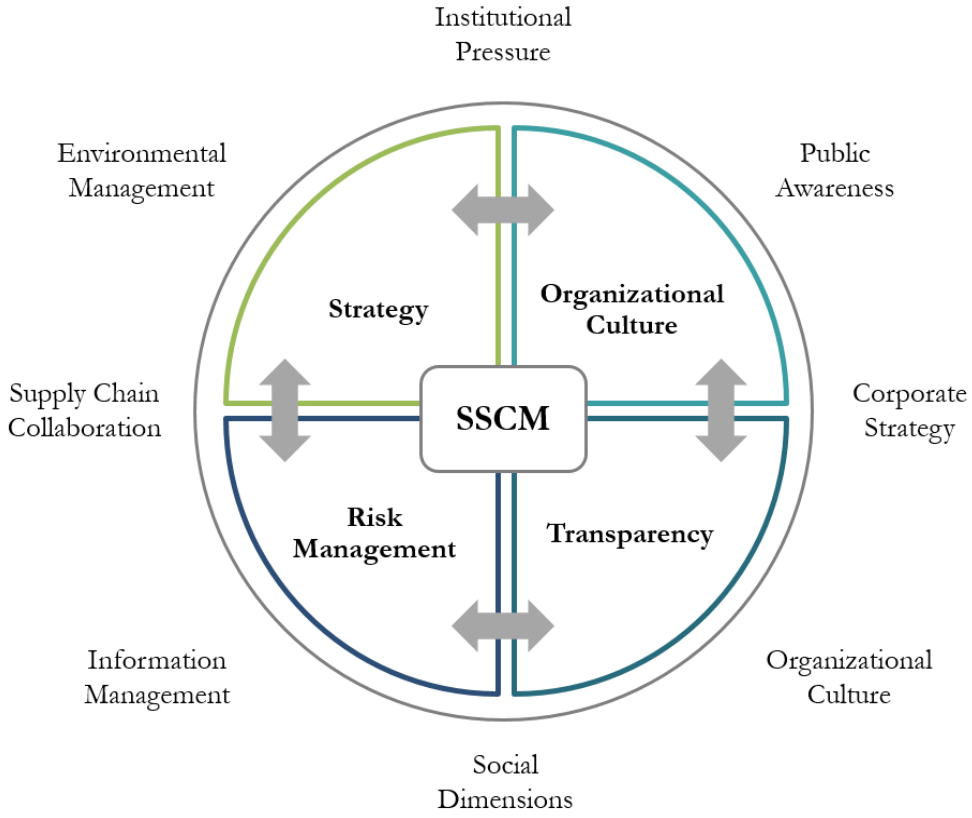

Figure 4-2 Framework for Building Sustainable Supply Chains

Source: Own Illustration

The list of enablers compiled by Dubey et al. (2016) include a number of enablers (see Appendix III) but only a few were selected for this new framework. Enablers like green product design, green procurement, green packaging, green warehousing, reverse logistics, minimization of greenhouse gases, and manufacturing strategies were not considered in the new framework. Although all these enablers have an important role to play in sustainable supply chain, these were assumed to be least relevant and hence excluded from the framework. The assumption made here is that most of the excluded enablers are related to product design, the lifecycle of product and the manufacturing process which were assumed to be out of scope for this research. The main areas covered by the enablers of SSCM are

explained in the following sections and also illustrated in Figure 4-4. These were decided based on the literature review and author's own understanding and assumptions.

The main assumption that governs the whole research is that if these enablers are referred to in the data sources (sustainability reports, sustainability policies, interviews, and the EUTR document No. 955/2010), will mean that they are contributing towards building sustainable timber supply chains.

4.4.1 Corporate Strategy

The alignment of corporate strategy with operations and sustainability activities in supply chain has a lot of significance (Dey, LaGuardia, & Srinivasan, 2011; Dubey et al., 2016; Forementini & Taticchi, 2016). Day and Lichtenstein (2006) have stated that this alignment is 'necessary' for the realization of SSCM. Carter and Denser (2001) and Griffiths and Petrick (2001) emphasized that the lack of corporate strategy acts as an obstruction for an organization's efforts towards achieving sustainability. For the purpose of this research, corporate strategy is considered a part of the analytical framework and it takes into consideration not only the alignment aspect but also prerequisites and targets set for suppliers to achieve sustainability. For the content analysis, presence of all types for supplier sustainability policies, code of conducts, procedures for selection of suppliers based on company's sustainability requirements, and sustainability targets for suppliers and supply chain were considered. Evaluation of suppliers prior to starting business with them in order to avoid risk has also been highlighted by Harms et al. (2013).

4.4.2 Environmental Management

Environmental management is an integral part of sustainability framework of TBL given by Elkington (1998) and therefore cannot be ignored in the SSCM. Dubey et al. (2016) considered environmental management as one of the key dimensions of the 'World Class Sustainable Supply Chains Management' framework. They considered a wide list of environmental enablers including green design, green packaging, green warehousing, lifecycle concept, and conservation of natural resources under environmental dimensions. For the purpose of this thesis, the conservation of natural resources was mainly considered and all the aspects related to lifecycle of a product, product design and procurement practices were not considered. The main focus was given to forest resources and their management as well as the environmental performance of the suppliers with regards to timber harvest and forestry practices.

During the analysis, where not specifically stated, content related to energy use, water use, transport and carbon footprint of supplier was considered in this study. Recycled paper or wood products were also not considered during the analysis as they are not within the scope of product to which the EUTR is applicable to (see Appendix III)

4.4.3 Information Management

Information sharing along the supply chain benefits the company in achieving better sustainability performance (Wittstruck & Teuteberg, 2012). It has also been considered a driving force for SSCM by Faisal (2010). Information management, for the purpose of this thesis, includes gathering information from suppliers and tracking their performance over time. The modes used for this can be anywhere from scorecards to supplier monitoring questionnaires (BSR, 2007). This can through data management software or other tools. Information management systems are deemed to be of utmost important in SSCM practices

while brining benefits to suppliers, organizations, and customers (Fiorini & Jabbour, 2017). Information management also helps in predictability in supply chains, whether related to supply or sustainability-related risks (Fiorini & Jabbour, 2017). It also aids in transparency throughout the supply chain (BSR, 2007). Sharing of sustainability-related information with stakeholders related to supply chain is also considered under this enabler. The suppliers should also have systems and procedures to collect information from their suppliers and sub-suppliers.

4.4.4 Institutional Pressure

Government regulations significantly influence the sustainability efforts of a company and are a main 'driving force' of SSCM (Amann, Roehrich, Eßig, & Harland, 2014; Dubey et al., 2016). Pressures from customers and investors are also key drivers of SSCM (Dubey et al, 2016; Trowbridge, 2006). Market demands and environmental regulations also have a role to play in SSCM (Darnall et al., 2008). Similarly, environment organizations and NGOs (e.g., Greenpeace, WWF, etc.) are increasingly concerned about the practices of companies in supply chains, especially related to forest resources. For this analytical framework, institutional pressure consist of all of the above mentioned.

4.4.5 Supply Chain Collaboration

Supply chain collaboration as an enabler of SSCM has been emphasized by a number of researchers (e.g., Attaran, 2007; Dam &Petkova, 2014; Dubey et al., 2016). Wolf (2011) emphasize the strategic collaboration of companies with suppliers while defining supply chain sustainability. For the purpose of this research, supply chain collaboration includes trustful mutual relationship between the company and its suppliers, evaluation and mitigation of sustainability risks at supplier level, checking compliance with company's code of conduct or sustainability requirements for suppliers, training and development of suppliers on sustainability issues, and giving responsibility to suppliers for their suppliers and sub-suppliers.

4.4.6 Organizational Culture

The need for cultural change in companies for the effective execution of supply chain activities has been discussed by Mello and Stank (2005) and Dubey et al. (2016). Organizational culture has been emphasized a lot by the practitioners of SSCM. Organizational culture includes integration of sustainability into all operations, top management commitment, and awareness and engagement of employees in sustainability activities. For the purpose of this thesis, this also includes training of employees on supply chain sustainability and forestry standards.

4.4.7 Social Dimensions

Violations of human rights are have been considered an important social dimension of sustainability (Lobel, 2006). Beamon (2005) has emphasized the significance of ethics in developing sustainable supply chains. For this research, social dimensions include the alignment of code of conduct or sustainability requirements for suppliers with human rights principles and ethical business practices. It also includes consideration of impacts on the surrounding communities where the company or its suppliers have operations and work on improving the social conditions along the supply chain.

Institutional Pressure
a. Government policies, rules and norms
b. Pressure from stakeholders

Environmental Management
a. Certifications for SFM
b. Sourcing timber from environmentally sustainable sources
c. Environmentally responsible supplier operations

Public Awareness
a. Customer's awareness
b. Customer's expectations
c. Company's efforts to educate customers

Supply Chain Collaboration
a. Trustful mutual relationship
b. Supplier risk evaluation and mitigation
c. Checking compliance
d. Supplier training and development
e. Supplier's responsibility for sub-suppliers

Corporate Strategy
a. Supply chain strategy and policies (CoC) consistent with corporate strategy
b. Selection of suppliers based on sustainability requirements
c. Targets for sustainable/legal timber sourcing

Information Management
a. Data collection systems
b. Tracking information and performance (Audits)
c. Sharing information with stakeholders
d. Suppliers have procedures to track information

Organizational Culture
a. Employee engagement and awareness
b. Sustainability integration in everything
c. Top management commitment

Social Dimensions
a.CoC based on human rights principles and ethical business practices
b.Considerate of impacts on communities
c.Work towards improvement of social conditions in supply chains

Figure 4-3 Main themes considered for SSCM enablers

4.4.8 Public Awareness

The importance of public awareness in building sustainable supply chains has been emphasized by Sigala (2008). Customers are also demanding sustainability from companies while also questioning the sourcing practices (Opara, 2003). For this research, consumer awareness on sustainably sourced products is also considered as well as the company's actions in order to promote awareness about sustainable sources raw materials, for example, FSC labels on cartons, is also included.

