Chain of Custody on Timber Products in the Construction Industry

- A Case Study at Skanska Sweden

Ellen Johansson
Ann Sterner

Department of Construction Sciences
Faculty of Engineering, Lund University
Box 118
221 00 Lund

Department of Business Administration
School of Economics and Management, Lund University
Box 7080
220 07 Lund

Master Thesis, Technology Management - Nr 213/2011
ISSN 1651-0100
ISRN LUTVDG/TVTM--2011/5213--/SE

Wallin & Dalholm, Lund 2011
Printed in Sweden

Abstract

Title: Chain of Custody on Timber Products in the Construction Industry – A Case Study at Skanska Sweden

Authors: Johansson Ellen
Sterner Ann

Tutors: Ghadban Roba, *Sustainability Manager, Nordic Procurement Unit, Skanska Sweden*

Kedström Christer, *Associate Professor Business Administration, School of Economics and Management, Lund University*

Landin Anne*, Professor Construction Management, Faculty of Engineering, Lund University*

Issue of study: Chain of Custody on timber refers to the chronological documentation throughout the value chain, from forest to consumer. For a construction company, who engages within Social Responsible Purchasing, it is important to know where purchased material origins from. Timber is especially important in this matter, since the problem with illegal logging is widespread and causes environmental damage, conflicts with indigenous populations and governmental loss in revenue. To be able to control that purchased timber origins from responsible managed forests is a desirable, yet difficult task for a construction company. The construction industry is characterized by decentralized structures, which make central procurement strategies difficult to implement. The implementation of CoC in procurement therefore needs to handle such challenges.

Purpose: The purpose is to investigate the driving forces and challenges with Chain of Custody (CoC), as a procurement strategy for timber products in the construction industry.

Method: The thesis is based on literature studies and empirical research. The research method was qualitative and the study has been performed in two stages. In the first step, the Natural Resources Stakeholder Model was brought forward by the authors, to identify the stakeholders on CoC. By

interviewing stakeholders, perceptions and driving forces for CoC could be analyzed. The aim with the second step was to analyze the challenges associated with CoC in a construction company. The research was performed as an interview study, where the handling of CoC in eco-certification projects was studied. By analyzing the research result with a theoretical framework, suggestions on how to handle CoC in a construction company could be brought forward.

Conclusions: There are many stakeholders within the issue of CoC on timber, and there are almost as many perceptions on CoC in the business environment today. The conclusion is that the expression traceability is a better word to use in this context, since it covers what a construction company would like to achieve with a CoC strategy. Regarding the driving forces for CoC, CSR seem to be the most important driver for CoC in the construction industry today. Additionally, challenges with CoC include both external and internal organizational factors, such as immature market conditions, ignorance and organizational structure for implementing CoC within procurement. To be able to work with CoC, organizational change has to take place at both the strategic, tactical and operational purchasing level. Through eco-certifications, construction projects can work with CoC and gain experience and knowledge that can spread throughout the organization.

Keywords: Chain of Custody, timber, construction industry, Skanska, corporate social responsibility, environment, sustainability, decentralization, FSC, LEED, Social Responsible Purchasing, procurement, eco-certification, supply chain.

Acknowledgements

The spring semester has come to an end and the thesis on Chain of Custody (CoC) at Skanska is about to be handed in. It has been an interesting and challenging journey that has taught us a lot about timber, CoC and the construction industry. This semester has additionally, been the perfect way to end our studies and we would like to start by saying that we are very grateful that we got the opportunity to write our thesis at such a great company as Skanska.

To our tutor, Roba Ghadban, who has challenged us and supported us with time and energy, in the difficult area of CoC. Thank you for being different from other tutors, trying to make us understand that the academic world does not provide all the answers in the “real” world.

To our tutors at Lund University, Anne Landin and Christer Kedström, who have provided us with tips, anecdotes and very rewarding tutor meetings. Thank you for letting us call you in situations of panic and thank you for challenging us and providing valuable input to the thesis. Additionally, thank you for making us understand that the academic world is needed to be able to solve problems in the “real” world.

Gustav Larsson, thesis student at Skanska, who has brightened our time at the Skanska office. Thank you Gustav for the many laughs and the never ending supply of pastilles.

Thank you to everyone that has participated in our study, both externally and internally at Skanska. It has been inspiring to hear your stories about CoC and timber procurement. Special thanks to Erik Lönn and Johanna Wikander, who have been a supportive and helpful link at Skanska, Solna.

Last but not least, we would like to thank each other for great teamwork and the many endless and interesting discussions about what we want from life and what the future will bring.

Malmö, May 2011

Ellen Johansson Ann Sterner

Table of Contents

List of Figures

List of Tables

1 Introduction

This chapter will provide a brief background to the topic of the master thesis, followed by a problem discussion that will lead to the research questions and purpose of the thesis.

1.1 Background

Buildings worldwide account for nearly 40 % of the global energy consumption yearly. This figure refers to the finished building, however if the construction process is included, the number increases to over 50 %. The resulting carbon footprint exceeds those of all transportation sectors combined. Not only does the construction industry consume the most energy of all sectors in the world, it also creates most waste, uses most natural resources and is responsible for the majority of the pollution. (NBT 2011)(WBSCD 2011) It is easy to conclude that the construction process have a large impact on the environment.

The need and desire for a more energy efficient and environmentally friendly building practice has given rise to a green building movement ignited by David Gottfried, who founded the US Green Building Council (USGBC) in 1992 (Gottfried & Malik 2009). The green building industry movement is now a global phenomenon, which is rapidly gaining grounds, and the results include a growing number of certified buildings according to standards by the USGBC and European counterparts. The main focus is *sustainable construction*, which is a subset of sustainable development, first introduced in the early 1980s. (Kibert 2005, pp. 1-5.) In 1987, the United Nations released the well known Brundtland Report, which defines sustainable development as;

> "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987, p. 24)

Sustainable construction directly addresses the role of the building environment by contributing to the vision of an overall sustainable development in terms of ecological, social and economic issues (Kibert 2005, p. 1). The concept of sustainable construction is today regarded as being part of many construction companies' Corporate Social Responsibility (CSR) strategies and how their operations are managed. (Dyllick & Hockerts 2002) As suggested by a number of researchers, CSR has gone from being optional to becoming a pre-condition in many industries. Additionally, it has been expanded to include, not only a company's own performance, but the performance of the whole supply chain.

The concept of *Socially Responsible Purchasing* (SRP) is a relatively new term that has been introduced in organizations, especially by global actors. (Leire & Mont 2009) SRP can be explained as the process of taking consequences of organizational

buying into account. SRP forces organizations to consider, not only the economical gain, when purchasing, but also the social and the environmental impact of the purchasing process. Today, purchasing often takes place on a global level, which enlarges a company´s scope of SRP.

One important area to focus on within SRP is the concept of Chain of Custody (CoC). CoC refers to the chronological documentation through the value chain, from the forest to the consumer, including all stages of processing, transformation, manufacturing and distribution. (FSC 2011:1) CoC is a proof of where the material origins and displays the full supply chain where the material has passed. In many industries it is critical to know where purchased materials come from, due to health, ethical, legal and quality concerns. Food industries, as the fishing industry, with their problems with illegal fishing and the mining industry with its blood diamonds, serve as excellent examples of why CoC is important.

In the construction industry, CoC is important and applicable for steel, bio-fuels, quarry and timber. The purpose of applying CoC on timber is to prevent illegal timber logging and timber trade, and to be able to prove to consumers that the timber originates from responsibly managed forests. The consequences of illegal timber logging include deforestation, loss of biodiversity and climate change. It also creates conflicts with indigenous and local populations and denotes billions of dollars in lost revenue for governments. (Smith 2004, p. 7) Illegal logging is today a global problem, taking place in regions all around the world. On May 1th 2011, it became public that *Skogsstyrelsen*, who manages politics concerning the Swedish forest, kept back sensitive statistics on how the Swedish timber industry harms the environment. The reason for keeping the statistics secret was due to pressure from the CEO of Stora Enso, one of the largest producers of wood products in Sweden. Nevertheless, the statistics illustrated that 37 % of the investigated timber logging in the province of *Dalarna* did not follow Swedish regulations on timber. This is only one example that demonstrates that the problem with illegal timber logging takes place all over the world. (SR 2011) The seriousness of the effects of illegal logging provides good arguments on why the construction industry ought to work with the CoC issue.

1.2 Problem Discussion

A few good arguments on why the constructions industry should work with the CoC issue exist today. However, the concept of CoC is relatively new in the industry and according to Frankelius, careful selectiveness is crucial in a world with abundance of information. The most crucial task for a company is to interpret their business environment in the best way to be able to take rational decisions and achieve top performance. (Frankelius 2001, p. 38) Hence, the construction industry ought to explore the environment around them to understand how the concept of CoC is being perceived and what the driving forces are, before taking action. In a world where consumers and companies are more aware of the consequences of their

purchasing behavior, a lot implies that consumers eventually would like to know the origin of their purchases. Today, many companies are also proud to say that they are responsible actors and they must therefore ensure that this commitment range throughout their supply chain. Or else, they might risk hurting their company image, especially if the media gets involved.

For a construction company, taking responsibility and engaging within CoC is considered to be a great challenge. (Gadde & Håkansson 2001, p. 12) In general, construction companies are often highly decentralized and complex in their organizational structure. To begin with, the number of suppliers is often large and the supply chain takes place in an international environment. Moreover, being a decentralized industry denotes that purchasing takes place on different levels in the organization. There are framework agreements (FWAs) that are applicable to the whole organization, where amount and price is specified before the purchase is being made. However, in a construction project, purchasing takes place both in FWAs and through specific project purchases. This makes procurement in a construction company both fragmented and difficult to control for the central organization. The special setting of the industry complicates the development of CoC in procurement considerably.

Furthermore, the concept CoC has many definitions and thus implications on the market today. This variety of perceptions of CoC obstructs the communication with suppliers and other stakeholders. Leire and Mont (2009) have in the area of SRP demonstrated that it can be difficult for a company to ensure that the suppliers in the supply chain are in line with different statement in the company code of conduct. Internally at construction companies, the problem with SRP seems to be the creation of a systematic way inside the organization for how to work with the question. A critical success factor is also top management engagement. Assuming, that Leire and Mont's findings apply in the case of CoC, barriers of working with CoC thus exist both at a strategic, tactical and operational level.

The concept of CoC is new and unexplored and will most definitely change the way purchasing takes place in the construction industry today. Construction companies play a key role in contributing to a more sustainable world and through CoC, one step in the right direction is taken. Timber material has been used for constructions in all times and is regarded to be a material that is possible to trace through the supply chain. However, CoC on timber is problematic and the industry setting creates many barriers. Consequently, if construction companies would like to integrate CoC in their procurement process, changes at all levels is the organizations are most likely to be required.

1.3 Thesis Questions

The thesis questions are as follows:

1. What is the perception of Chain of Custody on timber products on the market?
2. What are the driving forces for Chain of Custody on timber products in the construction industry?
3. What are the challenges when implementing Chain of Custody on timber products in the construction industry?
4. How should Chain of Custody, as a procurement strategy, be handled organizationally in a construction company?

1.4 Purpose

The purpose is to investigate the driving forces and challenges with Chain of Custody (CoC), as a procurement strategy for timber products in the construction industry.

2 Method

There are two common views on the relationship between theory and research. (Bryman & Bell 2007, pp. 7-15) The inductive view regards theory as the outcome of research, whereas the deductive approach argues that theory is the basis of any research. Depending on how theory is regarded, the research strategy will be different. The most common strategy is to use a deductive approach where the researcher, based on relevant theory, deducts a hypothesis that is to be empirically tested. Inductive strategies instead, involve drawing general conclusions from observations. Deductive research strategy is often associated with quantitative research methods focusing on numbers, whereas inductive strategy commonly involves qualitative methods with a focus on words rather than numbers. Qualitative research has a few disadvantages that need to be taken into account when choosing research method. It is claimed to be too subjective, difficult to replicate, hard to generalize and sometimes to be lacking transparency (Bryman & Bell 2007, pp. 423-425).

However, in this master thesis, a qualitative research method was considered to be appropriate since the aim was to gain a holistic understanding of the issue of Chain of Custody (CoC) in the construction industry. It was initially not possible to choose a strictly deductive or inductive approach. Instead, we began with an abductive reasoning approach. Abductive reasoning is a tool for determining the course of the research and includes the study of a wide range of facts from a multitude of sources. (Shuttleworth 2008) An assessment is made from the retrieved information and the most plausible theory can be adapted to the research. In other words, the reasoning can be described as an initial inductive approach which transforms into a deductive approach, as the process proceeds.

During the working process, a daily journal was kept for the purpose of documenting our line of thought and activity. The journal came to proper use when formulating grounds for decisions and delimitations, since it was possible to trace the background and reasoning. The journal also facilitated communication with tutors and between the authors in cases of absence. Additionally, we used a modified version of an opportunity register, according to McGrath and MacMillan (2000, p. 4). The purpose of the register was to keep track of ideas on the content, conclusions or method of the thesis that appeared during the working process. By using a register, no ideas were lost and at the same time, focus could be kept on the current task.

In Figure 2.1, on the next page, the research method of the thesis is presented. The research questions were investigated sequentially starting with number one. Each step was designed to answer one or two research question and to give valuable input to the following phase. For example, the literature review gave insights on

which stakeholders to interview in the study of the business environment. For the last research question, chosen results from the studies were analyzed together with theory in out theoretical framework.

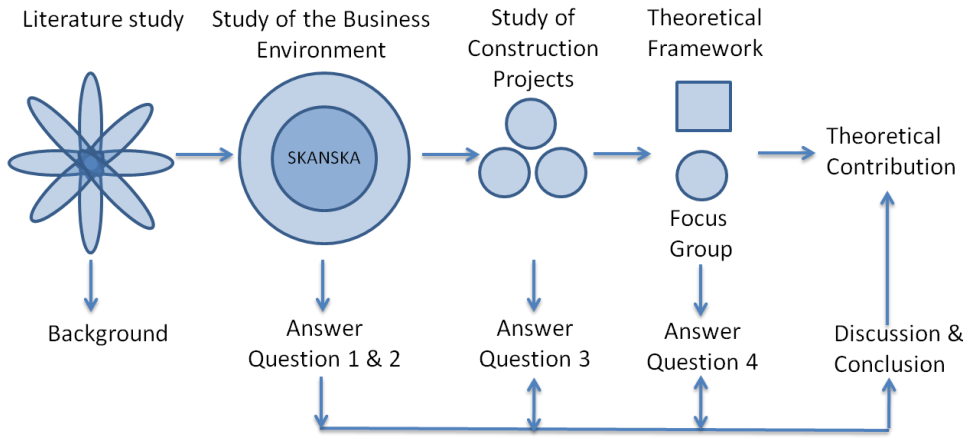

Figure 2.1 Research method

2.1 Literature Review on Chain of Custody and the Timber Industry

In order to navigate in what was already known about the thesis topic, we started off by performing a broad literature review. The aim was to perform a structured, yet narrative review. According to Bryman and Bell (2007, pp. 104-105) the narrative approach is appropriate for gaining an initial impression of the topic that you wish to understand. The narrative review tend to be less focused and wide-ranging than its opposite, the systematic review. We felt a need to be structured in a wide review, and decided to combine the two. First, we planned the review by advising experts in the subject. The result from different advisory meetings provided us with a base of keywords and search terms that later resulted in a list of books and articles to include in the review. The process was iterative in its nature and we constantly came over new and interesting areas, which we had to either exclude or include, in the review. The process can be illustrated in Figure 2.2 on the next page, where each flower petal symbolizes an area of interest to the thesis. The flower also presents how the areas overlap each other. We found the flower very useful in our aim to structure or review.

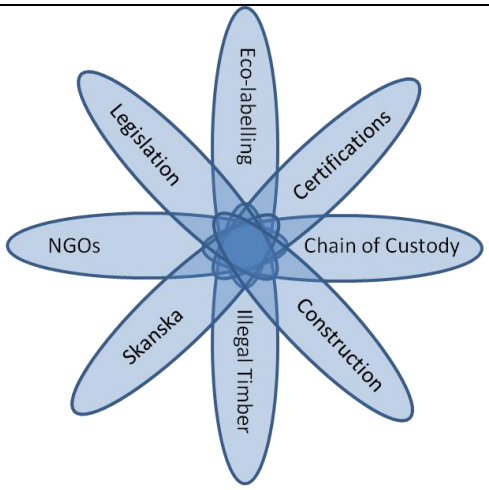

Figure 2.2 Literature review areas

The information studied in the literature review has been brought forward by other researchers in other studies (Bryman & Bell 2007, p. 326). Our aim was to use sources that were recently published and recognized for their quality and credibility in the topic of the thesis. Sources included books and journals, however, since research in this area was sparse, a majority of the reviewed sources were found on the internet.

2.2 The Business Environment

After the literature review was conducted, a study of the business environment was performed with the purpose of finding answers to our first two research questions. Proceeding from theory on stakeholder theory, the *Natural Resources Stakeholder* model (NRS) was created (see Figure 2.3). In the study, the stakeholders have been identified but their power influence has not been analyzed in depth. An analysis of the power influence of the stakeholders was not possible due to the scope of this study.

Figure 2.3 The business environment

We decided to divide the stakeholders into two groups, internal and external, to denote if differences exist. Internal stakeholders are considered to be the employees within the company, while the external stakeholders are the surrounding actors that influence the company. All the stakeholders were considered to have a stake, or an interest, in a company working with natural resources. In the NRS-model, the stakeholders are presented without any order of importance in the circle, meaning that each stakeholder is equally important in the model. The ten stakeholder groups are the ones considered to be the most important for mapping interests in natural resources.

The NRS-model was used to map and interview stakeholders on the market that have a connection to CoC, and to cover the variation that exists among them. A case study approach was chosen to get an in-depth elucidation of the issue of CoC in a construction company and in real construction projects. However, as Bryman and Bell point out, the question of validity and generalization is important to consider in a case study (2007, p. 63). The selection of interviewees in each stakeholder group was made in consultation with our tutors. This kind of selection is called *stratified selection* and the method includes the identification of categories and then choosing interviewees within each category (Höst 2006, pp. 90-91). Since the selection method is not random, our aim was to explore the research questions qualitatively rather than to generalize. In total, a number of 20 people were interviewed face-to-face or by telephone. The initial plan was to interview at least one person within each category. However, at the end we managed to talk to approximately three persons from each category. The internal interviewee scope covered employees at different levels in the company, such as the Environmental Management. The external scope included suppliers, non-governmental organizations (NGOs), customers and competitors. Performing the interviews, we finally realized that we were close to a point where the new information did not vary from the one already collected. In addition, we were repeatedly recommended by interviewees to talk to persons that we had already interviewed. Our interpretation of this was that our selection was sufficient according to our purpose with the study.

All of the interviews in the study of the business environment was semi-structured, meaning that a few questions were prepared in advanced to be covered in the interview (see Appendix II). Questions that were not prepared in advance were asked as the interview proceeded, with the purpose of gaining insight into what the interviewee found relevant and important. (Bryman & Bell 2007, pp. 472-475) This flexible approach required that the authors constantly evaluated what leads to follow up and to what extent. In many cases, new leads led to re-phrasing of the interview questions and addition of new questions to include in the interview protocol.

Some information from websites and other public documents have also been input to the study of the business environment. This kind of information has been particularly important when it comes to the categories; NGOs, legislation and certification organizations, since we often have been referred to public statements.

By being located at the company during the entire study, participant observations have provided useful information about the company in its processes. In addition, organizational documents were studied to gain an understanding of internal processes in the company. Also, by picking up internal vocabulary and terms, interviews with employees became more efficient. Additionally, we attended different company presentations to get information about the company, where we also got the chance to ask questions.

The information for the business environmental study has been analyzed with the framework of *grounded theory*, where the purpose is to search keywords and patterns in the data material. We started off by a coding process, where important passages or statements in the interview notes were highlighted. (Bryman & Bell 2007, pp. 584-586). We were careful not to take statements out of their context but rather highlight the entire section. Further on, we grouped the highlighted sections according to their contents and lastly, we appointed a keyword to each group of statements. In cases where it was not possible to appoint a keyword to a group of statements, the group was divided until it was possible to appoint a keyword to each group. We were careful to cover all variations in the statements and all keywords were thus included, even if there was only one statement concerning the specific keyword. The analysis was carefully documented, to be able to trace conclusions back to specific statements and groups of information. In the cases where we were uncertain of our interpretation of information, or if our interpretation could be considered to have major impact of our conclusions, we validated the information with the interviewee once again.

The outcome of the study from the business environment provided the answer to research question 1 and 2 and the basis and direction for question 3, where we further explored the challenges found in the study of the business environment.

2.3 Study of Construction Projects

In the construction industry, no project is the other like, and therefore, our aim was not to generalize the challenges associated with CoC, but instead highlight possible challenges that a project might encounter when trying to work with CoC. Possible projects to study where pointed out by our tutor, and our aim was to choose projects within different contexts, in order to cover as much variation as possible. However, it came down to only three construction projects that had been working with CoC on for timber to an extent appropriate to study in this thesis. They all had different interesting contexts and we therefore choose to include the three of them in our study. The purpose was to answer research question number 3 and 4 and to

gain an understanding of the procurement process and how it is affected by a CoC strategy.

Semi-structured interviews were structured according to the PDCA, which includes the *plan, do, check and act* stages (see chapter 5.4.2). Interviews were performed with key persons that had worked with CoC, in each project. These persons included project engineers, persons from the eco-certification group, purchaser, suppliers and clients. It was not possible to interview exactly the same functions/persons in the three projects. However, this was not a problem since the aim was not to compare but to explore different projects.

Both authors were present during the interviews; one person taking notes and the other person focusing on the interviewee. We also recorded each interview to be able to go back to statements later on in the study. The information retrieved in the interviews was categorized according to the PDCA .

2.4 Searching for a Theoretical Framework

Theory was advised during the whole process and was not entirely decided until after the empirical study. We advised not only literature but also professors from Lund University and the International Institute of Industrial Environmental Engineering (IIIEE). All in all, we concluded that the issue of the thesis is not closely linked to any specific set of theory but rather spans over a broad range of theoretical areas. Many areas have therefore been studied, but as the study proceeded, with an increasing understanding for the topic, a limited number of theoretical areas could be chosen. Our theoretical framework is illustrated in Figure 2.4.

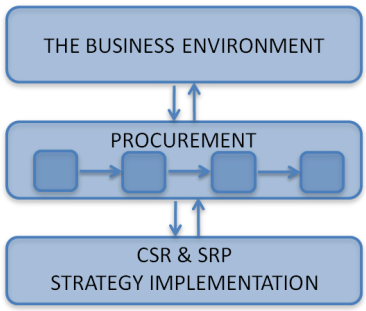

Figure 2.4 Theoretical framework

The theoretical framework was used to analyze the result from the research and to answer research question 4. In order to provide an in-depth analysis and to give feasible suggestions, the organizational issues were focused on in the last step.

2.5 Focus Group

In order to evaluate our suggestions related to question 4, an internal focus group was advised. The focus group consisted of persons from the eco-certification group

and the NPU. The focus group was involved at an early stage and was advised repeatedly during the process to validate and improve our suggestions and recommendations.

2.6 Reliability and Validity

Reliability and *validity* are important criteria in the evaluation of research. In qualitative research, reliability is concerned with the degree to which a study can be replicated and whether or not the members of a research team agree about what they see or hear. Validity, on the other hand, refers to the degree to which generalization across social settings can be made and whether or not there is a good match between observations and the theoretical ideas that they give rise to. (Bryman & Bell 2007, pp. 410-411)

In the literature review, all used sources are referenced and multiple sources have been used to verify any discrepancies found in information. However, since the topic is developing fast, it is difficult to ensure that only the most recent research is used.
In order to obtain high reliability from interviews, both authors were present during the interviews of the construction projects and they were also recorded. In the environmental study, the first interview with a stakeholder group was performed by both authors to get a common first impression of the stakeholder group. The following interviews could then be preformed individually. Another measure taken to increase the validity of the information was to always advise the interviewee if he/she could recommend us to talk to any other person with knowledge in the topic.

3 What is Chain of Custody and Why is It Important?

In the following chapter the concept of Chain of Custody (CoC) will be introduced and explained. This involves presenting the reason why CoC is an important issue for the construction industry to engage within. Additionally, legislation and the concept of third party certification on timber will be presented, as they are important aspects in the CoC question.

CoC is a legal term widely used in court to convict persons of crimes and is defined as "*the movement and location of physical evidence from the time it is obtained until the time it is presented in court"* (West's Encyclopedia of American Law 2011). In the timber industry, CoC refers to the chronological documentation through the value chain, from the forest to the consumer, including all stages of processing, transformation, manufacturing and distribution (FSC 2011:2). The purpose of applying CoC on timber in the construction industry is to prevent illegal timber logging and timber trade to take place, and to be able to prove to consumers that the timber originates from responsibly managed forests. As a mean to facilitate communication with consumers and suppliers in the question of CoC, a number of forest certifications systems have emerged around the world. The two main internationals schemes are FSC (Forest Stewardship Council) and PEFC (Programme for Endorsement of Forest Certification). The main purpose of the certifications are to work towards a more sustainable and responsible forestry around the world. A simplified illustration of CoC in the supply chain of timber in the construction industry is illustrated in Figure 3.1.

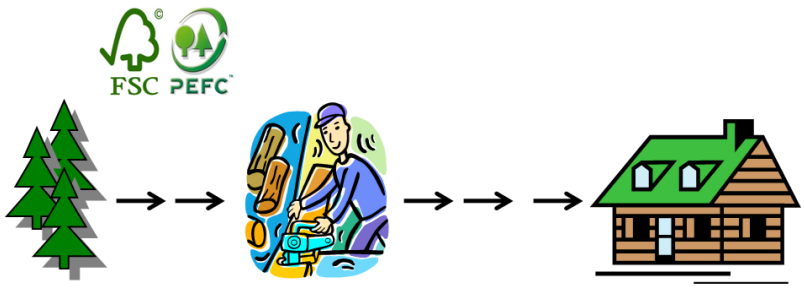

Figure 3.1 CoC in the supply chain

3.1 Illegal Timber

Illegal timber is derived from illegal actions during different stages of the value chain. In a joint statement between WWF (World Wide Fund International for nature) and World Business Council for Sustainable Development (WBCSD) for The Forests Dialogue, (8-10 March 2005, Hong Kong), illegal logging is defined as:

> "the harvesting of timber in violation of relevant forestry and environmental laws and regulation". Sourcing of illegal wood occurs when unprocessed wood is procured in the absence of the seller's legal right to sell or harvest. Illegal timber trade involves the procurement, processing, distribution and marketing of products made from wood that has been obtained by illegal sourcing or illegal harvesting and/or are not in compliance with relevant national and international trade laws". (WBCSD 2005).

The term illegal logging is commonly used in policy forum and in literature to refer to the illegal activities in all the different stages described above (*Illegal logging* 2007). In this master thesis, the term illegal logging will be used accordingly. Illegal logging occurs in all types of forests, across all continents, and is one of the largest global forest policy issues. As earlier presented, statistics from Dalarna in Sweden illustrate that 37 % of the investigated timber logging in the province does not follow Swedish law. This is only one example on the size and the spread of the illegal logging issue today. Thus, illegal logging has been addressed at global forums, such as the United Nations Forum on Forest, G8[1] meetings and through bilateral agreements between producing and consuming countries. (Smith 2004, p. 7) In September 2006, the G8 *Illegal Logging Dialogue* was initiated at the annual meeting of the International Monetary Fund (IMF) in Singapore. This dialogue takes place between the members of G8 and key timber producer countries, such as. China, India, Brazil, Indonesia, Malaysia, Democratic Republic of Congo and Peru. The dialogue is one of many international initiatives on illegal logging and in addition there is legislation that addresses the issue of illegal timber. (*Illegal logging* 2007) The predominant legislation is the EU's *Forest Law Enforcement Governance and Trade* (FLEGT) from 2003 and the more recent US Lacey Act that was amended in May 2008.

Global awareness and concern for the forest was first raised by non-governmental organizations (NGOs) such as the Environmental Investigation Agency (1996) and the Global Witness (1999). Today, the WWF is highly involved in the work in preventing illegal timber logging and trade. (*Illegal logging* 2007, pp. 7-12)

The consequences of illegal logging are complex and include environmental damage in terms of deforestation, loss of biodiversity and climate change. It also creates conflicts with indigenous and local populations with crime and abuse of human rights as a result. For governments, illegal logging denotes billions of dollars in lost revenue and thus promotes corruption. In contrast, millions of people depend on illegal timber trade for their livelihoods and survival. (Smith 2004, pp. 7-12) Economic, social, and ecological data on the consequences of illegal logging are scarce. Li et al. (2008) have studied long-term global effects whereas most other

[1] Group of Eight (G8) is a governmental forum for eight countries in the world; France, Germany, Italy, Japan, the United Kingdom and the United States.

studies have a national focus. For example, the American Forest and Paper Association (2004) focus on effects in the US, while Turner et al. (2007) has studied the implications for New Zealand.

3.1.1 Environmental Effects

Illegal logging causes destruction and degradation of forests and in extent global warming, forest fires and flooding. In the world's largest tropical forest, the Amazon, the deforestation rate peaked the second highest ever, between August 2003 and 2004, due to illegal logging. An area of 26,130 square kilometres, around the size of Belgium, was harvested and most of the timber was illegal. (Greenpeace 2008) Another effect of the illegal logging is loss of forest biodiversity. Given that much of the illegal logging occurs in tropical forests, it harms important environmental services (Bala et al. 2007), such as the habitat of the great apes in Africa (Walsh et al. 2003), and of the orangutan and the Sumatran tiger (Nellemann et al. 2007). Illegal logging in non-tropical forests, such as in the Baltic States and Russia have led to near extinction of the white-backed woodpecker and the black stork.

3.1.2 Social Effects

Illegal forestry activities often negatively affect indigenous communities and rural livelihoods. (*Illegal logging* 2007, pp. 110-115) The corrupt situation tends to favour those who have sufficient resources, meaning large logging companies, rather than small households engaged in small scale forestry. In addition, illegal logging often violates human rights and there are evidence that local communities have experienced threats and violence trying to prevent illegal activities. Even so, illegal logging involves many people, especially the poor and unemployed, and is an important and vital source of income.