5 Findings and Analysis

In this chapter, the author presents the key findings and brief analysis obtained by the content analysis of company's sustainability reports, sustainability policies regarding supply chain, and lastly the interviews conducted. The chapter also includes the content analysis of the EUTR in order to see which enablers are found in the regulation and therefore contribute towards building sustainable supply chains. The chapter first presents how the concept of sustainable supply chains is understood by these companies giving a picture of what constitutes sustainable supply chains for timber sector. Later in this chapter the author presents findings related to enablers of SSCM proposed in the analytical framework in Section 4.4 found in sustainability reports and sustainability policies regarding supply chains while validating this information from the content analysis of the interviews conducted. The chapter also presents the content analysis of the EUTR. The chapter subsequently proposes other possible enablers of SSCM and finally presents the perceptions of companies on the role of EUTR in building sustainable supply chains in timber sector.

5.1 SSCM definition in practice

SSCM is a field that started with practice and then was later highlighted in academia. This makes it important to see how different companies and sectors understand the term. Table 5-1 presents the main themes highlighted by the company representatives during the interviews. Most of the interviewees mentioned that compliance to laws and requirements of different certifications constitutes sustainable supply chain for their company. Close and mutual relationship with suppliers was also emphasized by a few.

Table 5-1 Sustainable Supply Chain Management Defined

Company Name	**Main contents described by Interviewee**
Duni AB	Close collaboration with suppliers, Meeting international requirements, Visiting and auditing suppliers, Not outsourcing these activities
IKEA	Looking at entire manufacturing process, Having control on supply chain through certifications, Making an impact in terms of social and environmental conditions
Kährs Group	Meet certain standards (FS, PEFC), Meet the law, Collection of data from suppliers, Lifecycle thinking
Stora Enso Paper AB	Compliance with legislation, Forestry certifications, Continuous improvement in supply chain with regards to sustainability
Tetra Pak	Compliance, Signatory to international standards, Understand individual responsibility, Finding a balance of responsibility, Level of demands company wants to aim for

Source: Interviews

5.2 Enablers of SSCM in Timber Sector

This section presents the findings of the content analysis of sustainability reports, sustainability policies and the EUTR with the help of the analytical framework illustrated in Figure 4-2 and Figure 4-3. Number of coding references in each document was used as an indicator of the presence of a particular enabler in the analyzed documents (Appendix I). The list of all the codes used for the purpose of this research and their total number of references in all the data sources analyzed are given in Appendix VI.

5.2.1 SSCM Enablers in Sustainability Reports

The results of the content analysis of 23 sustainability reports of the five companies interviewed are presented in this section. The number of sustainability report analyzed for each company varied based on the availability of the report on the company's website: 11 sustainability reports of Stora Enso, 7 of IKEA, 3 of Tetra Pak and only 1 for Duni AB and Kahrs Group (see Appendix I).

These sustainability reports were scrutinized based on the different themes (enablers) presented in the analytical framework (Figure 4-2 and Figure 4-3) to check whether or not these enablers are applicable in timber sector and to what extent. During the analysis, only the content specific to the timber supply chain was considered, especially the timber products covered by the EUTR (Appendix IIIAppendix III: Timber and Timber Products to which EUTR applies), for example, IKEA uses bamboo in its products but the related content was not considered for analysis due to its exclusion from the regulation's scope. During the content analysis there were also some overlaps between different enablers proposed in the analytical framework, for example, environmental management being part of corporate strategy, supply chain collaborations on social dimensions, information management on environmental management and social dimensions, and other similar overlaps.

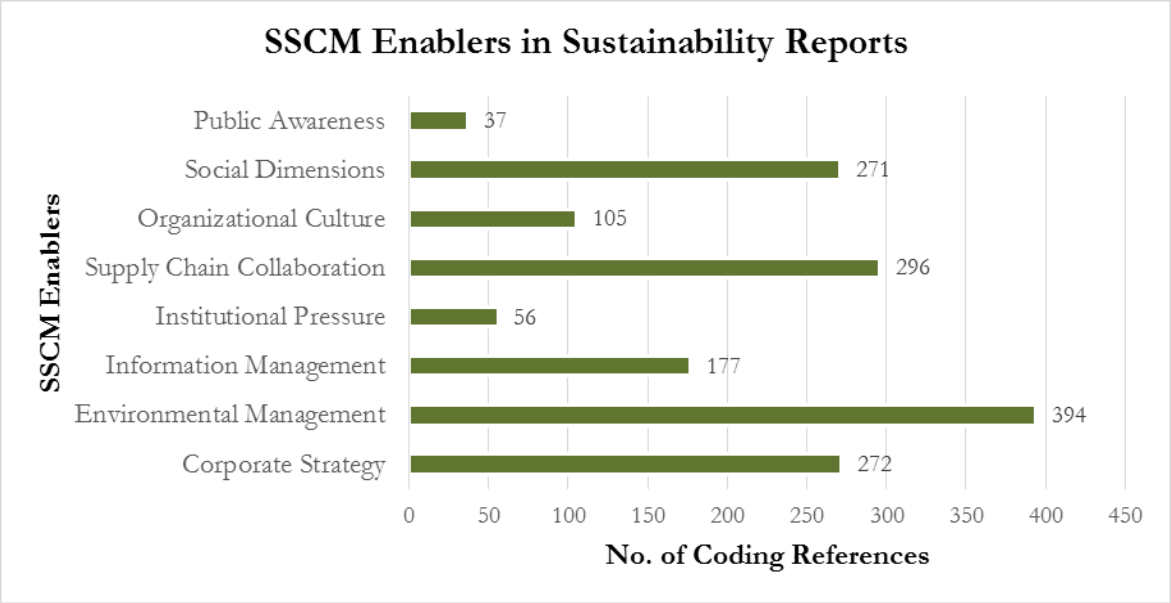

Figure 5-1 SSCM Enablers in Sustainability Reports

Source: Data collected from content analysis of sustainability reports

Content analysis of sustainability reports showed that all of the enablers of SSCM presented in the analytical framework of this research in Section 4.4 were found to be functional in the selected companies. Although this varied between companies where some enablers were found in some companies and not in others, but overall 4 out of 5 companies had all the enablers of SSCM (see comparison in Section 5.2.1.1). The analysis also revealed that all of the companies considered environmental management to be of utmost importance in their supply chains, followed by supply chain collaboration, corporate strategy and social dimensions (Figure 5-1).

With regards to environmental management, all the companies are either certified by FSC or PEFC, or both (see Appendix I) and refer to putting great emphasis on the certifications in

their suppliers' domain in their sustainability reports. Almost all the companies have set these certifications as a minimum requirement for their timber or timber product suppliers. Stora Enso presented an interesting case in terms of environmental management. Unlike the other four companies importing timber or timber products, they also own forests. Their sustainability reports emphasized significantly on the sustainable forestry practices and conserving biodiversity. In their sustainability report of 2014, they emphasized the environmental management enablers and stated, "Sustainable forest management is in our immediate and long-term interest, as it keeps forests healthy and productive, and thus helps to secure the long-term availability of this renewable resource. We aim to offer innovative ways to use land and practice forestry responsibly".

Supply Chain Collaboration was also emphasized to a great extent by all the companies. These collaborations included communicating and training the suppliers on the sustainability requirements and code of conduct (Duni AB, IKEA, Tetra Pak), training and working closely with suppliers to improve environmental and social improvements (Stora Enso, IKEA, Tetra Pak), training on forestry standards, relevant laws and FSC certification and working closely to ensure sustainable forest management (Kahrs Group, IKEA, Tetra Pak, Stora Enso), auditing, supporting and evaluating suppliers on sustainability requirements (Duni AB, IKEA, Stora Enso, Tetra Pak), third party audits of suppliers to evaluate risks and compliance (Stora Enso), "long-term relationships with suppliers with a focus on collaborative learning" (Duni AB, also focused by IKEA, Stora Enso), getting (anonymous) feedback from the suppliers on relationship (IKEA), giving responsibility to suppliers for their actions and their suppliers and sub-suppliers' activities (IKEA). Duni AB stated in their sustainability report that "Good working conditions are very important to us, and we believe that close cooperation with our suppliers is the best way to ensure this". A number of supply chain collaborations mentioned in the sustainability reports were with actors other than suppliers aiming to promote sustainability in supply chains. These are explained in Section 5.3.1.

Companies also highlighted reference to corporate strategy a number of times in their sustainability reports. Selecting suppliers based on sustainability assessment and compliance to company's sustainability requirements was mentioned by almost all of the companies. Sustainability as part of all business operations and aligning the strategy (including policies for supply chains) accordingly was mentioned by IKEA. Reference to sustainability requirements for suppliers and code of conduct have also been several times in all the reports. Setting targets and expectations from suppliers regarding sourcing of legal and sustainable timber and timber products was also mentioned by all the companies. IKEA stated in their report, "All suppliers must meet our IWAY forestry standard, designed to ensure wood is logged legally and doesn't have a negative impact on the environment".

An extensive focus on social dimensions of supply chains was also noticed in all the sustainability reports. All the companies increasingly paid attention to working conditions at suppliers' facilities, basic human rights, child labor, forced or bonded labor, fair wages, and working hours. Emphasis on treating workers fairly and with respect was also made. Emphasis on ethical business conduct, which was considered part of social dimensions in this research (see Figure 3-1), was also made in a number of reports referring mainly to zero tolerance for corruption from suppliers. Companies mentioned a few aspects related to social wellbeing of the communities around the forests they own or where they source from including projects to promote socio-economic development (Stora Enso, Kahrs Group) and partnerships with local farmers (Stora Enso). Stora Enso stated that they "engage with local communities and form partnerships with local farmers who earn their livelihoods through wood production". Most companies (Stora Enso, IKEA) also require their suppliers to comply with International Labor Organization (ILO) conventions and the United Nations' Universal Declaration of Human

Rights. IKEA repeatedly mentioned their efforts to promote decent working hours in China. In their sustainability report of 2015 they stated that "One big issue we have faced is ensuring that the people at our suppliers are not working too many hours in a week. In China, where long hours are very common in some industries, we've required a maximum 60 hour work week, including overtime, but this year we have gone further. Together with our suppliers, we reached working hour limit of 49 hours (including overtime), while maintaining wage levels".

5.2.1.1 Comparison of Companies

It would not have been fair if SSCM enablers found in all the sustainability reports of one company were compared with another as the number of sustainability reports analyzed for each company varied based on their availability on website (Appendix I). The author decided to compare the reports for the year 2016 which were available for the all the 5 companies. Figure 5-2 shows the comparison of these companies with IKEA standing out in all the SSCM enablers, except for public awareness, in their sustainability reports. The number of coding references in these sustainability reports of all the companies were found the most for the enabler of environmental management. Public awareness was mentioned the least amount of times and by only 3 companies.

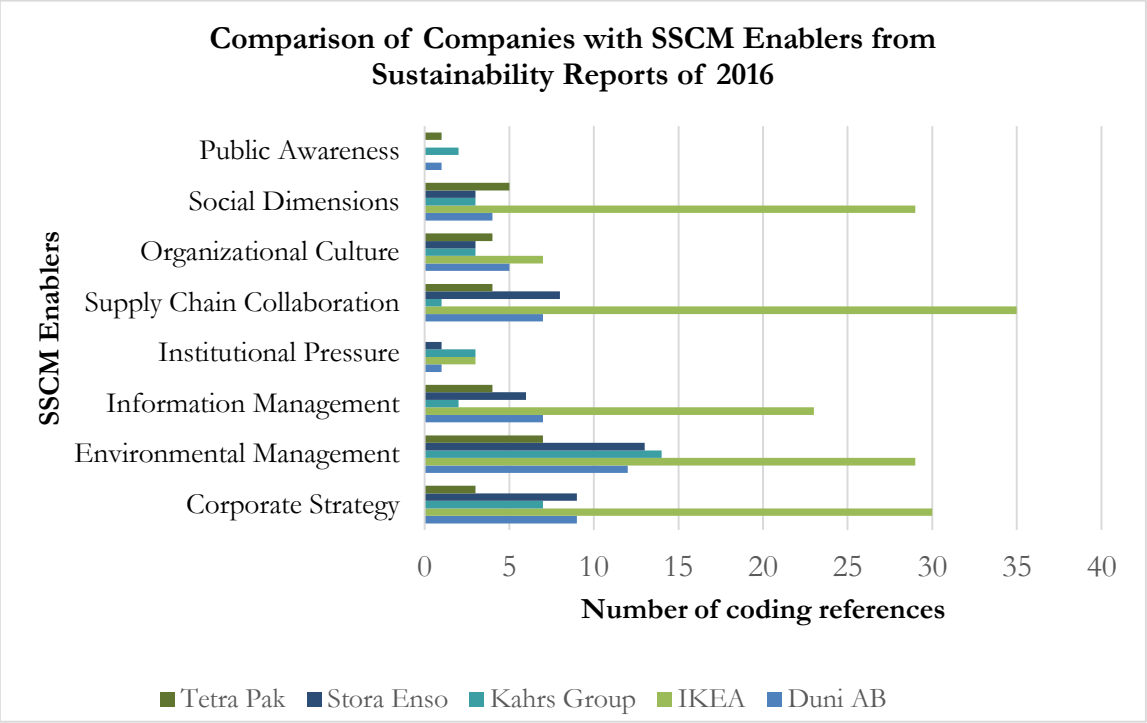

Figure 5-2 Comparison of Companies with SSCM Enablers from Sustainability Reports of 2016

Source: Data collected from content analysis of sustainability reports

5.2.2 SSCM Enablers in Sustainability Policies

The content analysis of sustainability policies regarding supply chain operations was also conducted in the same method as for the reports. This revealed very interesting results compared to the sustainability reports: companies focus the most on the social dimensions instead of environmental management. These social dimensions included a range of subjects from child labor in supply chain, workers basic rights, human rights, health and safety of workers to civil rights of indigenous communities and sustainable livelihoods. The reason for

this emphasis on social dimensions is that most of these companies operate or have supply chains in high risk countries like China. This was mainly highlighted in sustainability reports of IKEA and Stora Enso where they mention implementation challenges related to their sustainability policies, for example in China, where workers have to face many challenges related to working hours and freedom of association (IKEA, 2010).

Apart from the social dimensions mentioned above, ethical business conduct was also assumed under this theme. Companies typically focused on the issues of corruption and bribery in supply chains as well as zero tolerance to discrimination of any kind and harassment.

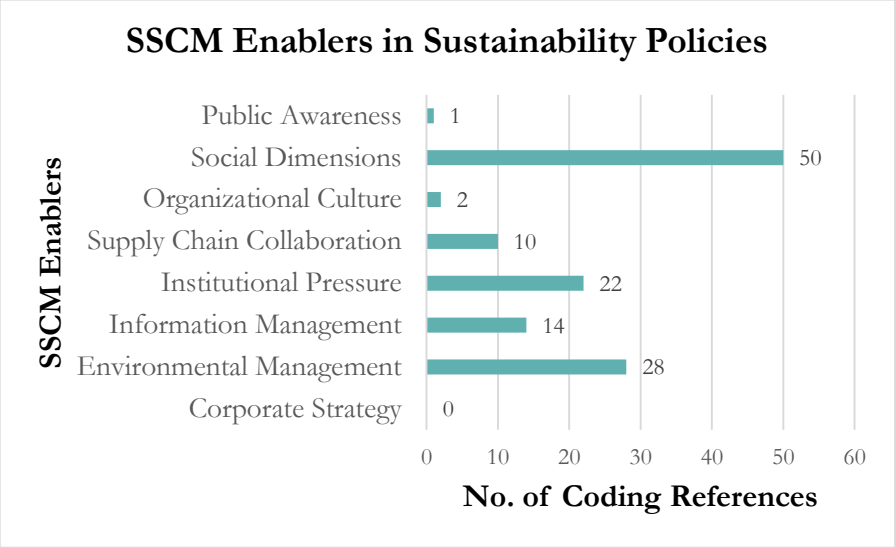

Figure 5-3 SSCM Enablers in Sustainability Policies

Source: Data collected from content analysis of sustainability policies

Social dimensions are followed by factors related to environmental management which includes considerations for harvesting, conservation of forests, sourcing from sustainably managed and certified forests, and meeting the requirements laid down by laws and regulations including the EUTR. While all companies expect legal compliance from their suppliers, Kährs Group is the only company, out of all 5, which clearly states in its code of conduct that the suppliers should meet the requirements of the EUTR and the Lacey Act whereas others mostly emphasize on the requirements of forestry certifications.

5.2.3 SSCM Enablers in Interviews

The author wanted to validate the findings of SSCM enablers found in sustainability reports and policies as well wanted to know the views of interviewees on SSCM enablers for their companies and asked the question "*What do you think enabled your (company's) supply chain to achieve sustainability?*" (Q6, Appendix II). All the responses were very interesting and covered all the SSCM enablers but the number of enablers varied per interviewee. Interviewee from Stora Enso referred to the most number of SSCM enablers. Kahrs Group stood out with regards to public awareness in both the comparison of companies (Section 5.2.1.1) as well as was the only one that mentioned it during the interview while referring to the customer demands.