3.1.3 Economical Effects

The World Bank estimates the market value of global annual losses due to illegal logging in public forests to exceed $10 billion. According to WWF (2004), the European Union (EU) stands for nearly a third of the total loss, because of a large import from affected countries. (World Bank 2006, p. 12) Furthermore, illegal timber is logged with less expense and can be traded to a lower price, which eventually pushes down the market price of timber. The American Forest and Paper Association has studied price development of timber and found that illegal logging depressed world timber prices by 7-16 % depending on timber product (American Forest & Paper Association 2004). Consequently, illegal logging directly undermines economic development of local and national economies.

3.2 Laws and Regulations on Timber Trade in Europe

Governments and legislation play a key role in the import of timber materials and the discussion often concerns the framing of international agreements for avoiding illegal timber. The negative economical, environmental and social impacts from illegal logging make the subject central for governments worldwide to engage within (see chapter 0). The EU policy against illegal logging from 2003, *Forest Law*

Enforcement Governance and Trade (FLEGT), plays an important role for banning illegal timber on the European market. FLEGT is applicable if an EU country directly imports timber from a country outside the EU. (European Commission 2011:1)

A central part of FLEGT is the Voluntary Partnership Agreements (VPAs) that involve countries trading with legally traded timber. (European Commission 2011:2) Commitment and action from both the exporter and the importer of timber becomes legally binding if both parts sign the agreement. The main countries to target in the FLEGT Action Plan are situated in high risk regions and pursue the majority of the world's forest export, such as Central Africa and Tropical South America. The majority of EU's member states are introducing green public procurement policies in their national legislation to secure legality on imported timber, which is in line with EU recommendations.

In addition to FLEGT, EU's Timber Regulation No 995/2010 from the European Parliament will be legally binding for all of EU's 27 member states, in March 2013. (European Commission 2011:3) The regulation covers a large variety of products such as paper, pulp, plywood, solid wood products and flooring. The law regulates obligations for placing timber products on the market and involves, in summary, three key areas.

- Illegally harvested timber and timber products derived from illegal timber hare forbidden to be placed on the EU market.
- First time importers must perform a due diligence which includes the undertaking of risk management. This involves providing information, perform a risk assessment and risk mitigation. (Additionally detailed rules concerning the risks will be adopted in June 2012).
- Track record of both customers and suppliers must be kept.

Each member state is responsible for both the regulation and its enforcement. (European Commission 2011:3) Further on, effective penalties will have to be implemented. By June 2011, each member state should nominate an authority that will handle the responsibility and secure that the timber regulation will be enforced.

3.3 Third Party Certification of Timber

Third party certification implies that a third party guarantees that a material or a service is performed according to assigned standards. Today, certifications are commonly used within the food, security and materials industry. The purpose of a certification is to ensure observance of national or international requirements on different aspects, such as quality, health, security and environment. (Inspecta 2001) The credibility of a certification is regarded to be highest when a neutral part or organization is responsible for the certification scheme. (PEFC 2010:2)

In the timber industry, third party certification has become a tool for securing responsibility from all parties involved in the supply chain of timber. (PEFC 2010:1) Certification of timber is performed through several different standards. However, the two primarily and largest standards are; the *Forest Stewardship Council* (FSC) and the *Program for the Endorsement of Forest Certification* (PEFC), presented in Table 3.1. The main purpose of both is to work towards a more sustainable and responsible forestry around the world. (PEFC 2010:3)

Table 3.1 Third party certification

Third Party Certification	FSC	PEFC
Type	Voluntary certification system for responsible forest management.	Voluntary certification initiative for sustainable forestry.
Year	1993.	1999.
Origin	Canada.	Europe.
Standard	International Standard.	Country Specific Standard.
CoC consideration	FSC CoC Certification.	PEFC CoC Certification.
Geographic distribution	Represented in over 50 countries.	31 member countries worldwide.

3.3.1 FSC

The FSC is a non-governmental, independent organization with the purpose to avoid deforestation of tropical forest. FSC has established an international standard, which each national FSC standard is assessed against. (FSC 2011:2.) Three different types of certifications are present today: *Forest management (FM*), *FSC Controlled Wood (CW)* and *Chain of Custody (CoC)*. FSC-FM, guarantees long-term sustainably forest management by the forest owner. To become FSC-FM certified, the forest owners also have to comply with the criteria for the FSC-CoC certification that tracks the timber through the entire production process. The first two certifications thus create a responsible production and consumption through the whole value chain and companies and forest owner normally use the certification to demonstrate that they take responsibility not only for their own activities but the entire value chain. The FSC-CW certification creates a system where producers are able to mix different sources of timber, thus still being able to track the non-FCS marked timber and demonstrate their knowledge about the material. (FSC 2011:3.)

3.3.2 PEFC

The PEFC has the purpose to shape an international standard for timber based on each country's timber prerequisites, a certification scheme that was adapted to different types of timber was created. The PEFC is a European system brought forward by each country separately and then compared to a standard to receive credibility. Compared to FCS, no international general standard exist in the PEFC

certification system. (PEFC 2010:3) PEFC offers two kinds of certifications: *PEFC Forest certification* and a *PEFC Chain of Custody certification*. (PEFC 2010:4)

3.3.3 Discussion on Chain of Custody

The discussion on deforestation has increased in the last decade and illegal logging is now a hot topic in global forums. The consequences of illegal logging are not only environmental damage but also negative impact on the society and the economy. Legislation in this area is thus constantly updated and improved and plays an important role in preventing the development of an illegal timber industry. CoC is another tool to prevent illegal logging and timber trade from taking place. CoC is applicable on the entire supply chain, from forest to the timber yard and the final product.

For a company, it is and will be even more important to guarantee that purchased timber products origin from sustainably managed forests. (DNV 2010) Today, a common way to guarantee this, is the use of the two largest third part certification systems, FSC and PEFC. Around 10 % of the world's forests are certified today, which implies that various actions can be taken to ensure that additional forest becomes certified. (Korsnäs 2011) Many companies today choose to purchase timber that is certified, as a part of their environmental strategy. (Södra 2011)

4 Chain of Custody at Skanska

The following chapter will introduce Skanska and in particular their sustainability work and procurement processes. This information is aimed at giving a background and understanding of the situation with Chain of Custody (CoC) at Skanska today.

4.1 Skanska the Company

Skanska AB is an international project development- and construction company working with commercial and residential buildings, civil construction and public-private partnership projects. The company employs 53 000 people worldwide with home markets in Europe, the U.S. and Latin America. (Skanska 2010:1) At any given time, the 53,000 employees and roughly four times as many subcontractors are executing around 10,000 projects in the home markets, which makes Skanska AB a complex and highly decentralized company. (Skanska 2011:2)

Skanska AB has been listed on the Stockholm Stock Exchange since 1965 and the company revenue in 2010 totaled SEK 122 billion. Originally, Skanska AB was called Skånska Cementgjuteriet and was founded by R.F. Berg in Malmö in 1887. In the 1950's, the company started an international expansion and in 1984 Skanska AB became the official name of the group. (Skanska 2010:2) The organizational chart for the Skanska group is represented by four different business streams: *Construction, Residential, Commercial and Infrastructure Development*, as presented in Figure 4.1. Skanska AB is the corporate group name followed by several underlying business units that are divided into geographical regions, such as. Skanska Sweden, Skanska Norway and Skanska Finland. (Skanska 2011:1)

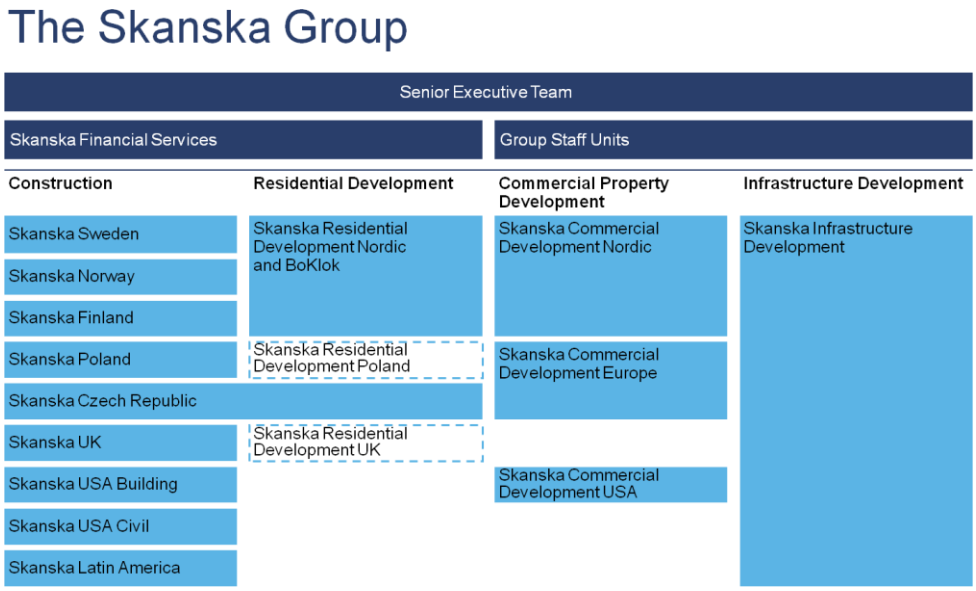

Figure 4.1 Organizational chart

This study only concerns Skanska Sweden and the results and conclusions of the thesis will thus be based on the Swedish situation today. However, the Nordic business units have similar markets and business models for construction, why the thesis could still be interesting for the rest of the Nordic units. The same reasoning can be applied to the entire construction industry in the Nordic countries. (Skanska: 2010:1).

4.2 Sustainability and CSR at Skanska

Skanska AB aims to be a financial and qualitative leader in the construction industry. In the financial targets, the ambition is to exceed industry norm, while qualitative targets are expressed in a five zeros vision: zero loss making projects, zero environmental accidents, zero accidents, zero ethical breaches and zero defects. (Skanska 2011:6) In 2010 Skanska AB published a *Profitable Growth Business Plan* aiming at becoming industry leaders in ethics, green, people development, risk management and safety for construction and project development, for 2011-2015. (Skanska 2011:2)

According to media consultant Hallvarson & Halvarssons's annual ranking of 700 company websites, Skanska AB is ranked fourth with regard to Corporate Social Responsibility (CSR) information on company websites in 2009 (Hallvarson 2009). However, Skanska Sweden do not use the term CSR to refer to this work but instead use the term sustainability. Thus sustainability will be used in the same context as CSR, when referring to Skanska.

Skanska AB has been proactive in Environmental Management since 1995 and all BUs are certified in accordance with ISO 14001. Buildings and other structures have large environmental impact in terms of consumption of finite natural resources both during construction and throughout the whole life cycle. Skanska Sweden has therefore in their environmental policy committed to continuous improvement in four priority areas; energy and climate, materials, biodiversity and local impacts. (Skanska 2007) Each priority area is measured by a Key Performance Indicator (KPI), indicating a direction of outcome. The KPIs are reported by each BU to Skanska AB annually. (Wikander 2011)

As a part of the commitment to reduce the environmental impact of the built environment, Skanska AB has developed *Skanska Color Palette* ^{TM} *– The Journey to Deep Green*^{TM}, for building and civil. The color palette for building is presented in Figure 4.2 on the next page.

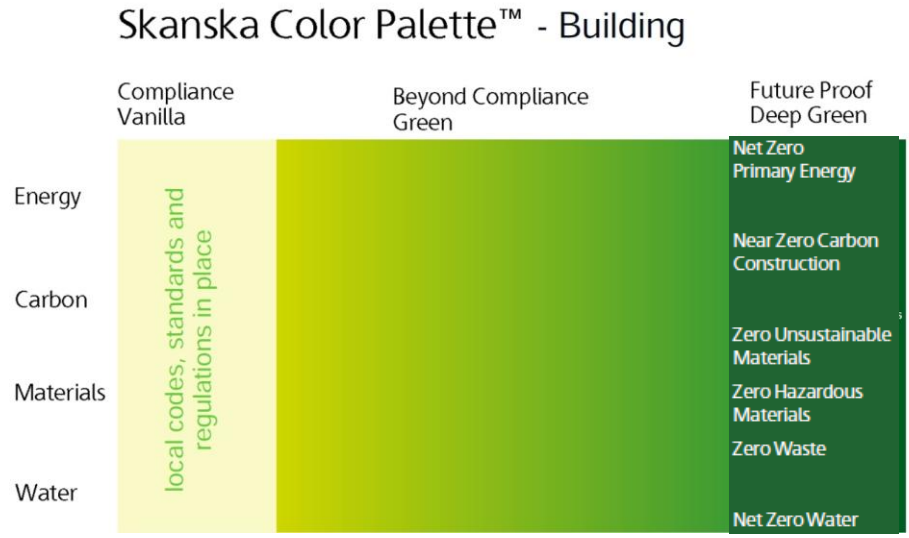

Figure 4.2 Color Palette™[2]

The palette is a communication tool and strategic framework that has the purpose of measuring and guiding the company's and/or projects' performance on the movement towards reduced environmental impact; deep green in the palette. (Skanska 2011:3) A deep green position of a project or the company, symbolizes a construction process and product performance with near zero environmental impact and thus the future target. A green position implies a construction process or product performance beyond compliance with law, regulations, codes and standards, while vanilla position projects only just meet these requirements.

Regarding social responsibility, Skanska AB is committed to operations in accordance with the highest industry standard in labour practises, human rights and societal impacts and product responsibility. (Skanska 2011:4) Four prioritized areas have been identified; safety & health, business ethics, human resources and community involvement. In business ethics, the vision is to have zero ethical breaches. The implementation of the vision includes a code of conduct and training of employees. Furthermore, Skanska is involved in disaster relief, charitable donations and sponsorship as means of community involvement.

In an economical aspect, Skanska AB's main focus is to avoid becoming involved in unacceptable projects in terms of social or environmental aspects. In line with this, Skanska work with securing their supply chains and perform social and environmental audits of prospective first-line suppliers in a try to influence their performance. (Skanska 2011: 5) An issue closely connected to taking responsibility in

[2] Figure 4.2 is accessed from: http://skanska-sustainability-case-studies.com/index.php/Skanska-Color-Palette.html

the supply chain is the question of CoC on timber products. The current situation of CoC at Skanska will be described in the next section.

4.3 Chain of Custody on Timber at Skanska

The concept of CoC on timber is relatively new at Skanska and the ambition is to exclude illegal material in the supply chain. Skanska AB has decided that CoC should be monitored and reported on different purchased materials in a CoC KPI. The CoC KPI is defined as follows:

> "% prioritized materials[3] affecting flora, fauna and ecosystems that can show a clear chain of custody".[4]

Timber and timber products are regarded as prioritized materials in the CoC KPI since they are associated with high risks and have high impact on global warming. Today, each business unit (BU) annually reports a figure for the CoC KPI to Skanska AB. However, the BUs have different approaches on how to handle the KPI. Skanska Sweden reports the KPI for call offs on framework agreements (FWAs), whereas Skanska UK reports the KPI for all timber and timber products, excluding furniture and paper purchases. The opportunity for each BU to choose what to include in the KPI is preferable according to Wikander as the purchased material different a lot between the BUs. However, the figures have to be traceable and it has to be clear which timber that is included in the KPI. This is not the case today, which results in uncertainty in the interpretation of the KPI. (Wikander 2011)

Because of the difficulties with implementing the CoC KPI, Skanska AB´s *Green Business Support* has during 2010 developed a document called; *"Chain of Custody for Timber – Guideline for implementation".* The guideline is supposed to provide support to BUs in reporting the CoC KPI. The aim with the guideline is to:

> "Support Skanska's Business Units in the implementation of the Environmental Policy, and to achieve and report progress in accordance with the KPI for Chain of Custody defined in the Environmental Strategy".[5]

The goal is to help each BU to report a KPI that is representative for their purchases of timber. The guideline describes the implementation process in three steps; define scope, traceability & verification and continual improvement shown in Figure 4.3 on the next page.