Table 5-2 SSCM Enablers mentioned in the Interviews

"What do you think enabled your (company's) supply chain to achieve sustainability?"		
Company name of interviewee	**Response to the question**	**SSCM Enablers**
Duni AB	"It was management commitment that this (SSCM) was needed and they then set up quite an ambitious scheme including the code of conduct."	- Organizational Culture - Corporate Strategy
IKEA	"Making sure that this was considered a priority for business so putting the requirements for forestry as pre-requirements for business. So there is no business in case the supplier is…compliant with legislation but not with our minimum requirements for forestry"	- Corporate Strategy - Environmental Management
Kahrs Group	"Communication with suppliers, working with forestry association (Skogsstyrelsen/Swedish Forest Agency), finding out what customers' demands may be." "…One more thing that was very helpful to the company; we call it Triple Helix…we worked a lot with the local universities, and then governments, other industries which could be in our suppliers or our supply chain."	- Supply Chain Collaboration - Public Awareness - Collaboration with other Stakeholders (see Section 5.3.1)
Stora Enso	"We comply with any (especially forestry-related) legislation referring to any sustainability aspects (be it legal harvesting, protection of high conservation value habitats and biotopes, etc.)" "We have our own Sustainability Policy and Wood and Fibre Sourcing Policy which covers all the relevant sustainability aspects." "We also apply diverse voluntary third party verified forest certification management systems such as FSC Chain of Custody and Controlled Wood as well as PEFC Chain of Custody and Due Diligence System." "Stora Enso has implemented its so-called Stora Enso Supplier Code of Conduct."	- Institutional Pressure - Corporate Strategy - Environmental Management - Information Management - Supply Chain Collaboration
Tetra Pak	"One important enablers is that we have a long-term relationship with suppliers; it's kind of mutual dependency" "….we have put environment in our global agenda for suppliers, specifically the most important suppliers for us like paper" "...we compete in a market with different packaging materials…we want to make sure that our supply chain is efficient and effective and has the lowest possible environmental impact because that is important for our positioning in the market."	- Supply Chain Collaboration - Corporate Strategy - Environmental Management

Source: Interviews

5.2.4 SSCM Enablers in EUTR

The contents of EUTR were also scrutinized and themes were identified using the analytical framework proposed for this research (Section 4.4). Although the regulation itself is an enabler but the content analysis gave interesting results regarding the emphasis of regulation on other enablers of SSCM. As shown in Figure 5-4, the regulation repeated themes related to information management including Member States to support research and gather information regarding illegal logging in different countries, operators and traders to provide information on their suppliers and buyers regarding the timber and timber products, a due diligence system to include all the information related to country of harvest, applicable laws in that country, species, and quantity of import. It also focuses on the exchange of this information as well as transparency. According to the regulation, based on this information risk assessment should be carried out by the operators and in case of presence of risk, operators should take steps to mitigate the risk.

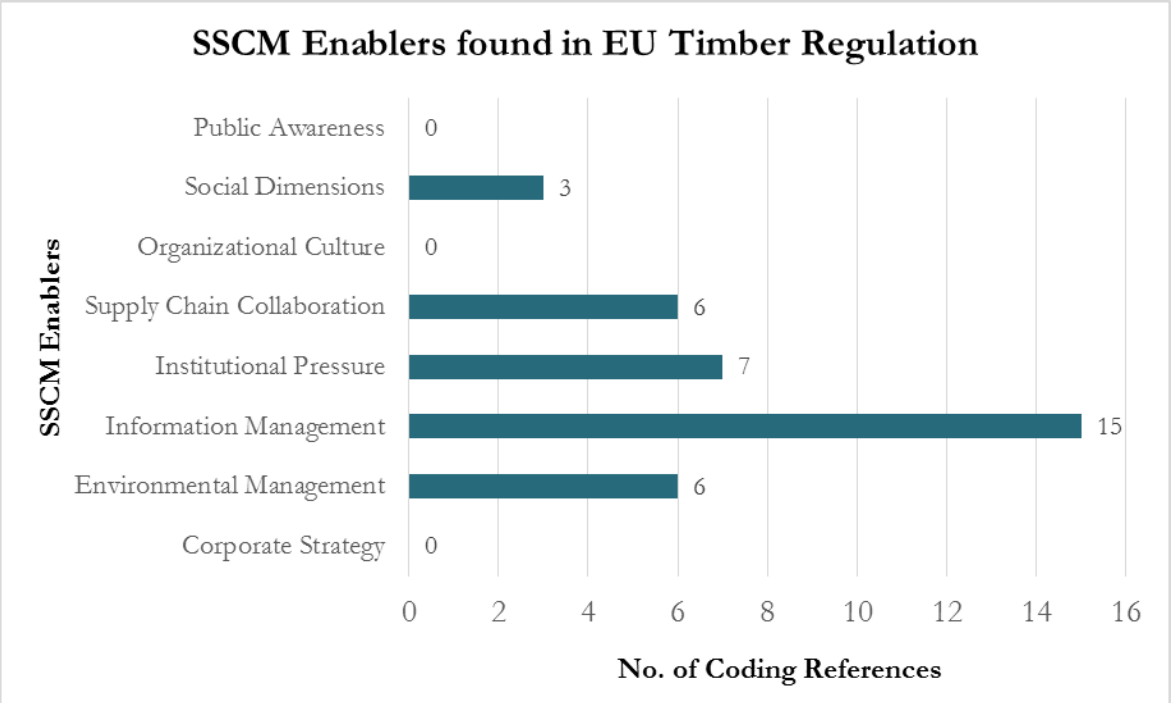

Figure 5-4 SSCM Enablers in EU Timber Regulation

Source: Data collected from content analysis of EU Timber Regulation

Information management is followed by institutional pressure which included climate change commitments of the EU to the United Nations Framework Convention on Climate Change as well as emphasis on the applicable legislation and international conventions in the country of harvest. Environmental management and supply chain collaboration were equally mentioned in the regulation. With regards to environmental management, the regulation not only mentions the importance of forests in climate change but also states that illegal logging demoralizes sustainable forest management. These references to environmental concerns were considered regulation's focus on the issues related to environmental management. The statements in regulation referring to supply chain collaboration include the field audits carried out by the competent authorities, measures and procedures to mitigate risks when identified and operators to assist in carrying out field audits. Social dimensions related to the impacts of illegal logging on the livelihoods of communities dependent on forests were also referred to in the regulation. All in all, the regulation referred to themes related to five of the SSCM enablers

with the remaining three not mentioned at all. This seems reasonable as the nature of the regulation is not as such to stipulate that operators and traders should align their corporate with the regulation or incorporate it in the culture. Although not stated in the regulation document (Regulation No. 955/2010), public awareness in emphasized by the Commission and before the EUTR came into force, an awareness campaign was carried out by the EC (EC, 2016). The EC asks all the Member States to take steps for public awareness of the regulation (EC, 2016). Although the content analysis of sustainability reports and policies showed that the companies do mention the regulation (Kahrs Group), and if not the regulation, they still put requirements on suppliers about illegal harvesting and traceability. The next section (Section 5.2.4.1) explains the findings on this regard.

5.2.4.1 Reference to EUTR in Sustainability Reports and Policies

The content analysis of the EUTR also revealed if the companies were referring to the regulation or not while talking about timber sourcing. 11 out of 23 sustainability reports mentioned the regulation while expecting from their suppliers to source from sustainable sources. Companies which stated the EUTR in their sustainability reports are Stora Enso and Tetra Pak. Stora Enso has been continuously mentioning the regulation in its sustainability reports since 2012. It has also been continuously talking about traceability in supply chains and origin of all the wood used, which are two of the main aspects of the EUTR, way before the regulation, since 2003. Stora Enso stated in its sustainability report of 2003, "Traceability ensures that fibre comes from sustainably managed sources" and that traceability systems provide one of the most effective ways to combat illegal logging". All the sustainability reports of Stora Enso analyzed in this research mentioned about traceability in wood sourcing. References related to legally sourced wood were also found in the sustainability reports of IKEA and Stora Enso.

The sustainability policies also frequently emphasize the legal origin of wood and that wood should be harvested according to the applicable legislation in the country of harvest (IKEA, Stora Enso, and Tetra Pak). Kahrs Group is the only company that specifically mentions the regulation in its code of conduct stating that they only "source wood meeting the EU Timber Regulation".

5.3 Other Possible Enablers

This section highlights the factors that might also have contributed to the management of sustainable supply chains in timber sector. These were identified by analyzing the sustainability reports, sustainability policies, and the EUTR, and are based on the number of coding references in all the data sources (**Error! Reference source not found.**). These include: Collaboration with other Stakeholders, Global Initiatives and Standards, and Supply Chain Mapping (Figure 5-6).

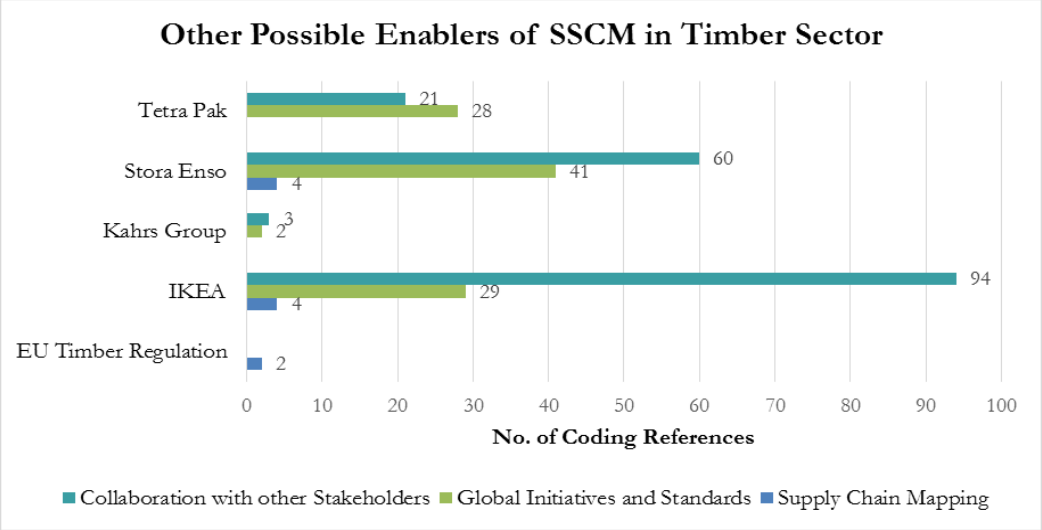

Figure 5-5 Other Possible Enablers of SSCM in Timber Sector
Source: Data collected from content analysis of sustainability reports, sustainability policies and EUTR

5.3.1 Collaboration with other Stakeholders

This enabler was one of the most mentioned out of all three other possible enablers (Figure 5-5) with IKEA having the most number of references followed by Stora Enso and Tetra Pak. Although this graph is based on the coding references from all the sustainability reports and therefore it is not justified to compare the companies. But the focus here is not the comparison but to see how much emphasis companies have given to collaboration with stakeholders other than suppliers. The stakeholders can be governments, policy makers, international organizations, NGOs, researchers, and other companies. These collaborations can be partnerships, engaging with different stakeholders in supply chain, research and projects related to supply chain sustainability, and learning from stakeholders and their experiences (Figure 5-6).