[3] Prioritized materials are currently wood and quarry 2011-03-09

[4] Citation from Skanska AB organizational document "Chain of Custody for timber- Guideline for implementation", p. 1

[5] Citation from Skanska AB organizational document "Chain of Custody for timber- Guideline for implementation", p. 1

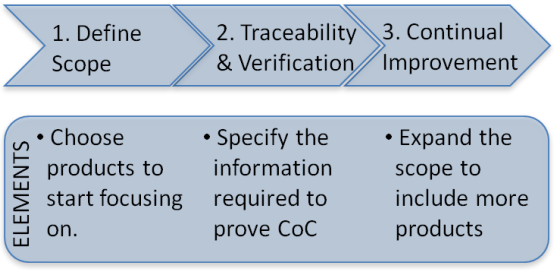

Figure 4.3 Step in the guidelines for Chain of Custody

The scope is the timber or timber products to start focusing on in the work with CoC and the scope can be specified based on different criteria such as volume and spend. One BU can thus decide to report the percentage of hardwood floors that can indicate a clear CoC, if the BU has the largest spend or volume in hardwood floors. The traceability and verification step specifies what kind of information that is required from the supplier to prove a clear CoC. Information includes specification of species of timber, and for example where the timber was grown. The last implementation concerns the expansion of the scope to include more products than were focused on in the beginning. The guideline also gives preference to third party certification suppliers and products and call for monitoring systems for suppliers in high risk areas with extensive corruption. The guideline will be implemented in 2011 and evaluated in accordance with the BUs. During the writing of this thesis, the first version of the guideline was released but the evaluation had yet not been performed when the thesis was finished. (Wikander 2011)

To summarize, Skanska Sweden report the KPI only for FWAs today, however, they are not satisfied with the way the KPI is handled. On an operational level, the KPI is not reported for any projects. Instead, the projects work with CoC through eco-certifications, such as LEED and Svanen.

4.3.1 Eco-certifications

In Skanska's construction projects, CoC is handled through eco-certifications on buildings. Eco-certifications include green building[6] certification schemes and have arisen due to increased demand on the construction industry to lower their environmental impact at local, regional and global scales. What characterizes an eco-certification is that it awards points or credits for reduced environmental impact. (Cidell 2009, p. 622) Eco-certifications apply to both new construction and renovations and the main focus areas are the building shell, installations, materials, user behaviour, energy sources and overall design of the building. However, there are only a few of the available eco-certification that directly address CoC on timber. These are world leading eco-certifications: Leadership in Energy and Environmental

[6] Buildings that are aimed at energy conservation, saving natural resources, and preserving the environment (http://www.usgreenbuilding.com/glossary.asp 2011-02-23)

Design (LEED™), BRE Environmental Assessment Method (BREEAM™) and the Swedish Svanen label. They handle the criterion for CoC differently and the following sections highlight the different definitions. Figure 4.4 presents the logos of the different eco-certifications.

Figure 4.4 Eco-certifications for buildings

LEED

LEED is an internationally recognized green building design guideline developed by the U.S. Green Building Council (USGBC) in 1998. By 2009, there were 2,476 LEED certified projects and 19,524 registered projects, distributed in over 90 countries (USGBC 2009)

LEED has a whole-building approach and measures performance in nine different areas: water efficiency, energy and atmosphere, material and resources, indoor environmental quality, locations and linkages, awareness and education, innovation in design and regional priority. LEED points are awarded on a 100-point scale with an additional 10 bonus points, which address regional issues and innovation in design. Based on awarded points, a building can be certified on four different levels: certified, silver, gold and platinum. (USGBC 2011)

The materials and resources credit category encourages the selection of sustainably grown, harvested, produced and transported products and materials. Credit 7 (MRc7) addresses the issue of CoC in terms of certified wood and the intent of encouraging responsible forest management. The requirements for the credit are:

> "Use a minimum of 50 % (based on cost) of wood-based materials and products that are certified in accordance with the Forest Stewardship Council's principles and criteria, for wood building components. These components include at a minimum, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. Include only materials permanently installed in the project. Wood products purchased for temporary use on the project may be included at the project team's discretion. Furniture may be included if it is included consistently in MR Credits 3." (LEED NC 2009, p. 109)

4.3.2 BREEAM

BREEAM was established in the UK by the Building Research Establishment (BRE) in 1990. BREEAM and is the world's leading and most widely used certification scheme, with over 115, 000 certified buildings and 700,000 registered projects. BREEAM has a holistic approach looking at a broad range of environmental impacts:

management, health and wellbeing, energy, transport, water, material and waste, land use and ecology and pollution. Each category is divided into main issues and credits are awarded according to performance in each issue. The building is thereafter rated and certified on a five-step scale from pass, good, very good, excellent and outstanding.

In the material category, BREEAM rewards responsibly resourced materials for key building elements. (BREEAM 2011:1) The purpose of the following text is to give a brief presentation of how CoC on wood is addressed in BREEAM. The authors have made a narrow selection, and summarized only the most relevant content, with regards to the purpose of this thesis. The full-context text can be found in the *Assessor manual of BREEAM International 2008* (BREEAM 2009:2). In material issue no 5, CoC is addressed:

> "Up to 3* credits are available where evidence provided demonstrates that 80 % of the applicable materials** compromising each of the following building elements are responsible sourced; structural frame, ground floor, upper floors, roof, external walls, internal walls, foundation/substructures and staircases. Any non-certified timber used in the development comes from a legal source and is not included in the CITES[7] list." (BREEAM 2009:2, pp. 195-205)
>
> * Credits are awarded according to level of credibility of evidence. The highest level of credibility is FSC and PEFC certifications (and a few others that are not treated in this thesis).
> ** Including timber, timber composite and wood panels

4.3.3 Svanen

Svanen is a Nordic eco-certification that was established in 1989 by the Nordiska Ministerrådet. Miljömärkning Sverige operates the Svanen label, on behalf of the Swedish government. (Svanen 2011) The label applies to consumer goods, hotels and other buildings. For buildings, evaluation categories are: energy, indoor environment, material, ventilation, building processes and operation instructions for the residents. There are 51 credits that are compulsory and 22 credits that are eligible. In order to become Svanen certified, a total of 60 credits have to be achieved. Regarding CoC in the Svanen certification there are two compulsory credits and one eligible. The purpose of the following text is to give a brief presentation of how CoC on timber is addressed in Svanen. The authors have made a narrow selection, summarized and translated only the most relevant content, with regards to the purpose of this thesis. The full-context text can be found in the

[7] CITES, Convention on International Trade in Endangered Species of Wild Flora and Fauna. The CITES List includes over 5,000 species of animals and 28,000 species of plants are protected by CITES against over-exploitation through international trade. (http://www.cites.org/eng/disc/species.shtml)

manual *Svanenmärkning av småhus, flerbostadshus och förskolebyggnader Version* 2.0 (Svanen 2009, pp. 17-18).

> "O23 Ensuring wood and bamboo materials from sustainable areas
> Wood and bamboo materials may not be from:
> - Protected areas
> - Areas with unclear ownership or user rights
> - Illegal logging
> - Forest with high conservational value
>
> The constructer should have a written routine on how to ensure that wood and bamboo materials come for legal sources and sustainable areas. Chain of Custody certificates can be used to document the origin of the wood"
>
> "O24 Controlled wood and bamboo
> The requirements apply to parts of wood or bamboo in solid wood or bamboo, laminated bamboo and plywood.
>
> If a product comes from forest has been certified according to an approved forest standard and has been documented in 025, no documentation according to this requirement is needed."
>
> "O25 Wood from certified forests
> For products made of solid wood, laminated wood or veneer, at least 50 % must come from areas with operation certified by a national forest standard approved by the Nordisk Miljömärkning. Calculations can be based on weight or volume and the used certification system must be specified. Wood products with the Svanen label, count as wood from certified forests. Chain of Custody certificates are only valid documentation, in combination with sustainable forestry certification approved by the Nordisk Miljömärkning".
>
> "P7 Higher proportion of wood from certified forests
> If the amount of certified wood (according to O25) is more than 60 % of the total amount of timber, 1 credit is given."

4.4 Procurement at Skanska in the Nordic Countries

Procurement at Skanska is characterized by a high degree of decentralization and a majority of the procurement decisions are made in the projects in accordance with Skanska´s overall strategies. (Skanska 2008) For many years, Skanska has worked towards maintaining a strong procurement position in the market and great effort has been put on finding economies of scale and common competitive advantages; regionally, nationally and between different BUs. In 2009 the *Nordic Procurement Unit* (NPU) was created to provide a coordinated purchasing support for the Nordic countries. The conditions for purchasing collaboration in the Nordic region are very good since the markets and business models for constructions are similar.

The NPU handle requests from BUs and their main task is to provide procurement related services, such as FWAs, project procurement strategies and environmental support. The NPU strategy for 2010- 2012 focuses on six different areas; improving current FWAs, increasing the number of FWAs, improving procurement support in bidding & estimating phases and improving project procurement. For 2011, an implementation plan has been developed to reach the overall strategy. The plan includes a preferred supplier program, where more detailed demand on suppliers can be formulated. It also includes strategic purchasing category work, improvements in logistics and work with safety and green. (Stark 2011) With regards to the CoC guidelines, which are part of the implementation plan, the NPU has an important role in supporting the BUs in how to report the CoC KPI in a way that is representative for their unit.

4.4.1 The Procurement Process

Purchased products and services amount for approximately 60-80 % of the total cost in a typical construction project, why purchasing processes are of high importance. Material can be purchased in two different ways at Skanska in the Nordics; coordinated purchasing through FWAs and project specific purchasing, as seen in Figure 4.5 (Skanska 2008). Coordinated purchasing accounts for approximately 30 % of a project's procurement costs and what is left is projects specific purchasing such as service and material from subcontractors (Leimalm 2011).

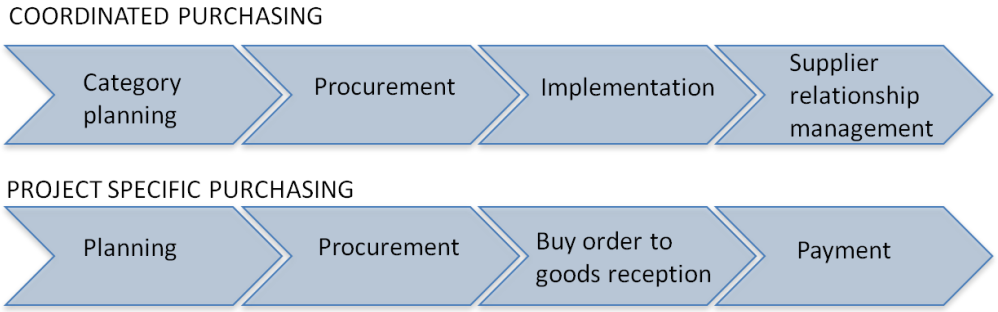

Figure 4.5 Purchasing at Skanska

In coordinated purchasing, the focus is to handle suppliers and supplier relations in a long-term perspective. (Lönn 2011) The main form of work is FWAs that set out general terms and conditions under which purchases can be made with a specific supplier. The coordinated purchasing includes direct and indirect materials and products and services. FWAs are mainly used for strategic products, to reduce costs or to secure materials supply. Skanska is an important customer for their suppliers and can be said to have large buyer power over Swedish suppliers.

In first hand, a project calls off products and services from FWAs in coordinated purchasing. However, frequently a project has to buy goods and services that are not covered by any FWA. The working process for project specific purchasing includes four steps, see Figure 4.6 on the next page. (Björlingson 2011)

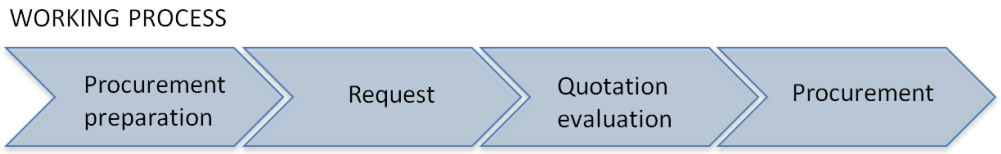

Figure 4.6 The working process in project specific purchasing

In the procurement preparation, the client's demand and expectations along with Skanska criteria are communicated to the suppliers. (Björlingson 2011) Other activities include risk inventory and total cost calculations. The next step is to compile the results and to send a request to suppliers and subcontractors. Requests contain different conditions and criteria depending on the product or service. For timber and timber products that need to be traceable, criteria include environmental and quality reporting documents. The supplier and subcontractor selection is based on the project specific requirements and also earlier experiences from working with the specific supplier and subcontractor. Quotations are evaluated and in the final step, agreements are signed.

There are numerous of people involved in the procurement process. (Skanska 2008) At a strategic level, there are category planners that work with purchasing strategies. Tactical purchasers include procurement coordinators who are appointed to large projects >20 SEK million to secure that the project receives the right level of support from the procurement unit and NPU. There are also category managers at the procurement unit, who mainly work with FWAs. At an operational level, there are specialist purchasers who work in close connection with the projects and provide specialist knowledge within a certain area. In the project, a person with procurement responsibility is appointed and this person may sometimes be the project engineer. Small purchases may also be performed by the construction workers in the project. The different purchasing levels at Skanska are shown in Figure 4.7.