For example, IKEA states in its sustainability report that, "To improve social and working conditions in China, IKEA cooperates with other international companies and organizations while also seeking support from Chinese authorities". Collaboration with NGOs was also emphasized by 4 out of 5 companies (IKEA, Kahrs Group, Stora Enso, and Tetra Pak). Kahrs Group supported a project in Chile called Fair Wood which was a double certification by FSC and the Fairtrade and was a concept by WWF supported by SIDA. The goal of this collaboration was "to offer the native population opportunities to sell timber on the global market and get fairly paid for it…and ensures that the forest are managed in a sustainable way". Tetra Pak, Stora Enso, and IKEA are also part of the WWF GFTN Sweden, which is "advocating zero net deforestation and forest degradation by 2020" (Tetra Pak, 2017).

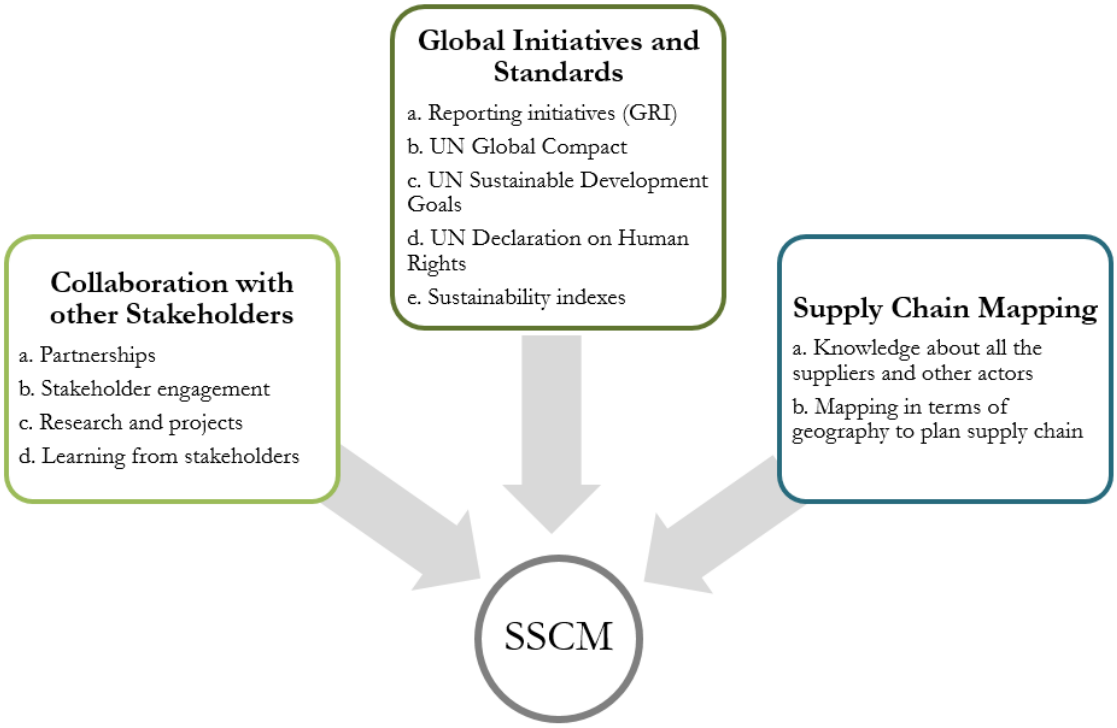

Figure 5-6 Other Possible Enablers of SSCM

Source: Own Illustration based on analysis

5.3.2 Global Initiatives and Standards

This includes a number of sustainability related voluntary initiatives (Figure 5-6) that can play an important role building sustainable supply chains. Forestry certifications (FSC or PEFC) were not included as they were already considered under the enabler of environmental management but they are noteworthy when it comes to voluntary global initiatives and standards. Reporting initiatives, for example the Global Reporting Initiative (GRI) have been used by 3 companies (IKEA, Stora Enso, and Tetra Pak). GRI provides guidelines on sustainability reporting and companies use it to report sustainability-related impacts across their business operations including supply chains. Reporting on sustainability on these platforms puts more pressure on the companies to perform better which in turn enables sustainability in supply chains. Other reporting platforms like CDP (Carbon Disclosure Project) forests programme (Tetra Pak) and CDP's climate programme (Stora Enso) and SEDEX (Supplier Ethical Data Exchange) (Tetra Pak).

Kahrs Group, IKEA, Stora Enso and Tetra Pak also set their expectations from suppliers based on the 10 principles of the United Nations Global Compact (UNGC). UNGC is a voluntary initiative aimed at implementing the universal principles of sustainability. Its 10 principles are categorized under four major areas: Human Rights, Labor, Environment, and Anti-corruption and these principles are driven from the Universal Declaration of Human Rights, the International Labor Organization's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development, and the United Nations Convention Against Corruption (UNGC, n.d.).

Companies (IKEA, Stora Enso, and Tetra Pak) have also put great emphasis on the United Nation's Sustainable Development Goals (SDGs). They all have integrated the 17 SDGs into their business strategies as well as set goals for each SDG. A number of goals have been

referred to with regards to supply chains, for example, Goal 8 - Decent work and economic growth with companies focusing on improving environmental and social conditions in supply chains, Goal 10 - Reduced inequalities with a focus on respecting basic human rights, workers' rights, and children's rights, Goal 15 - Life on land with a specific focus on forest resources, Goal 16 - Peace, justice and strong institutions focusing mainly on human rights issues in supply chains, and Goal 17 - Partnerships for the goals focusing on supply chain collaborations in order to achieve SDGs.

Sustainability Indexes, for example, the Dow Jones Sustainability Index (DJSI) which "assesses the economic, environmental, and social aspects of some of the world's largest companies" also have a role to play in SSCM. Stora Enso stated in their sustainability report that "Stora Enso was the only European company from the paper and forest products industry listed in the DJSI from 2011-2012. We received top industry scores for sustainable management, product stewardship and environmental management. We have now been listed on the DJSI every year from 11 year running". All of these global initiatives and standards encourage companies to perform better and set examples for the rest of the companies in the sector.

5.3.3 Supply Chain Mapping

Although the Figure 5-5 shows only a few number of references to the Supply Chain Mapping code, the author deemed it to be worth adding to the list of enablers for SSCM in timber sector. Themes related to Supply Chain Mapping are given in Figure 5-6 were chosen from the analyzed content and show that the mapping can be of two kinds; mapping suppliers and other actors in terms of numbers, types, and tiers of supply chain, and mapping in terms of geographical context and location of suppliers and sourcing activities. The EUTR, in Article 5 - Obligation of traceability, emphasizes on mapping suppliers (operators or traders), throughout the supply chain, who have supplied the timber or timber products and keeping their information for at least five years' time (EC, 2010).

Companies that referred to the themes related to supply chain mapping include IKEA and Stora Enso. IKEA first mentioned supply chain mapping in their 2013 sustainability report stating "To improve our understanding and oversight of our sub-supply chain, in FY13 (financial year) we completed the process of mapping our first-tier sub-supply chain for home furnishings. We identified 2200 critical sub-suppliers. Where necessary, we have mapped the sub-supply chain right down to the raw material production level". IKEA also stated in their 2015 sustainability report that they studied their "…paper supply chain to understand exactly where our paper products currently come from. Currently more than 90% of the supply chain has been mapped". They also stated that "we are conducting a mapping exercise to ensure that we have identified the organizations and individuals most critical to our focus areas. We anticipate that by taking a more systematic approach, we can have a much greater impact in the areas that matter most to us and our stakeholders", where responsible sourcing is one of their focus areas.

Stora Enso, on the other hand, started mapping their supply chains way before IKEA and the EUTR but not in terms of suppliers but in terms of environmental management. In their 2004 sustainability report they mentioned about their facility in Russia and state that "During 2004, Wood Supply Russia continued to extend its Geographical Information System (GIS) maps. The GIS system contains information on existing and planned conservation areas, as well as potentially valuable old-growth forest areas". Most of their mapping references have been with regards to optimal forest management and environmental management (an enabler of

SSCM). In 2017, they referred to mapping supply chains in terms of compliance of suppliers with their code of conduct.

5.4 Drivers and Barriers for SSCM

The drivers and barriers in building sustainable supply chains in timber sector were specifically looked at during the interviews. A number of different drivers and barriers were mentioned by the interviewees and were identified through the content analysis of the transcribed interviews. Most interviewees emphasized that there were not specifically barriers but challenges while executing sustainable supply chain initiatives and activities or integrating sustainability into supply chain management. For this reason, the responses for Q8 and Q15 (see Appendix II) were combined to present the main challenges these companies faced. Most responses were given with respect to initial integration of sustainability into supply chains decades ago. As of today, these companies have well established policies and procedures for sustainable supply chains in place.