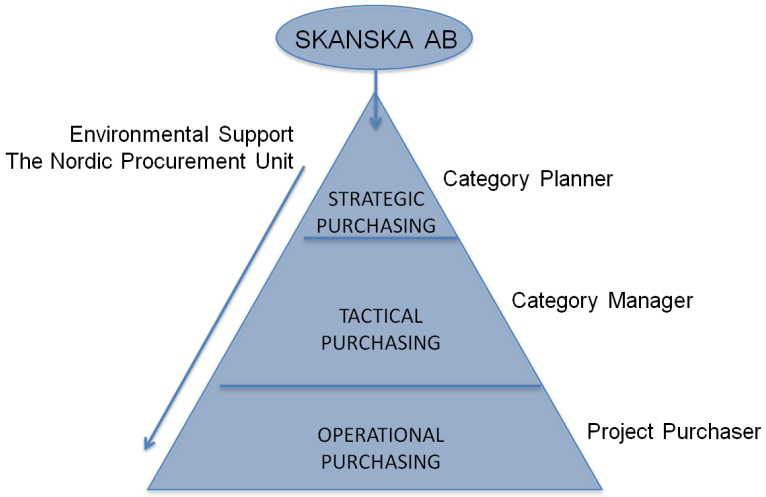

Figure 4.7 Purchasing levels at Skanska

4.4.2 Timber Procurement at Skanska Sweden

Today at Skanska, there exists no clear statement on what timber and timber products are, or in which purchasing categories the products can be found. According to Lönn (2011), who works with FWAs at Skanska, timber and timber products can be found in the following categories that are exemplified below:

1. Structural Frame	Joists, glulam beams, wooden beams, form wood
2. Ground floor	Sawdust floors
3. Upper floors	Hardwood floors, parquet
4. Roof	Tongue and groove boards, roof trusses, and spline
5. External walls	Sashes, doors, door frames, panel
6. Internal Walls	Doors, doorframes, baseboards, cornice, panel, plywood masonite sheets
7. Staircases	Wooden staircases
8. Kitchen furniture	Doors, benches

To illustrate how large costs that timber accounts for in Skanska Sweden´s total purchased material, estimations have been made by a category manager for FWAs on timber. The estimation shows that 9 % of total purchasing costs are timber and timber products. The percentage includes both FWAs and project purchasing. Approximately 70-75 % of the total purchased timber, origins from Swedish forests. The total number of timber suppliers is estimated to be 1,700. Approximately 80 of these are suppliers that Skanska purchase material for over 1 million SEK from. The 80/20 rule applies, meaning that 20 % of the suppliers deliver 80 % of total volume. For timber products, Skanska Sweden´s FWAs range from 2 to 200 million SEK agreements. (Lönn 2011) It can be concluded that timber represents a fairly large purchasing amount in spend, at Skanska Sweden.

4.5 Summary on Chain of Custody at Skanska

Skanska is one of the world's leading project development and construction companies and aims at being a leader in the development of green projects. This can be seen in various initiatives such as the profitable growth plan, the Color palette^{TM} and in the environmental policy. Skanska's construction projects also work to get eco-certified, within LEED, BREEAM and Svanen.

In line with this sustainability ambition, responsible procurement and CoC on timber is a prioritized question. Skanska want to exclude illegal timber in their supply chain and minimize the environmental, social and economic impact of illegal logging. Today, Skanska AB works with a CoC KPI to report CoC for their FWAs; however the work is not proceeding optimal.

The reason for this is that Skanska, like the rest of the construction industry, is highly decentralized which makes it very difficult implementing and measuring CoC performance. Purchasing takes place at different levels of the organization, both in FWAs and in project specific purchasing. In the decentralized structure that exists, well-functioning procurement processes is a critical success factor in and the success or failure lies much in the hands of the people at a tactical and operational level in projects.

5 Theoretical Framework

For a company, the business environment and its stakeholders is an important area to observe. A company needs to know how it interacts with its stakeholders and how stakeholders and their activity affect the company. This business environment of a company can be studied in various ways; however the important task is to gain knowledge that allows the company to make strategic decisions.

One function in the company where interaction and involvement with several external actors is compulsory is procurement. Interests from various directions need to be taken into account, and the company's impact on the supply chain needs to be considered. Today, a common way for companies to take all of these interests into account is CSR, *Corporate Social Responsibility*. CSR is often included in the corporate strategy and within purchasing the concept is normally referred to as SRP, *Socially Responsible Purchasing*. In SRP, the company ensures that its purchasing activities are managed in a responsible way throughout the entire supply chain. The concept of SRP is closely connected to Chain of Custody (CoC), since it assures that a company knows what it is purchasing and from where it origins. Involving the concepts of both CSR and SPR in a company might sound like an easy task. However, strategy implementation is known to be a complicated task.

In the following chapter, theories that treat the issues described above will be presented. Hence, this theoretical framework will be the basis for the analysis in this thesis. The theoretical areas that will be integrated are illustrated in Figure 5.1.

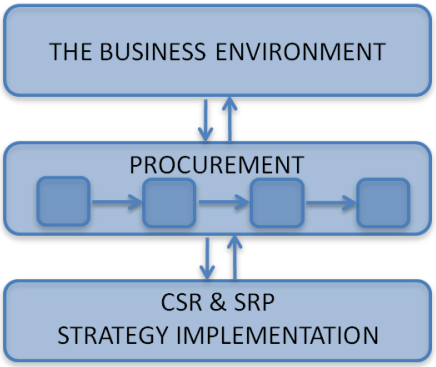

Figure 5.1 Theoretical Framework

5.1 Business and the Environment

The concept of CoC refers to the ability to trace a material or a product from its source. For CoC on timber, there are not only many stakeholders in the supply chain but also many other parties that have an interest in the CoC question. Hence, understanding the business environment becomes important when working with and analyzing the area of CoC.

The operations in an organization are said to be highly dependent on the available information when decisions are being made. Today, an abundance of information exists and selectiveness in companies becomes crucial. The business environment of today can be described as very complex since there are many aspects to take into consideration in the global environment. (Frankelius 2001, p. 38) There are micro factors such as employees, suppliers, distributors, competitors and customers as well as macro factors that are not in direct control of the company. Examples of macro factors can be laws and regulations, trade barriers or governmental policy changes. (Oxford University Press 2007) The most crucial task for a company is to interpret its business environment in the best way to be able to make rational decisions (Frankelius 2001, p. 38).

Inspired by Barnard's research on stakeholders and by sociological science, R.E. Freeman (1984) created the *stakeholder model* for identification of the key people or institutions that influence the success of a company. These stakeholders might affect the achievement of a company in different ways. The term stakeholder is used since stakeholders are said to have a "stake" in the company, hence an influence that companies should guard. The stakeholder theory is based on a traditional input-output model of managerial capitalism where four different groups are related to the company; employees, suppliers, shareholders and clients. According to Freeman, this traditional view was not enough to explain the dynamics in the business environment since the most difficult task for a company was to take external changes into account and try to incorporate the external views in the company. Freeman therefore added competitors, the communities and the government. The reason for this was that employees and customers are actors that the company has built a relationship with; hence their behavior can more easily be estimated. However external influence, such as NGOs and laws, is not directly connected to the company and is thus regarded as a larger threat. The external environment poses a great risk since it is uncertain how its behavior will affect the company. Freeman argues that the concept of the stakeholder is a simple way to identify and map those who affect the organization. The stakeholder model was presented in the book *Strategic Management: A Stakeholder Approach* in 1984. (Fassin 2008)

Caroll (1996) explains the term stakeholder, in accordance to Freeman, by stating that stake is a share or an interest in a company. The definition of stake is thus very broad and can range from legal claims to extreme undertakings between clients and

the company. Stakeholder theory is often taken one step further in literature and is instead denoted as *stakeholder analysis*. In stakeholder analysis, an attempt to classify different identified stakeholders, depending on their influence of the company, is made (Rowly 1997). Accordingly, it is not enough only to identify the stakeholders, since they might differ in their relationship to the company. The vital steps in a stakeholder analysis are to *1. identify the different stakeholder groups, 2. determine their interests* and *3. evaluate their type and level of stakeholder power*. (Wood 1994 in Putler & Wolfe 2002)

In 2003, Freeman created an adaptive version of the stakeholder model. This meant reducing the model to five stakeholders in the close environment; financiers, suppliers, customers, employees and communities. Additionally, governments, environmentalists, NGOs, critics, the media and others were added. (Fassin 2008) The adapted model is displayed in Figure 5.2.

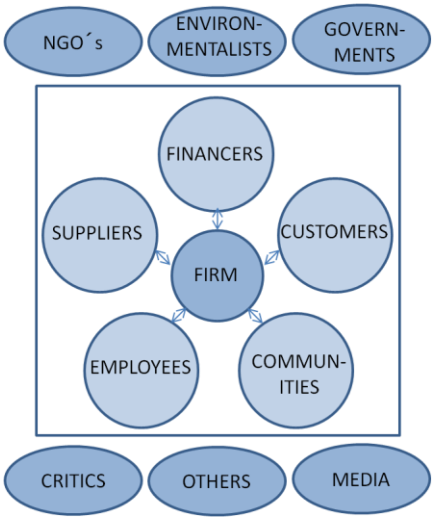

Figure 5.2 Adapted stakeholder model

More than a few models for analyzing the influence of surrounding environmental factors have been suggested throughout the years. During the 1960s and 70s, models for network mapping arose, suggesting that markets should be seen as clusters. By displaying how different actors were connected to each other, their relationship could be analyzed. The network models also showed that the market never looks the same; it differs with context and the specific company and situation. (Frankelius 2001, p. 50) In 1980, Michael Porter presented his famous *Competitive Strategy,* which presents five different forces that a company should consider and observe when analyzing its surroundings. The forces were; *competitive rivalry within an industry, bargaining power of suppliers, bargaining power over customers, threats of new entrants and threats of substitute products.* (Karlöf & Lövingsson 2007, p. 176) According to Porter (2004, p. 4), these forces also influence the industry

structure. On a fragmented market, with many actors, competition is fierce and affects the profitability. However, when only a few actors are present, companies' power over the customer becomes stronger. Rivalry within an industry is said to be dependent on price, quality and innovation.

Another model for analyzing the environment is the PEST model, created by McCarthy in the 1960s. The capitals represent Political, Economical, Social and Technical factors. Later the E for Environment and L for Legal were added to form the PESTEL model. The different factors in the model are explained as "uncontrollable considerations" and are external aspects that affect a company. (Frankelius 2001, p. 50) The PESTEL model is presented in Figure 5.3.

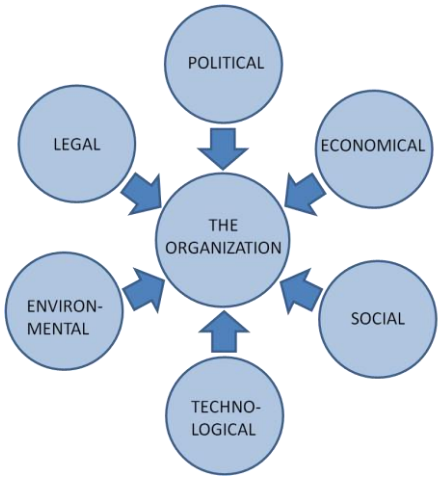

Figure 5.3 The PESTEL model

Igor Ansoff, who is considered to be the father of *Strategic Management*, early pointed out that all organizations are affected by their environment in different ways, why generalization of companies becomes difficult. Also, he proposed that methods for analyzing the surroundings, both internally and externally, were necessary for top firm performance. (Frankelius 2001, p. 46)

5.2 Procurement

Procurement in a company represents a function where it is important to take the business environment into account. (van Weele 2005, pp. 4-7 & p. 22) Traditionally, procurement has been considered mainly as an administrative function. However, during the last century, a lot has happened within procurement and procurement strategies. Supply chains have become much more global and complex, involving an increasing number of stakeholders. This change is mainly due to the globalization, the information society and changing consumer patterns. Other influencing factors are environmental or social aspects. Changed pre-requisites forces companies to take new interests into account and procurement processes have to change in the

same pace. (Gadde & Håkansson 2001, p. 4) As a result, supply chain management and procurement are today often regarded as the key business drivers in the competitive business world. In the end, this new attitude towards procurement poses new requirement on purchasers and the procurement process.

Procurement is said to be the purchasing inputs such as materials, supplies and equipment in a firm´s value chain. According to Porter, procurement is a support activity to the primary activities in a company, such as logistics, operations and sales. Figure 5.4 illustrates Porter´s generic value chain.

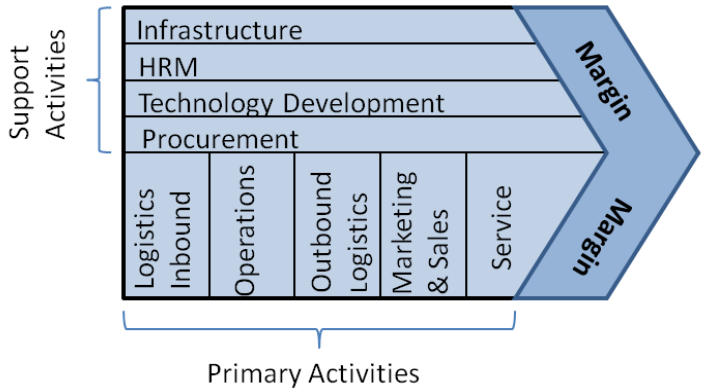

Figure 5.4 Purchasing and the value chain

The goal of all the activities in the value chain, procurement included, is to create value, both for the company as a whole and for the end customer. (Porter 2004 [1998], pp. 36-39) When the value for the customer, exceeds the cost of the activities, the result is a profit margin. Additional goals with procurement can be to secure that the production process has a continuous flow, that new technology is being used or to create a competitive advantage by purchasing the best goods to the lowest price. An efficient procurement function can be achieved in interrelation with other functions of the company and with consideration of external factors that influence the purchasing behavior.

In Figure 5.5 on the next page, the purchasing process is presented in a model that presents how the different purchasing activities interrelate. Some of the important aspects of the model will be presented on the next page.

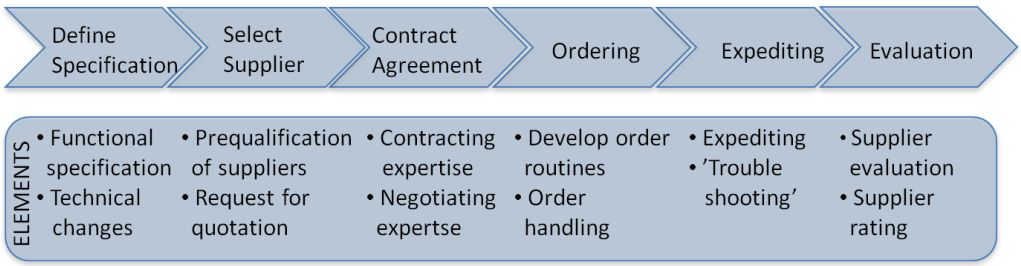

Figure 5.5 Purchasing process model

In the first step, the purchasing order specifications are specified. (van Weele 2010, p. 29) The input is business needs and requirements that can be both general and more detailed. For example, a business requirement could be SRP, and in more detail CoC on timber could be a demand. Knowing the requirements, the right suppliers can be contacted. Activities include determining the method for subcontracting, preliminary selection of suppliers, analysis of the bids received and final selection of the supplier. In the third step, contracting takes place and terms and conditions are clearly specified for both parts. Additionally, the contracting step normally includes the discussion of price, terms of delivery, terms of payment, penalty and warranty regulations. When the agreement has been signed, the ordering step follows. At this point, typically the quantity, product description and unit price, delivery date and other additional information for the logistic and administrative work are decided. The various steps in the process are closely connected and the output from one step is very likely to affect the output of the subsequent steps. Deficiencies in one step tend to become visible in the final step where evaluation of the purchase and follow-up is performed.

There are relatively few situations in reality where all the steps in the model are gone through, except the first time a product or service is purchased. (van Weele 2010, pp. 31-36) In practice, more or less all purchasing transactions involve *straight rebuys*, meaning the procurement of a known product from a known supplier. There are also *modified rebuys* where the company wants to buy a new product from a known supplier.