5.4.1 Drivers

Among the drivers, the interviewee from IKEA emphasized that having a strong sustainability agenda for the company is what helps is in building sustainable supply chains. According to PwC (2008), the sustainability agenda of a company starts with the integration of environmental, social, economic and moral aspects into 'strategic decision-making' and extending it to assess how these aspects impact the business and all its stakeholders as well as identify associated risks. Lastly, sustainability agenda includes risk mitigation and getting benefits from the integration of these sustainability aspects (PwC, 2008). This aspect was also analyzed as part of corporate strategy in this research but sustainability agenda is broader than the strategy and requires top management commitment to a great extent. Compliance to laws and regulations was highlighted by the interviewee from IKEA.

Table 5-3 Drivers and Barriers/Challenges faced by companies while integrating sustainability into supply chains

Drivers	**Barriers/Challenges**
Strong sustainability agenda of a company	Lack of sustainability knowledge, culture and top management commitment
Legal compliance	Human resource
Sweden as a 'sustainable brand'	Lack of trustful relationships between suppliers and the companies
Customer requirements	Cost of conducting audits and hiring sustainability professionals and other activities
Sustainability reporting to stakeholders and other common disclosure projects	Confusion in a number of forestry/sustainability certifications available
Sourcing from high risk countries	Implementation especially in other countries with different cultures and demands

Source: Interviews

One of the most interesting one was highlighted by interviewee from Kahrs Group stating that when the Group first started its activities regarding sustainable supply chains in the 1980's

they just wanted to be an environmentally good company which was driven by the fact that at that time Sweden, compared to rest of the world, was focusing a lot on being environmentally friendly country. So having operations in a country where the country itself was a sustainable brand encouraged the company to be in line with Sweden. He also highlighted that the company wanted to be ahead of customers and at that time not many customers were demanding sustainably procured timber but surely customer requirements have changed a lot overtime and thus makes it an important driver as well.

Sustainability reporting to stakeholders and at other common disclosure platforms was highlighted by the interviewee from Tetra Pak. He described that Tetra Pak "…started reporting publically on environment back in 1999 and … Tetra Pak is a privately owned company so in many senses we don't have investors knocking on our doors and asking for disclosure, still we disclose information on CDP on climate, CDP on forest, we report on SEDEX, so we use a lot of common disclosure projects to report on our performance". Apart from this he mentioned that Tetra Pak has annual sustainability report and did a materiality analysis to ensure that they have all the important methods of sustainability, both for internal and external stakeholders, under radar.

Sourcing from high risk countries was surprisingly mentioned as a driver and not as a barrier. Interviewee from Duni stated that when the company started integrating sustainability into its supply chains, it was an important time period as they "went from owing a lot of (their) own factories to starting sourcing much more from outside the EU…from more high risk countries like China". Integration of sustainability into their supply chain activities was the decision they took in order to be in control of the risks, especially the social risks in those factories.

5.4.2 Barriers/Challenges

Interviewee from Stora Enso emphasized on the lack of sustainability knowledge when the term was introduced. She said that "sustainability was, at least in its beginnings (let's say in the 1950s to 1970s), an 'exotic discussion' and it was not always easy to convince people, be it our own SE people but especially (small) suppliers, that sustainability is key for a company who wants to survive and persevere also for the next coming centuries". Interviewee from Stora Enso also highlighted two other challenges related to human resource (HR) and cost of SSCM saying that "…implementing professional sustainable supply chain management systems needs excellent experts (so, it's quite an HR task to find and hire the best experts) and costs time and money, not only for external certification costs but also for internal workload and manpower costs, both for us but also for our (especially smaller) suppliers". Interview from Kahrs Group also mentioned the need for bringing in "…not just young but people with a broader exposure to new ideas" while emphasizing the need for cultural change within an organization. With regards to costs he mentioned that "There's always a cost to add audits, staff, processors, policies..." to be one of the barriers.

Interviewee from Kahrs Group while answering the question related to barriers also mentioned something very interesting. He said that not a single company in this world is 100% sustainable in its own operations or supply chains and it's a continuous process and every company is trying to work towards sustainability. Companies are not trying to get to a level of sustainability and stopping there because "…you never get there" and 20 years from there might be a new word for sustainability.

5.5 Perception of companies on the role of EUTR in building sustainable supply chains

During interviews, companies were asked about their perceptions on the regulation and what do they think about its role in building sustainable supply chains. This question was found very interesting by the interviewees and they all had different perceptions about the regulation. Their perceptions were coded into sentiments during the content analysis which gave us the picture of how these companies perceive and interpret the regulation (Figure 5-7).

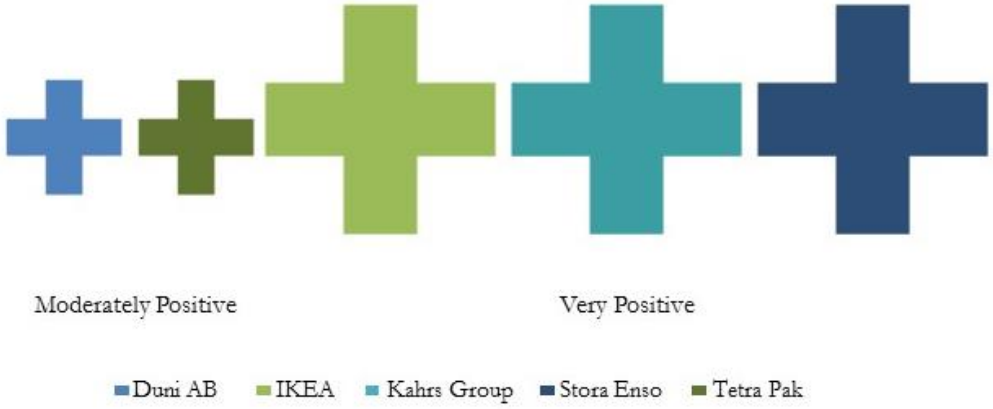

Figure 5-7 Perceptions of companies on the role of EU Timber Regulation in building sustainable supply chains

Source: Interviews

Interviewees from IKEA, Kahrs Group and Stora Enso responded to this question in a very positive way stating that the regulation sets the minimum requirement for the timber sourcing activities which has always been a part of the certifications and chain-of-custody verifications for the SFM. Companies also believe that the regulation does provide the level playing field for all the companies which is in favor of the responsible and sustainable companies. This is also one of the objectives of the regulation. Interviewee from IKEA also emphasized on it stating that the regulation is valuable for the companies that already care about the issue of illegal logging in supply chains and are doing a good job at controlling the situation. Note that IKEA was also one of the signatories of the common statement to EC establish uniform rules in the timber trade and to ensure fair competition (WWF, 2005).This perception was also shared by the interviewee from Tetra Pak whose response was moderately positive and argued that the role of regulation in building sustainable supply chains depends very much on the definition of sustainability.

Interviewee from Kahrs Group, while emphasizing the role of regulation in leveling the playing field, stated that just by having a law has a lot of impact on the imports of exotic and tropical species into the EU. He further highlighted an aspect where the regulation has failed and that is the support for communities of the tropical forests. EU consumes a large amount of tropical timber that come from southern latitudes and those southern latitudes are the ones that need the most support as they are the ones most impacted by the illegal wood sourcing and trading, he added. He stated that "…but if you don't purchase from those areas in a legal and sustainable way with requirements then you're not trying to help those very people living there. That was the whole purpose there, to help them get the fair price. But people (operators and traders) were not just buying there anymore, they just stopped. And that doesn't help the indigenous people or the natives or pioneers of those places who want to take care of the

forests because suddenly it's like your trees have no value. And the most important thing we can do for the wood industry globally environmentally is to have a fair price of the wood all over the world and to create a need for those species to help those very people effected in Southeast Asia, South America, Central America, and Africa. To say your species has value, we will buy from you, we are the customers but it has to meet the EUTR, we would like to see FSC, if not FSC then PEFC". This highlighted an important aspect regarding the regulation that companies reduced the timber or timber products import from global south in fear of the regulation which has a negative impact on the livelihoods of local communities living there. Interviewee from Duni stated that the regulation does have an important role to play in sustainable supply chains but it will take time and also that the government should support smaller companies to meet the requirements of the regulation which is otherwise difficult for them to handle.

A part of the question also focused on the views of interviewees on achieving sustainability through legality. To this all of the interviewees responded positively while highlighting that "legal requirements can help sustainability tremendously" (Kahrs Group). Interviewee from IKEA, while saying that the regulation does have role to play, expressed concerns related to weaker forestry policies in some countries but emphasised that ensuring legality can definitely support the company in sustainable forest management. Interviewee from Duni said that legality and sustainability go hand in hand.

6 Discussion

To answer the research questions, the content analysis of sustainability reports, sustainability policies, the EUTR, and interviews was conducted. Overall this thesis looked into two main research questions mentioned below, that were divided into sub-questions (see Section 1.2):

RQ1: What enables timber companies to move towards sustainable supply chains and what are the drivers and barriers they have to face in this regard?

RQ2: What is the role of EU Timber Regulation with regards to building sustainable timber supply chains?

6.1 SSCM in Timber Sector

The content analysis, based on the analytical framework (Section 4.4), of sustainability reports, sustainability policies and interviews helped in answering RQ1. The findings which helped in answering RQ1a and RQ1c were solely based on the interviews. The eight enablers of SSCM namely: supply chains collaboration, environmental management, social dimensions, institutional pressure, information management, organizational culture, corporate strategy, and public awareness were selected based on the author's assumptions and scope of this research .