5.2.1 The Organizational Structure of Procurement

The structure of procurement is highly dependent on the characteristics of the business and the purchased goods. (van Weele 2010, pp. 282-294) It is possible to distinguish between three different levels in procurement, presented in Figure 5.6 on the next page. The top level is the strategic purchasing level where strategic purchasing decisions are being made. This involves long run procurement decisions that influence the market position of the company, such as decisions on outsourcing or long term contracting with preferred suppliers. The middle level involves tactical purchasing, meaning the selection of suppliers, agreements and other contracting. These are the first three steps in the purchasing process model (see Figure 5.5). The

bottom level is the operational purchasing level where the order process and troubleshooting of orders takes place. The different purchasing levels are illustrated in Figure 5.6.

Figure 5.6 Levels of purchasing

Within purchasing, it is also possible to distinguish between centralized and decentralized structures. (Gadde & Håkansson 2001, p. 12) Central purchasing takes place when a majority of the purchases is performed by one central purchasing group. In contrast, decentralized purchases mean that different business units or individual projects and productions sites are responsible for their own purchases. Most companies rely on a combination of centralization and decentralization.

According to research by van Weele (2005, p. 35), many companies do not use their organization in the way they ought to when purchasing. The purchasing function often becomes an administrative function, when it should have a more strategic function. This situation poses a risk for the company; if too much time is spent on administrative activities; tactical and strategic purchasing might become under-prioritized. According to van Weele, this displays the great improvement potential that exists in procurement organizations today.

5.3 Taking the Business Environment into Account

As described in the previous chapter, procurement processes involve numerous of stakeholders. Purchasing decisions cannot be made in isolation, but should take into account the effects on other business activities and stakeholders in the business environment. (van Weele 2010, pp. 59-62) In order to achieve this, companies have to engage in activities to secure that different interests among stakeholders are taken into consideration. In general, this is achieved by pursuing CSR strategies and systematic work within the concept of Social Responsible Purchasing (SRP).

5.3.1 Corporate Social Responsibility

CSR has been described as;

> "the firm´s consideration of, and response to, issues beyond the narrow economic, technical and legal requirement of the firm" (Davis 1973, p. 312).

A more contemporary definition, established by the European Commission, reads as;

> "a concept whereby companies integrate social and environmental concerns in their business operations and in their interactions with their stakeholders on a voluntary basis." (2005).

In conclusion, numerous of definitions of CSR exist, which indicates the width of the concept. (Nowak & Thomas 2006) Today, many organizations engage in CSR work and the concept is part of business activities and strategies. A number of authors even suggest that CSR is a requirement rather than a choice for business activity today (Dyllick & Hockerts 2002). Additionally, many companies have realized that a corporate responsibility is a top priority, not only internally in the company, but also throughout the entire supply chain. Examples of social aspects to consider are protection of workers, reduced unemployment or equal treatment of employees through the whole supply chain (Jennings & Entine 1999 in Leire & Mont 2009). Environmental aspects involve areas such as handling of resources in a sustainable way or products' environmental impact (Crane & Matten 2004, p. 24). Figure 5.7 illustrates the social, economic and environmental perspectives that are included in the CSR concept.

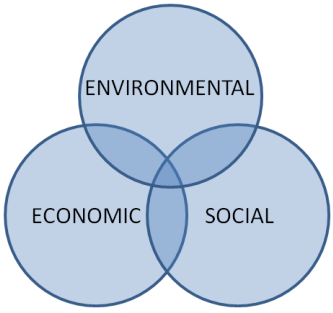

Figure 5.7 CSR

5.3.2 Social Responsible Purchasing

The implementation of CSR in purchasing is called Socially Responsible Purchasing (SRP) (Bacallan 2000) (Mohammad 2008). Many different names exist for responsible purchasing, such as socially-responsible buying (Maignan et. al. 2002), responsible procurement (Allen 2006), and purchasing social responsibility (Mohammad 2008, p. 355). In this thesis, the term SRP will be used when referring to responsible purchasing.

There are not only many names for the responsible purchasing, there are also numerous of definitions. SRP is by Drumwrite defined as;

> "taking into account the public consequences of organizational buying or bring about positive social change through organizational buying behavior" (Drumwrite 1994).

Carter (2004) on the other hand, suggests that SRP involves issues such as human rights, diversity, safety, community and philanthropy. Bacallan (2000) proposes that both social and environmental aspects are of consideration in SRP. Van Weele (2005) discusses that non-economic considerations in purchasing are important since they denote that a company not only pursues an overall strategy that involves taking responsibility, but actually works with it in its operations.

Because of the different implications of SRP, it is difficult to establish what is meant when an organization claims to be engaged in SRP. (Leire & Mont 2009) Depending on how the organization would like to define their SRP system, some firms choose to focus more on social aspects, while others lay focus on the environmental part. During the last year, more and more organizations have started to focus on green aspects of purchasing. However, social and ethical issues have lacked behind. *Green purchasing* focuses on green features and environmental aspects during the production and lifetime of a product.

Leire and Mont (2008) have demonstrated the reasons for why a company in Sweden should engage in SRP. They state that the most important motives are company reputation and pressure from external stakeholders such as the media and NGOs. Furthermore, they point out that barriers exist for working with SRP. It can be difficult for a company to ensure that all the suppliers in the supply chain are in line with statements in the company's code of conduct. Furthermore, internal problems with SRP include the invention of a systematic way inside the organization for how to work with the question. Lastly, Leire and Mont state the importance of top management engagement in the question of SRP.

In Sweden today, large companies are frequently portrayed in mass media as actors within CSR & SRP. IKEA is one example of a company that repeatedly has been portrayed in this context. Today, their environmental approach is considered to be honest. However, they have experienced many ethical conflicts throughout the years, especially related to sourcing issues. Ever since, bad purchasing behavior is regarded as a high risk that has to be managed. According to a recent study made by Fair Trade Center, IKEA today has a well-structured and systematic way to deal with ethical rules for purchasing. (SVD 2009) In conclusion, strategy implementation and systematic work in the organization is of high importance in succeeding with SRP initiatives.

5.3.3 CSR and Company Value

In 1970, Milton Friedman (1970) claimed in an article in *New York Times*, that responsibility could be taken by individuals but not by organizations. Furthermore, he argued that organizations' main goal is to earn money. Thus, their primary focus should be on providing shareholders with positive financial results. Additional aspects, such as ethical or social considerations, could harm financial results and should thus be avoided.

Friedman's framework (1970) is based on the view that shareholders own the organization and are called principals. Managers in the organization, the agents, are there only to serve the interest of the principals. Friedman argued, that if shareholders would like to engage in social questions, they could do so with money that the company creates, instead of engaging in CSR whilst still earning the money. Since agents want to maximize the financial return, there is no reason to spend money on CSR that does not guarantee a financial return.

Based on Freidman's radical article, there have been many discussions about whether or not there is a connection between CSR and increased sales revenue. Peloza (2006) argues that CSR and firm performance is most definitely related. He claims that the main idea of CSR is not that companies should turn into NGOs. Instead, companies should be able to ensure that their profit comes from responsible sources, which will be beneficial in the long run. Another view that has gained increased attention, regards CSR as an important part of a firm's reputation. Panapanaan et al. (2003) claim that the reasons for companies to engage in CSR are: increased globalization, sustainable development and regulations. In relation to this, Spar and Mure (2003) argue that CSR is a way to react to threats from competitors. The general view of CSR today, is that it can increase shareholder value in a company, especially in connection with marketing. In spite of this understanding, few companies manage to incorporate CSR, both organizationally and strategically. CSR as an additional activity to the normal operations of the company will not generate a maximum effect. Instead, a link between CSR and normal operations must be created, to succeed with CSR. (Emerald Group 2008)

5.4 Strategy Implementation and Organizational Adaptation

Procurement policies and strategies are likely to be initiated at a strategic level and need to be communicated to the entire organization. (van Weele 2010, pp 64-67) Also, procurement operations need to be aligned to the new policies. At the tactical level, managers play an important role in the implementation of a procurement policy and there are a few important areas to consider. At an operational level, purchasers need to know the incentives to working according to a specific strategy.

For many years, researchers have discussed how organizations should operate to ensure that their strategy and organizational change is moving in the same direction. Kotter and Schlesinger (2008) indicate that organizations have to have systematic

ways to adapt according to changes in the business environment. Many of the organizational changes taking place today are not as entirely successful as they could be, even though few organizational changes turn into complete failures. Contrastingly, Corby and Corrbui (1999) indicate that up to 70 % of all strategic implementation fails.

Porter describes strategy as a way of choosing and compromising which way a company would like to go. (Hammonds 2001) Additionally, strategy can be described as a map on how a company should reach their goal and is often connected to the competitive positioning of the company. (Bengtsson & Skärvad 2001) According to De Wit & Meyer (2004) the strategy process can be divided into five diverse phases, demonstrated in Figure 5.8.

Figure 5.8 The strategy process

In the first phase, the vision and goals are established by the company and this is followed by an analysis of the prevailing situation internally at the company and in the business environment. The next step is to formulate the strategy, which is followed by an implementation phase. The last step involves evaluating and verifying the outcomes of the strategy process. In this study, the main focus has been on the strategy implementation phase. In the following sections, models for strategy implementation that were found appropriate for this study will be presented.

5.4.1 Critical Success Factors for Strategy Implementation

A strategy can be perfect in its formulation; however it can be useless if the implementation process turns into a failure. Strategy implementation is demanding since it often forces the whole organization to be involved and engaged. The biggest challenge is usually to create one, common vision of where the company is heading. Corboy and Currbui (1999) also discuss "seven deadly sins of strategy implementation", which can be reformulated into critical success factors for strategy implementation:

- **Realistic, specific, motivating.** For strategy implementation to be successful, it needs to be realistic, specific and provide incentives for the employees. If the employees do not know the importance of the strategy, they will not put active support into it.

- **Plan for implementation.** A plan for the implementation is needed. Before starting, a few areas need to be considered and decided, such as: priorities, timescale, lessons learnt, impact, participations and risks.

- **Communication.** Top management has to sell in the importance of the strategy. Customers and employees might not understand the theory, so communication has to be careful and an on-going process during the whole implementation phase.

- **Individual responsibility.** Clear and specific areas of responsibilities need to be formulated so that individual responsibilities for implementing the strategy are clear.

- **Top management commitment.** Key persons and top management have to participate actively throughout the entire implementation process since most often strong leadership is needed.

- **Mistakes while implementing.** It is important to keep in mind that things will not always go as planned in a strategy implementation and problems will most likely arise. Employees should be encouraged to be creative and innovative in these situations. It is also important to encourage employees to address and acknowledge the problems before they grow too large.

- **Right priority.** The implementation of the strategy might be too time consuming. Implementation work should not be prioritized higher than other daily tasks.

Moreover, Raps (2004) points out four areas that are critical for the success of strategy implementation, presented in Figure 5.9.

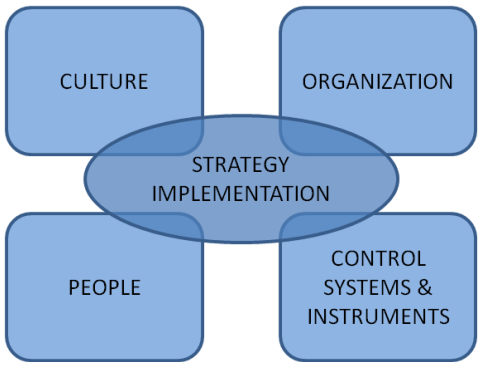

Figure 5.9 Key success factors for strategy implementation

- **The company culture.** The culture of a company consists of values and norms that are important in all types of organizational changes. For example, motivation decides the level of degree of change than can take place. Also, top management's commitment is important to get the rest of the organization on board.

- **The organization.** The structure and the decision-flow process of the company is crucial in strategy implementation. The structure constitutes the frame of the company, describing how to reach the strategy and goals. For example, problems might occur if the assignments of responsibilities are unclear. Additionally, a large number of organizational business units in a company tends to make implementation even more complex.

- **The people**. To succeed with strategy implementation, cooperation, confidence and competencies are needed. This involves willingness to change among employees, in accordance to when the organization wants to change. Willingness among employees is often related to whether or not they understand the strategy that is to be implemented. Thus, communication has to take place in all levels of the company, which might be a difficult task.

- **Control systems and instruments.** To be able to ensure that change is taking place like expected, different control systems might be necessary. For example, time restriction is often a critical point when dealing with strategy implementation, why it is recommended to have a clear time frame for the implementation phase.

Strategy implementation is about turning words into action; to improve company performance. It is important that the people understand what the goal is with the strategy and how their job and responsibilities will be affected. The models presented above, gives guidance to aspects that should be considered before implementing a strategy.

5.4.2 PDCA as a Tool for Strategy Implementation

In the 1950s, Edward Deming developed and simplified an earlier proposed framework of Walter Shewhart, suggesting that companies should analyze their business processes more structurally and frequently. (Hyvarinen et al 1998) The model presents basic work-principles for companies that want to identify how products and processes deviate from customer demand. Deming's main suggestion was the use of continuous feedback-loops to help managers identify where in the process mistakes that lead to deviation are made. When having identified these situations, improvements in the process can be made. The thoughts were presented in a general model that is called the PDCA, consisting of the four different phases Plan-Do-Check-Act. The PDCA is often shaped as a turning wheel as seen in Figure 5.10 on the next page.

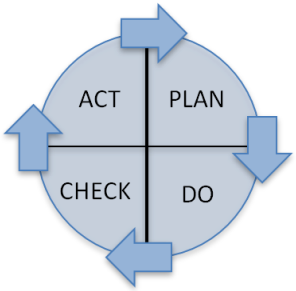

Figure 5.10 The PDCA cycle

- **Plan:** The pre-phase where a company decides its strategy and goals and how these should be accomplished.
- **Do:** The implementation phase of the strategy where employees are educated, so they know what should be accomplished.
- **Check:** The evaluation phase where follow-up on goals is performed.
- **Act:** The action phase where the company acts in accordance to what have been discovered in the evaluation.

One important aspect of the PDCA is the quality improvement that is achieved by the continuous improvements cycle. Consequently, the four phases can never be separated. (Cheng et al. 2008) After the introduction, the PDCA has been used as a tool in TQM, Total Quality Management, where focus is on continuous improvement in organizations. The PDCA cycle has turned out to be applicable on all kinds of processes, due to its simplicity. In addition to TQM, the PDCA cycle can be used for various management activities on a business strategy level and when focusing on knowledge creation and continuous learning. (Cheng et al. 2008) (Arveson 1998) (Chen et al. 2010:1, 2010:2) Moreover, PDCA is today often recognized as a part of EMS, Environmental Management Systems, which are frameworks for how to manage the environmental impact of an organization. (Ammenberg 2004)

5.5 Summary on the Theoretical Framework

An organization is influenced by and has big influence on many stakeholders in its business environment. In specific, procurement is a function where many different interests need to be considered and taken into account. CSR and SRP are viewed as concepts that can facilitate the task of taking responsibility over all impact a company has in its supply chain. However, to be able to pursue responsible business truly effective, the concepts need to be embedded throughout the organization and in the corporate strategy. Even so, a well-communicated and accepted strategy is not enough to succeed with the task. Problems are very likely to occur in the implementation process and to their help, companies can use tools like the PDCA cycle to handle the problems and to ensure continuous improvement.

6 Perceptions and Driving Forces for Chain of Custody

The motivation for engaging within CoC is very important for a construction company, however the reasons for engagement are not yet defined. To be able to find out more about CoC, the following two research questions will be answered: *What is the perception of Chain of Custody on timber products on the market* and *What are the driving forces for Chain of Custody on timber products in the construction industry?*

Proceeding from the framework on stakeholder analysis, presented in chapter 5.1, a model was created to capture the market input on the first two research questions. Stakeholder analysis is used to identify key people or institutions that influence the success of a company. The *Natural Resources Stakeholder* model (NRS), presented in Figure 6.1, is a model that can be used to map stakeholders that influence a company that use natural resources in their operations. Natural resources are materials that occur in their natural state, and can for example be mineral deposits, fresh water, natural energy or timber. The stakeholders are divided into internal, meaning inside the company and external, outside the company, to denote if differences exist. The NRS-model includes ten stakeholder groups. Internal stakeholders are Environmental Management who works with environmental strategies. The Eco certification group support projects that are trying to become eco certified. External stakeholders are actors and organizations that influence a company that use natural resources in their supply chain.

In the following sections, the main findings regarding perceptions and driving forces for CoC, retrieved from the interviews with stakeholders in the NRS-model (Figure 6.1), will be discussed.

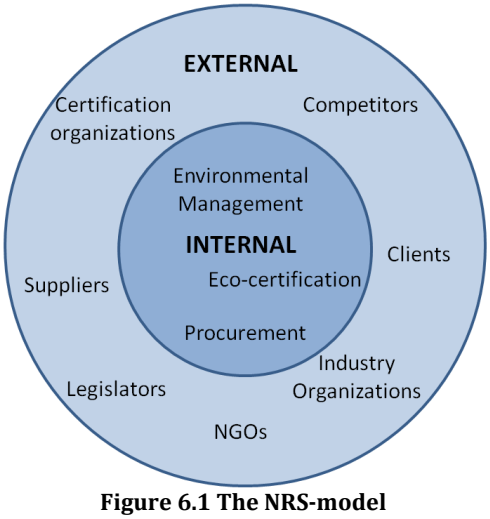

Figure 6.1 The NRS-model

6.1 Perceptions of Chain of Custody on Timber

Question 1: What is the perception of Chain of Custody on timber products on the market?

To be able to identify the stakeholders' perception of CoC on timber, being an important natural resource, the first research question will be answered.

In Table 6.1 on page 55, individual key statements on CoC from the stakeholder interviews are presented. The interview questions can be found in Appendix II. The statements are categorized according to keywords found when analyzing the data. For each stakeholder group, the statements are sorted beginning with the most common perception. For further details on the research method, see chapter 2

INTERNAL			EXTERNAL						
Environmental Management	**Procurement**	**Eco-certification**	**Clients**	**Suppliers**	**Competitors**	**Industry Organizations**	**NGO's**	**Certification Organizations**	**Legislators**
Skanska should use FSC when working with sustainable forestry.	For CoC, FSC and PEFC is used at Skanska UK.	For CoC, FSC is preferred over PEFC.	FSC is trustworthy and the most accepted certification.	FSC is the best tool to use for CoC.	We use FSC for CoC.	FSC has larger demand and higher credibility than PEFC.	Naturskydds-föreningen believes that FCS has low credibility as a tool for CoC.	Traceability is required in BREEAM.	The unbroken path, from the forest to the consumer.
CoC is the goal and FSC is the best tool.	Traceability of timber is somehow an unknown area.	More than one certification system is needed, to deal with credibility issued in some countries.	FSC should be preferred over PEFC.	For CoC we demand certified suppliers in our supply chain.	CoC means that our agreements should not include illegal timber.	The number of different certification schemes give rise to credibility issues.	According to FSC Sweden, CoC is the traceability from forest to timber yard, documented in a certificate.	The chronological documentation through the value chain, from the forest to the consumer.	According to FLEGT, CoC means that you have control over your supply chain.
Traceability from forest to end client is the definition of CoC.	Sustainability goes hand in hand with the CoC issue.	FSC and PEFC is not equivalent.	CoC is the securing of traceability with documents.	CoC is a tool for minimizing the risk of illegal timber.		CoC means certification through paper works.		CoC is a traceability certificate.	
The reason why Skanska would like to work with CoC is sustainability		I do not know if Skanska has a definition of CoC.	No mutual agreement or definition of CoC exists. This is problematic.	I do not want to define CoC myself.		CoC is to be able to certify traceability.		FSC or PEFC is required in the Svanen label.	
		I do not want to define CoC myself.		CoC is securing that material origins from sustainable forestry, through the SC.		CoC is the ability to assure that timber is legally harvested.		FSC instead of PEFC is required in LEED.	

Keyword
Certifications
Traceability
Legality
Ignorance
Sustainability

Table 6.1 Perceptions on CoC on the market

As seen in Table 6.1 there are many perceptions on CoC. In the following section, the different statements will be summarized for each keyword according to the categorization.

- **FSC and PEFC.** The majority of perceptions about CoC are strongly connected to certification schemes, especially to FSC. All stakeholders, except the NGOs, point out that FSC is preferred when working with CoC. Naturskyddsföreningen alone takes a distance from FSC, claiming that its credibility is too low. Internally, at Skanska, CoC is stated to be the long run goal and FSC to be the best available tool to achieve this goal. This perception is supported by most of the certification organizations that demand FSC in their certifications. An additional important aspect is the number of certification schemes that exists. A number of stakeholders denote that the large number in itself give rise to credibility issues, while others point out that it is important that more than one certification system exists, due to credibility issues in some countries.

- **Traceability in the supply chain.** Both internally and externally, CoC is explained as being equivalent to traceability from forest to client. Externally it is also recognized that traceability certificates, in form of documents, are needed, to be able to secure CoC through the whole supply chain.

- **Legality.** A competitor to Skanska brings up the legal aspects of CoC. Their mission with CoC is to exclude illegal timber in all agreements. The industry organizations support this and explain that the most important aspect of CoC is to prevent illegal harvesting. Skanska's suppliers agree and state that their perception is that CoC is a tool for minimizing the risk of illegal timber in their products. Internally at Skanska, the legal aspects are not mentioned in the any of the interviews.

- **Ignorance.** Internally at Skanska, there are employees who do not want to define the meaning of the concept CoC. Also, a lack of knowledge in the area of material traceability is pointed out by procurement employees. A client discusses that it is not strange that many perception exist about CoC, since no mutual agreement or definition is available in the construction industry today.

- **Sustainability.** The important link between sustainability and CoC is recognized by very few stakeholders. Internally at Skanska, the Environmental Management concludes that sustainability is the basic reason for Skanska to engage in the CoC question. One of Skanska's suppliers has the same perception and emphasizes that the purpose of CoC is to assure sustainable forestry.

From the study of the business environment, it can be concluded that CoC is a broad and undefined area, both according to the internal and external stakeholders. In Figure 6.2 below, the spread of the different perceptions of CoC is illustrated. It should be noted that it has not been relevant to specify the exact number and percentage in the figure. Thus, the reason is to give an overview of the spread of different perceptions. The spread is calculated based on the prevalence of statements concerning the different keywords. If one interviewee brings up certifications when defining CoC, the perception is assumed to be representative for the whole stakeholder group. Thus, each stakeholder group can collectively have many perceptions about CoC. As illustrated below, the most widespread perception about CoC among the ten stakeholder groups is that CoC is closely connected to CoC certificates, FSC in particular. Traceability in the supply chain is the next commonest perception about CoC.

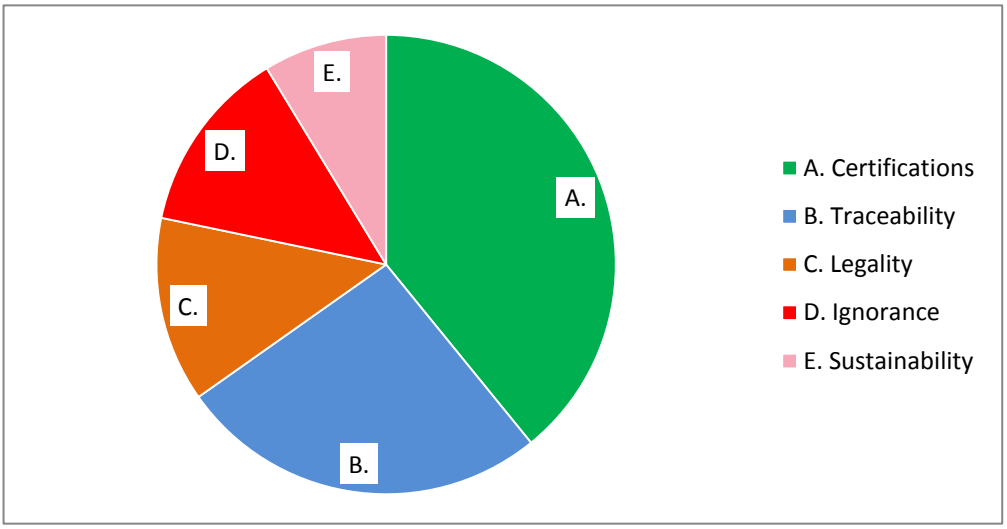

Figure 6.2 Spread of perception of CoC

Skanska Sweden defines CoC as the process used to maintain and document the chronological history of the unbroken path a product takes to the consumer, including all stages of manufacturing and distribution (Skanska 2010:3). However, as observed in Table 6.1 on page 55, no general perception of CoC exists internally among Skanska's employees. Common associations include traceability, different certification systems and the importance of having control over the supply chain.

Internal definition issues clearly exist at Skanska today. According to Leire & Mont (2008), who discuss the internal problems that arise with SRP implementation, Skanska needs to find a systematic way for how to work with SRP, hence starting with the definition of CoC. CoC is a complicated and ambiguous choice of word, when referring to traceability of materials. Many stakeholders, both internally and externally, state that FSC is their perception of CoC. Accordingly, Skanska should be

careful when using the word CoC, since it seems to be a creating confusion among, employees, suppliers and customers.

Furthermore, when studying the perceptions about CoC, the connection to CSR and SRP becomes clear. As earlier discussed, the EU´s (2005) definition of CSR encourages companies to integrate both social and environmental aspects in their operations, and in their interaction with stakeholders.

Last but not least, a discussion exists about the number of certification systems that are available today, with the conclusion that FSC should be preferred. However, since Skanska works with different eco-certifications, such as LEED, BREEAM and Svanen, they have no other choice than accepting both FSC and PEFC as a tool for CoC.

6.2 The Driving Forces for Chain of Custody on Timber

Question 2: What are the driving forces for Chain of Custody on timber products in the construction industry?

In Table 6.2 on page 59, key statements concerning driving forces are presented. The statements retrieved from the stakeholder interviews are categorized according to keywords found when analyzing the data. For each stakeholder group, the statements are sorted beginning with the most common perception. For further details on the research method, see chapter 2. The interview questions can be found in Appendix II.

Table 6.2 Key statements on driving forces for CoC in the market

INTERNAL			EXTERNAL						
Environmental Management	**Procurement**	**Eco-certification**	**Clients**	**Suppliers**	**Competitors**	**Industry Organizations**	**NGO's**	**Certification Organizations**	**Legislators**
The sustainibility trend drives CoC, Skanska wants to be a responsible actor.	Environmental impact, rather than customer demand will drive the future demand of CoC.	Eco-certifications are important drivers for CoC, without them no one would be working with CoC.	SRP is an important question for us.	Skanska has a strong buyer power and can drive the development of CoC.	Customer demand drives the question.	Customers are not familiar to CoC. Powerful companies have to drive.	A driver to CoC is the ability to communicate credibly to stakeholders.	Companies, as Skanska drive the question, not the customers.	National adaptation, according to FLEGT, will be a driving force for working with CoC.
The risks associated with timber procurement drive the CoC question.	Skanska has strong buyer power and can force suppliers to work with CoC	Success stories of projects working with CoC are important drivers.	The EU law has an important role in the CoC question.	The new EU law will drive the question.		The clients or the business-case can drive the question of CoC.	What drives the CoC question is to prevent deforestation.	Role models in the construction industry are important.	Lacey Act, is driving the question in the US.
Skanska has the power to affect their suppliers in the CoC question.	NGOs are important drivers in improving timber procurement.		If customers do not demand CoC, the large companies can drive the question.	Customer demand for sustainability and CoC will increase in the future.		The importance of CoC depend on position in the supply chain .			
CoC is an issue for the entire construction industry.	The risk of bad media is an important driver for CoC.		NGOs have a large impact on customer choices in the CoC question.	NGOs drive the question of CoC by influencing the customer.					
Laws will be extremely important in the near future.	Engagement at all levels at Skanska is needed in the CoC question.			Company reputation and CSR are driving forces for CoC.					
Control over materials to avoid bad media is an important driver.				Sub-suppliers drive the CoC question.					

Keyword
CSR
The industry
Laws
Customers
Suppliers
NGOs
Image
Engagement
Eco-certifications

As seen in Table 6.2 there are many driving forces for CoC. In the following section, the different statements will be summarized for each keyword according to the categorization.

- **CSR.** Actively taking responsibility over reducing the environmental impact from illegal logging is an important driving force for CoC. Sustainability, the environment, SRP and eco-certifications are words that are frequently used by both internal and external stakeholders. At Skanska, there seems to be a common view that the sustainability trend is the most important driver. However, the only external stakeholders that share the same view are some of Skanska's suppliers. NGOs agree that CSR is important, however they tend to focus more on the environmental, rather than the corporate aspects of CoC.

- **The construction industry.** There exists a widespread internal and external view that the construction industry and its actors drive the CoC question. Internally at Skanska, there is also a perception that Skanska, being an important purchaser, has the ability to influence and push the development among its suppliers. Skanska's suppliers agree with this and thus imply that Skanska is not putting enough pressure on the industry, if they want a change. Certification organizations point out that the industry serves as an important first-mover since customers do not yet drive the question of CoC.

- **Laws.** Laws and regulations on timber trade are important management control measures for CoC. In June 2013, the new EU legislation on timber will come into effect, see chapter 3.2. The law mainly concerns timber importers but will act as a driving force for CoC for the whole industry.

- **Suppliers.** Industry organizations point out that suppliers are important drivers in the CoC question since it is easier to work with CoC, the closer to the source the company operates. Skanska's suppliers agree in this opinion and have experienced pressure from sub-suppliers.

- **Customers.** In contrast, some of Skanska's competitors claim that the customers are the ones who drive the CoC question. Among Skanska's suppliers this view is partly supported, however the belief is that the customer demand for CoC will increase in the near future.

- **NGOs.** NGOs play an important role in driving the CoC question. This view is brought forward, both internally at Skanska, and by clients and suppliers, who emphasize NGO's influence on the individual. When individuals start to care about CoC as an important question, customer demand will increase significantly.

- **Image.** Company image is a driving force for Skanska and their suppliers to work with CoC. The media holds great power over company images and lacking timber procurement can result in bad media exposure. Bad media publicity can harm a company's reputation and in the long run a company's profits.

- **Engagement.** Internally at Skanska, the eco-certification group and the purchasers point out the importance of engagement at all levels in the company. If employees feel that CoC is a prioritized question that will be an important driver.