6.1.1 Dominance of Environmental Management in timber supply chains

Environmental management has been emphasized repeatedly by all the companies in their sustainability reports, sustainability policies and during the interviews. This not only shows the knowledge of these companies regarding their operations in supply chains, which are very much focused on the timber sourcsing and forest management but also their concerns regarding the issues of illegal logging and forest degradation. Through this increased focus on sustainable management of forests and their wood sourcing practices, these companies can contribute towards the global goals of sustainable development. The findings related to dominanace of enviromantal mmanagement enabler were expected by the author but there was no bias that impacted the coding process.

6.1.2 Significance of collaboration

Colllaoration in supply chains have shown to play an important role in building sustainable supply chains, and now this research gives empirical evidence for it. Collaborations in timber sector are not just limited to the relationships with suppliers but also extend to partnerships with other stakeholders like international organziations, NGOs, academia, and other companies. But the nature of collaboration varies among stakeholders.

6.2 Role of EUTR in building sustainable timber supply chains

To answer RQ2, the author first analyzed the content of regulation with the help of analytical framework (Section 4.4) in order to understand if the regulation does include enablers of SSCM. 5 out 8 enablers were found in the regulation including information management, supply chain collaboration, environmental management, institutional pressure, and social dimensions. According to the main assumption made with regards to the applicability of the analytical framework, these results can prove that the regulation does indeed has a role to play

in building sustainable timber supply chains. This was further confirmed by asking the companies' sustainability representatives about their perceptions regarding the role of the EUTR in order to understand the views of SSCM practitioners in timber sector. It was interesting to see that all the companies were supportive of the regulation and believe that the regulation has a very important role to play in building sustainable supply chains.

6.2.1 Level playing field

Companies prioritizing social responsibility among other business units tend to use timber that is sustainably or legally harvested (Levashova, 2011). Owing to the lack of regulatory procedures, such companies had to face an 'unfair competition' against companies using low-cost illegally harvested timber (Greenpeace, 2006; Levashova, 2011). This deprived the companies of a 'level playing field' in the timber sector (Levashova, 2011). It was interesting to see that all five the companies interviewed realize the role of EUTR in this regard and emphasized that the regulation provides them a 'level playing field'.

The interviewed companies consider themselves to be sustainable and responsible and hence repeatedly focused on the importance of level playing field for their business.

6.2.2 Achieving sustainability through legality

The interviewees, while appreciating the role of EUTR in building sustainable timber supply chains, highlighted their concerns for the timber imports from the global south. Almost all tropical forests are considered part of the global south which are mostly poor countries with weaker laws and enforcement infrastructure. The EUTR is based on the concept of legality and that wood harvested according to the laws of the country of origin will be considered legal in the EU market, but under the light of state sovereignty the regulation cannot impose a universal definition of legal timber. This has certain sustainability-related implications in the long-run for the countries in global south as the wood coming from these countries might be legal but may not necessarily be sustainable, consequently leading to loss of tropical forests and biodiversity. This was also highlighted by Jonsson et al. (2015, p. 26):

> *Legality is a core precondition for sustainability, but does not guarantee sustainability per se.*

Sustainable and responsible companies have a very important role to play in this regard and should not just rely on the regulation but rather broaden their scope of sustainability activities in supply chain. This has also been emphasized by Pagell and Shevchenko (2014) by saying that the finite resources of this planet are running out. In addition, actions are being demanded by stakeholders regarding climate change issues and working environment at suppliers' facilities in developing countries (Pagell & Shevchenko, 2014). If these unsustainable practices are not addressed by business models aimed at reducing social and environmental impacts, most supply chains existing today will no longer be existing tomorrow (Pagell & Shevchenko, 2014).

Illegal logging affects a number of actors, ranging from governments to general public. In EU, it is specifically affecting the donors who contribute for the betterment of vulnerable countries, whereas valuable resources are being taken away from those countries at the same time, making the donations inefficient (EC, 2007). General public and civil society actors are also being influenced by the range of social and environmental issues like loss of biodiversity and climate change due to impacts of deforestation over a period of time. It also demoralizes the efforts of the EC aiming to achieve development objectives regarding social development,

peace, security, the fight against corruption, good governance, and sustainable environmental management (EC, 2007).

6.2.3 Scope of Regulation

Timber and timber products covered by the regulation are given in Appendix III. A lot of debates around the scope of these products has been ongoing. It was still interesting to see that companies like Tetra Pak and Duni focus on their supply chain sustainability even when importing products that are not covered by the regulation. This means that building sustainable supply chains for these timber companies is broader than just legal compliance. Although they do focus on compliance but for them sustainable supply chain is related to close collaboration with suppliers, making an impact on the social and environmental conditions in their supply chains, meeting the sustainable forestry standards, understanding individual company's responsibility in supply chains and finding a balance of that responsibility.

It was interesting to see that over time companies' attitudes towards supply chain collaboration changed. In the beginning most companies (e.g., IKEA) focused on ending the contract with supplier. But now their risk mitigation has improved and they work closely with suppliers to improve their sustainability performance, especially in terms of forestry practices. It should be noted that evaluating the performance of companies on SSCM enablers was not the focus of this research and the presence of SSCM enablers in the sustainability reports and policies of companies does not indicate their performance in supply chain sustainability.

IKEA states in their sustainability report that "…many suppliers in China do not comply with requirements relating to working hours, and it is not realistic to close the gap between the legislated working hours and reality in a short period of time." Even with the introduction of the Trade Union Law in China, the situation did not change much because the management of the workers union was in the hand of the company and not the workers (Wrest, 2017).

7 Conclusions

This chapter highlights the major academic contributions of this research in terms of SSCM enablers in timber sector as well the role of EUTR in building sustainable timber supply chains. It also highlights the limitations of the research as well as presents opportunities for future research.

7.1 Academic contributions

Although the research in SSCM is growing, little empirical evidence exists about what enables the companies to achieve sustainability in supply chains, especially in the timber sector. This research aimed at this research problem by analyzing 5 companies by taking into account the SSCM enablers presented in the analytical framework (Section 4.4). It also looked at different drivers and barriers (taken as challenges by the companies) faced by the companies while integrating sustainability into their supply chains. Finally, the role of the EU Timber Regulation, a policy instrument that mainly governs timber supply chains, was evaluated based on the analytical framework and the perceptions of the (interviewees of) companies.

Specific gaps regarding the lack of empirical evidence in the SSCM research were addressed. Presence of all the SSCM enablers namely: supply chains collaboration, environmental management, social dimensions, institutional pressure, information management, organizational culture, corporate strategy, and public awareness, indicates that the companies are on the right path in terms of building sustainable supply chains in timber sector but do need to work on all the enablers. This research adds to the existing knowledge about SSCM, especially in the timber sector and proposes three possible enablers of SSCM:

- Collaboration with other Stakeholders
- Global Initiatives and Standards
- Supply Chain Mapping

In order to answer RQ2 and to evaluate the role of EUTR in enhancing sustainability in timber supply chains, the content of regulation document was analyzed using the analytical framework (Section 4.4). Five out of eight SSCM enablers were found in the regulation namely: environmental management, supply chain collaboration, information management, social dimensions, and institutional pressure. The main assumption author made with the content analysis of EUTR was that the presence of SSCM enablers in the regulation are indicative of the contributing role of EUTR in building sustainable timber supply chains. Apart from this, reference to the regulation in the content analysis of sustainability reports and policies was also analyzed which revealed that companies do refer to the regulation as well as the related themes of illegal logging and traceability. This shows that the regulation does play a role in enhancing sustainability in timber supply chains but to what extent is unknown. To partially answer that the author asked the interviewees about their perceptions about the role of regulation in building sustainable supply chains. All the companies responded positively and agreed that the regulation does have an important role to play but highlighted some concerns well including the definition of sustainability in timber sector, lack of support for the tropical timber producing countries, and the nature of laws and governance in those countries.

7.2 Limitations and future research opportunities

One of the limitations is the selection of companies for this research which are all based in Sweden. This could limit the generalizability of this research as country-specific features can act as contingency factors (Sousa & Voss, 2008; Formentini & Taticchi, 2016). However, it is important to note that the selection of these companies was based on their international supply chains so that this limitation can be reduced and findings can be generalized. The choice of research methods and different methodologies employed to carry out this research provides quality and profoundness to the analysis presented in this research. Consequently, the author felt that the value of research work was not compromised by the limitations.

To confirm the applicability of other possible SSCM enablers proposed in this research, future research should be conducted across different sectors in different countries. The comparison among different enablers and how one enabler is important than the other should also be researched. The research also did not focus on evaluating the performance of companies on sustainability activities in timber supply chains over time and the author recommends this research in order to see the impact of the regulation on these companies. The role of the EUTR in building sustainable supply chains should also be studied for other EU countries as well as to what extent the regulation has been successful in enhancing sustainability in supply chains should also be focused on in future research.

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Appendix I: Other details about Companies interviewed

No	Company Name	Products	Controlled Importer audited by Swedish Forest Agency	Sustainability Policy Analyzed	Sustainability Reports Analyzed		Certifications (FSC and PEFC)	Interview Date and Time
					Name	Years and No.		
1	Duni AB	Table top, packaging and take-away solutions for food	Yes 2017	Code of Conduct	Our Blue Mission - CSR Report	2016 Total: 01	FSC	23 April 1400-1500 Telephonic interview
2	IKEA	Furniture	Yes 2014-2015	IWAY - Supplier Code of Conduct IWAY Forestry Standard	Sustainability Report	2009 - 2013, 2015, 2016 Total: 07	FSC	07 May 14:00-15:00 Skype
3	Kahrs Group	Wooden floors	Yes 2014-2015	Code of Conduct	Environmental & Sustainability EMAS - The Conscience Report	2016 Total: 01	FSC PEFC	18 April 1500-1600 Telephonic interview
4	Stora Enso Paper AB	Pulp and Paper	Yes 2014-2015	Supplier Code of Conduct Wood and Fibre Sourcing, and Land Management Policy	Sustainability Report Global Responsibility - Sustainability Report	2003, 2004, 2009- 2017 Total: 11	FSC PEFC	Answers received through email
5	Tetra Pak	Packaging solutions	Yes 2014-2015	Procedure for Responsible Sourcing of Liquid Packaging Board	Sustainability Update Sustainability Report	2015 - 2017 Total: 03	FSC	25 April 1400-1500 Tetra Pak office

Appendix II: Interview Questions (Semi-structured Format)

General context of the organization:

Q1. What timber products do you import?

Q2. From how many countries do you import timber or timber products? Also, can you name them?

Q3. Among the products you sell, what is the proportion of products that use timber or timber products?

Main questions:

Q4. When did the organization first start its activities for a sustainable supply chain?

Q5. What were the drivers behind (these) sustainability activities in the organization's supply chain?

Q6. What do you think enabled your (company's) supply chain to achieve sustainability?

Q7. Do you think collaborating with suppliers can help achieve sustainable supply chains? What type of suppliers (e.g. first tier, second tier, size of the supplier, etc.) do you collaborate with?

i. If yes, explain how?
ii. If no, why not?

Q8. What were the challenges for your organization to integrate sustainability into supply chain management?

Q9. What is sustainable supply chain management for your organization?

Q10. You mentioned these supply chain activities in your sustainability report/strategy/website. How would you categorize them under these categories?

- Strategy
- Risk Management
- Transparency
- Organizational Culture

Q11. Did you have to add any additional activities in your supply chain after the EU Timber Regulation came into force?

i. If yes, what were those activities?

Q12. Do you think EU Timber Regulation has a role to play in building sustainable supply chains?

i. If yes, in what ways?
ii. If no, why not?
iii. Do you think sustainability can be achieved through legality?

Q13. Do you think your supply chain activities will have any impact on the environmental, social and economic conditions in the global south?

i. If yes, what impacts do you perceive?
ii. If no, what is/are the reason(s) behind it?

Q14. Do you have any collaboration with actors other than suppliers (e.g. other producers, NGO groups, researchers, etc.) in building sustainable supply chains?

i. If yes, in what ways and do you think they are helpful?
ii. If no, why not?

Q15. What were the barriers for your organization while integrating sustainability in supply chains or any other sustainable supply chain activities?

Q16. Do you feel that your organization has a significant role to play in building sustainable timber supply chains?

Closing Questions:

- What else would you like to add?
- Can I contact you again for follow-up questions or any clarifications?
- Would you like to have a copy of the audio and/or the final thesis?

Appendix III: Timber and Timber Products to which EUTR applies

EU Combined Nomenclature Code/Reference No.	Timber and Timber Products
4401	Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms; wood in chips or particles; sawdust and wood waste and scrap, whether or not agglomerated in logs, briquettes, pellets or similar forms
4403	Wood in the rough, whether or not stripped of bark or sapwood, or roughly squared
4406	Railway or tramway sleepers (cross-ties) of wood
4407	Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm
4408	Sheets for veneering (including those obtained by slicing laminated wood), for plywood or for other similar laminated wood and other wood, sawn lengthwise, sliced or peeled, whether or not planed, sanded, spliced or end- jointed, of a thickness not exceeding 6 mm
4409	Wood (including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded or the like) along any of its edges, ends or faces, whether or not planed, sanded or end-jointed
4410	Particle board, oriented strand board (OSB) and similar board (for example, waferboard) of wood or other ligneous materials, whether or not agglomerated with resins or other organic binding substances
4411	Fibreboard of wood or other ligneous materials, whether or not bonded with resins or other organic substances
4412	Plywood, veneered panels and similar laminated wood
4413 00 00	Densified wood, in blocks, plates, strips or profile shapes
4414 00	Wooden frames for paintings, photographs, mirrors or similar objects
4415	Packing cases, boxes, crates, drums and similar packings, of wood; cable-drums of wood; pallets, box pallets and other load boards, of wood; pallet collars of wood (Not packing material used exclusively as packing material to support, protect or carry another product placed on the market.)
4416 00 00	Casks, barrels, vats, tubs and other coopers' products and parts thereof, of wood, including staves
4418	Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes
	Pulp and paper of Chapters 47 and 48 of the Combined Nomenclature, with the exception of bamboo-based and recovered (waste and scrap) products
9403 30, 9403 40, 9403 50 00, 9403 60 and 9403 90 30	Wooden furniture
9406 00 20	Prefabricated buildings

Source: EU Timber Regulation document No. 955/2010. (EC, 2010)

Appendix IV: List of SSCM Enablers by Dubey et al. (2016)

No.	SSCM Enabler	Measures	Used in Analytical Framework
1	Supply chain collaboration	Trustful supplier partnership Mutual sharing of resources for better utilization	Yes
2	Green product design	Design emphasis upon: • Green material selection • Good recyclability • Easy re-manufacturing • Minimum environmental impact during product usage	No
3	Environmental management	Ecological conservation Natural resource conservation	Yes
4	Green procurement	Purchasing that involves activities for material: • Reuse • Reduction • Recycling	No
5	Green packaging	Use of packaging materials which are: • Re-usable • Recyclable • Environmental friendly	No
6	Green warehousing	Warehousing by: • Minimum Energy usage • Maximize space utilization	No
7	Reverse logistics	Energy and fuel conservation Pollution reduction Waste management	No
8	Minimization of greenhouse gas emissions	Logistics route optimization Transport load and speed optimization Optimum logistics scheduling Renewable fuel usage Encouraging online trade	No
9	Institutional pressure	Government bodies Stakeholders Customers Government policies Government rules and norms	Yes
10	Manufacturing strategies	Agile manufacturing Reconfigurable manufacturing Lean production	No
11	Information management	Minimization of bullwhip effect Supply chain Integration Knowledge Management	Yes

12	Social dimensions	Ethics Working conditions Human rights Safety Community involvement	Yes
13	Public awareness	Customer awareness	Yes
14	Organizational culture and corporate strategy	Employee engagement and awareness Supply chain strategy in line with corporate strategy Top management commitment	Yes (as separate enablers)

Source: Dubey et al. (2016)

Appendix V: Information on Companies: Timber products imported, countries of import and proportion of products using timber among the total products sold

Company Name	Timber products imported	Countries of import (Within EU)	Countries of import (Outside EU)	Proportion of products using timber among the total products sold
Duni AB	Paper products including paper cups, paper plates, and food boxes		China, Taiwan, and Indonesia	~80%
IKEA	Home furnishing articles including wooden furniture, picture frames, lighting articles and some others	Almost 50 countries in total Poland, Germany, Lithuania, Romania, France, Slovakia *	China * (names not provided during interview)	>70%
Kährs Group	Sawn wood	Denmark, Germany, France, Poland, Hungary, Romania, Finland, Switzerland, Estonia	Russia, Brazil, USA, Canada, Australia, Indonesia	99%
Stora Enso Paper AB	Pulp wood and pulp	Norway, Denmark, Latvia, Estonia, Poland, Germany, Scotland	Brazil	Final product contains ~80% of wood fibres
Tetra Pak	Liquid packaging board	Finland	USA, Brazil, Russia. Also buying from different countries (like China) for regional production facilities	~75% of all packaging

*Source: Interviews and *Sustainability Reports*

Appendix VI: Codebook with all the Codes and Number of Sources and References

Name	Sources[6]	References[7]
Barriers	**5**	**7**
Confusion in no. of sustainability certifications	1	1
Cost	1	1
Human resource	1	1
Implementation challenge in other countries	1	1
Lack of Sustainability Knowledge, Culture and Top Management Commitment	2	2
Lack of trust between supplier and the company	1	1
Challenges	**14**	**39**
Complex supply chains	3	7
Cost of Certification	3	4
Geographical context	1	1
Global South	4	13
Organizational culture	2	2
Stakeholder engagement	1	1
Traceability	2	3
Drivers	**4**	**8**
Customer Requirement	1	1
Leadership	2	2
Legal compliance	1	1
Sourcing from high risk countries	1	1
Sustainability agenda	1	1
Sustainability Reporting	1	1
Sweden as a brand	1	1
Efforts for High risk countries (Global South)	12	37
Ethical conduct	2	8
Legality focus	**24**	**115**

[6] All the sources used for this research: EU Timber Regulation document No. 955/2010, sustainability reports, sustainability policies, and interviews

[7] Total number of references for some codes is different than individual codes because most codes were divided into sub-codes but for some the main code was also used for coding (e.g., Legality focus)

Name	Sources[6]	References[7]
Reference to EUTR	15	18
Illegal logging	4	9
Traceability	13	51
Other Possible Enablers	**29**	**292**
Collaboration with other Stakeholders and Companies	25	182
Global Initiatives and Standards	23	100
Supply chain mapping	6	10
Perceptions of companies on the role of EU Timber Regulation	**5**	**5**
Moderately Positive	2	2
Very Positive	3	3
SSCM Enablers	**34**	**1791**
Corporate Strategy	25	275
Environmental Management	31	432
Information Management	32	209
Institutional Pressure	30	88
Organizational Culture	26	108
Public Awareness	16	38
Social Dimensions	32	325
Supply Chain Collaboration	33	316
EUTR's reference to Sustainable Forest Management	**1**	**2**
What SSC means for the company	**5**	**7**
Certifications	1	1
Legal Compliance	2	2
Stakeholder demands	1	1