- **Eco-certifications.** According to employees at the eco-certification group at Skanska, eco-certifications are the only reason for any project to work with the CoC question. Without the possibility to take extra credits for CoC, no project would ever bother to secure CoC on timber.

As displayed above, a number of driving forces exists for CoC in the construction industry today. Driving forces include both micro and macro factors in Skanska´s business environment. In spite of the large scope of driving forces, there is no driver that alone can lead the development for traceability. Figure 6.3 illustrates the different keywords that have been discussed with regards to driving forces of CoC, in interviews with the stakeholders. The spread is calculated based on the prevalence of statements concerning the different keywords. If one interviewee discusses NGO's when talking about driving forces, this belief is considered to be representative for the entire stakeholder group. Thus, each stakeholder group can collectively consider many factors to be driving forces to CoC and the spread shows which driving forces that are mentioned the most by the stakeholder groups.

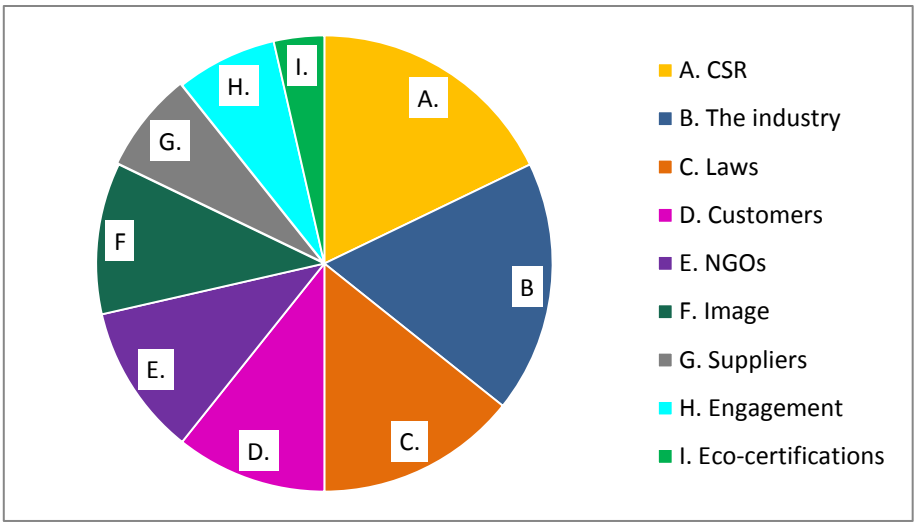

Figure 6.3 The spread of driving forces for CoC

A majority of the stakeholders consider the rise of CoC in the construction industry to be due mainly to industry push rather than customer pull. The reason for the industry to push this development is due to the market trend, where sustainability and CSR are used as fashion words. However, this trend has not yet led to customer pull for CoC. The CSR trend in combination with industry push, are considered by the most stakeholder groups to be the major drivers of CoC.

As a result of the CSR trend, the media is an important driving force to consider in the issue of CoC. According to Smith (2011), the media has started to pay attention to companies that are leading the work with CSR, but also to companies that do not take their responsibility. As a result of this, there have been several instances where companies have received bad publicity due to their timber procurement. In most of the cases, NGOs have been involved in revealing the truth about the timber procurement. (Smith 2011) Companies are afraid of the risks associated with timber procurement and by working with CoC, they can improve their image and minimize these risks. Laws and regulations on timber, do not concern the construction industry today, but regulate suppliers and their import of timber. This in turn, affects the construction industry and creates a push effect within the industry to start engaging in the question. The interaction between the various driving forces is illustrated in Figure 6.4.

Figure 6.4 Driving forces for CoC

It is worth reflecting more upon the fact that a limited amount of customer demand for CoC exists today. Customers have preferences regarding sustainability in general, but the concept of CoC is new and unknown to Skanska's clients. According to Ballog (2010), Skanska generally push sustainability concepts to customers since the recognition is very low. As Frankelius (2001, p. 38) points out, an understanding of the business environment is crucial in the decision-making process in a company.

The opinion at Skanska and among the external stakeholders is that customer demand will increase in the future. Skanska can either decide to act early and receive a first mover advantage within CoC in the construction industry, or wait for others to take the lead and see how the area of CoC develops. Since Skanska are aiming to become industry leaders within ethics and green, they are acting in accordance with their strategy when being among the first to implement CoC in their operations. (Skanska 2011:2)

7 Challenges when Implementing Chain of Custody

Question 3: What are the challenges when implementing Chain of Custody on timber products in the construction industry?

In order to answer research question number 3, challenges when working with Chain of Custody (CoC) were discussed with the interviewees in the study of the business environment. The aspects brought up by the stakeholders were mainly strategic and tactical in their nature. However, they provided good background information and a direction to the study of the construction projects, which aimed at finding challenges at a more operational level.

In the first half of this chapter, the challenges found in the study of the business environment will be presented and discussed. Further on, the studied projects at Skanska Sweden will be presented in short. The aim is to display both the external and internal views on the challenges that exist when working with CoC, and at the same time demonstrate how CoC has been a challenge in projects at Skanska Sweden.

7.1 Challenges according to stakeholders in the Business Environment

In Table 7.1 on page 65, key statements from the stakeholder interviews on challenges when working with CoC are presented. The interview questions can be found in Appendix II. The statements are categorized according to keywords found when analyzing the data. They are sorted for each stakeholder group; beginning with the most common challenge mentioned by the stakeholders. For further details on the research method, see chapter 2.

Table 7.1 Key statements on challenges with CoC

INTERNAL			EXTERNAL						
Environmental Management	**Procurement**	**Eco-certification**	**Clients**	**Suppliers**	**Competitors**	**Industry Organizations**	**NGO's**	**Certification Organizations**	**Legislation**
Projects need more support from NPU in the CoC question.	CoC is not a top priority for management.	The projects are dependent on NPU when handling the questions of CoC.	CoC is about engaging the whole supply chain.	The CoC question is not a "heart question" for people.	Only a few suppliers prioritize the CoC question.	CoC is not a prioritized question by Kretsloppsrådet.	The area of CoC is immature on the Swedish market.	CoC experience is tied to employees instead of the company.	
The CoC strategy is not effectively communicated to all levels.	Routines, roles and authority are not established.	Earlier project experience is not communicated to new CoC projects.	It is problematic that no common definiton, yet exists, on CoC.	CoC is unknown for end customers.	Mixed materials are problematic.	There are too many suppliers and products in the SC.	Knowledge about traceability seem to be low.	Mixed materials creates problems for CoC.	
Engagement from top management is a critical challenge.	Engagement from all levels at Skanska is needed.	CoC needs to be a natural component when developing new projects.	The industry might have to push demand, to get a change.	We are waiting for a demand for CoC to arise.		Mixed materials are problematic.			
No routines for tracing certified timber in a project exist.	There are no incentives for working with CoC.	It is very difficult to take the CoC credit in LEED, a lot of insecurity exist.	The supply of certified timber is not very large.	Suppliers can deliver FSC, if customers are willing to pay.		The many different certifications give rise to credibility issues.			
Decentralisation makes CoC a challenging area.	Skanska do not have enough willingness to change.	The gain of taking the LEED credit for CoC is very difficult to estimate.		Certification documents can not always be trusted.					
The construction industry is very conservative.	Change and decentralisation do not go hand in hand.	Scepticism towards the CoC concept exisits in the industry.		The credibility for certifications needs to be secured.					
This is an industry issue, and not only a company issue.	Central routines for CoC will be difficult in this industry.	The structure of the industry is not the best for working with CoC.		Some suppliers are proffessional, while others are not.					
The purpose of working with CoC is unclear for the employees.	The Swedish market is not mature, with regards to FSC.	CoC is said to be expensive.		There is low willingness to pay for CoC certified materials.					
End customers are not yet interested in CoC.	CoC is costly and low costs are top priority, also timber is not a strategic product.	It is easier to catch the CoC credit in LEED in projects with little wood.		Processed timber (mixed) is difficult to trace.					
It is difficult to show CoC on mixed interiours.	People are not familiar with the CoC concept.			The amount of certified timber is limited today.					
It is not easy to find FSC timber today.	The long-term gain of working with CoC has to be clarified.								
CoC denotes a higher cost.									

Organization
Industry structure
Ignorance
Costs
Customer demand
Materials
Supply
Credibility of certifications

As displayed in Table 7.1, many challenges exist when working with CoC in the construction industry. In the following section, the different statements will be summarized for each keyword according to the categorization.

- **Organization.** Internally, the majority of all key statements concern the organizational handling of CoC at Skanska. According to the interviewees, the CoC strategy is not communicated effectively through all levels in the organization and does not seem to be top priority for management. At a more operational level, specification of routines, roles and authorities for working with CoC are missing, which results in low incentives and engagement among employees. Projects need additional support from the NPU in the CoC question, who should communicate earlier project experiences within the organization and negotiate FWAs that support the work with CoC.

- **Industry structure.** Internally, a concern is articulated for the conservatism that is often seen in the construction industry. In addition, the decentralized structure of the industry is referred to as obstruction change and not being optimal for working with CoC. The Environmental Management means that CoC is an issue at an industry level, rather than at a company level. Externally, statements are more focused on the fragmentation of the industry, with many suppliers but only a few who prioritize the CoC question and are concerned about its effects.

- **Ignorance.** All internal stakeholders express the knowledge gap that exists in the CoC question on the market. They also state that the purpose of working with CoC is unclear, which leads to insecurity when working with CoC in eco-certifications such as LEED. Furthermore, the scepticism that exists towards the subject of CoC in the construction industry is brought forward as a challenge at the moment. On the other side, the suppliers express their worry for the CoC question, not being a core question for end clients and NGOs emphasize that knowledge about traceability is low.

- **Costs.** Both internally and externally, customers' willingness to pay for FSC certified timber is being discussed as a challenge. Additionally, it is highlighted that in the construction industry, cost pressure is always top priority. If the purchasing price on timber would increase, because of FSC, this would be problematic according to the suppliers. The purchasers at Skanska denote the expensive start-up costs for CoC, as a challenge.

- **Customer demand.** Externally, the clients denote that CoC is a question where the industry has to push demand to the customers, for them to engage in the area. Internally, the Environmental Management states that customers are not yet interested in CoC. The suppliers' side of the story is that they are waiting for the customers to start demanding CoC. Before that,

CoC will not be a prioritized question. According to them, the problem will not be to deliver FSC certified timber as long as there is a demand. In conclusion, all stakeholders seem to agree in this aspect.

- **Materials.** The majority of the external stakeholders express difficulties in working with mixed materials and traceability, since the CoC path is broken when timber is being mixed. The internal stakeholders express their concern for handling timber material in accordance to LEED. For example, the eco-certification group denotes that the gain of receiving one extra LEED credit for CoC is difficult to quantify and that it is challenging to work with CoC in projects with large amounts of timber.

- **Supply.** Regarding the supply of certified timber, a conflict between the external stakeholders exists. Some believe that the supply of FSC and PEFC certified timber is scarce and that there will be problems in the future, while others mean the opposite.

- **Credibility of certifications.** A challenge brought up by the industry organizations is the credibility of different certifications systems and the problem that some certification documents cannot always be trusted.

From studying the business environment, a general conclusion is that the Swedish industry and market is immature when it comes to working with CoC. At Skanska UK in contrast, the work with CoC is much further developed as a result of a more mature market. For example, the UK government has set a timber procurement policy which requires the public sector only to procure timber that comes from legal, or sustainable or FLEGT licensed sources. To support public sector buyers and their suppliers, the government also has a service function called the CPET, Center Point of Excellence in Timber that provide advice and training in the CoC topic. (Smith 2011)

As a result of the market being immature in Sweden, internal and external stakeholders notice a high ignorance and low willingness to pay for FSC among clients. Suppliers will not push the question and if the construction industry wants to work with CoC and sustainable procurement, they will have to push the development. Other market characteristics that complicate the work with CoC are the decentralized structure of the industry, which is not very likely to change in the near future. Thus, the construction industry has to find ways to work their way around the challenges.

Internally at Skanska, the organizational handling of the question is the key focus. CoC influences the whole organization since the concept includes employees at all levels. Challenges include to effectively communicate the purpose of working with CoC and to set routines and guidelines for the operational work.

7.2 Challenges in Projects working with Chain of Custody

At present, there are only three projects at Skanska Sweden that have dealt with CoC at an operational level, to an extent that is appropriate to study. In common for the three projects is that they have been working with CoC in different eco-certifications. In the upcoming section, the result from the study will be presented.

Project A and B are LEED projects, while project C is a prefabricated concept at Skanska which is Svanen labeled. However, they will all be referred to as projects in this thesis. To read more about how the different eco-certifications handle the CoC question on timber, see chapter 4.3.1. Since the projects differ in size, type and task, it should be clarified that these projects do not represent one general project at Skanska Sweden. Instead, they cover a variation in how the CoC question has been handled in the different projects. The projects have either been able to fulfill the request on CoC, or tried to fulfill the request but have failed for various reasons. In common for all three projects is that purchases include both call offs on FWAs and project specific purchasing.

The PDCA cycle, presented in Figure 7.1 and in chapter 5.4.2, will be used to categorize the experienced challenges in each project, when working with CoC. By using the PDCA, the aim is to discover possible gaps in the handling of the CoC question.

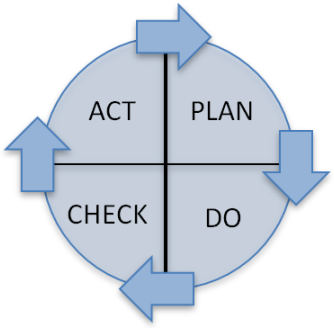

Figure 7.1 The PDCA cycle

7.2.1 Project A: Rotundan

Project A is a restoration project of existing office and commercial premises into a hotel. Skanska AB is contractor for the project and the client approved to become LEED certified. In Table 7.2 on the next page, the details for project A are presented. In the following text, the challenges in the project are presented according to the PDCA. Challenges include different activities and settings that complicated the situation.

Table 7.2 Project A

Project:	A: Rotundan
Type of project:	Restoration
City:	Stockholm
Project deadline:	April 2011
Eco-certification:	LEED Gold, MRc7
Responsibility over CoC:	Project engineer
Material list:	Variable
Status:	In April 2011 project A failed to take MRc7

PLAN

- **The decision on CoC came too late.** The project had already started before the LEED requirements were interpreted. A scorecard was used to evaluate the different LEED credits and the probability of succeeding in taking them. The MRc7 credit was initially denoted a possible credit to take, however it was not decided until later to go for the credit. According to the project leader, the opportunity to take the MRc7 credit is highly dependent on how early the requirements are interpreted in the procurement process. In a perfect scenario, the requirements are included in the agreements with suppliers. In project A, the decisions on the CoC credit were taken too late.

- **Difficulties in identifying timber material.** The material that was easy to identify was material that was visible and noticeably made of timber. Built-in material was difficult to trace since it was not specified on the layout documents to the project. Small volumes or items were also problematic since they often were accounted incorrectly and thus lost traceability.

- **Unclear owner of responsibility.** The project engineer was the main driver when working with the MRc7 credit, in spite of an initial division of responsibilities. The task of working with the MRc7 credit was very time consuming. The project manager had no experience of working with CoC and as other responsibilities were added to her tasks, it was impossible to devote enough attention to the MRc7 credit. Some people in the project were happy to engage in the LEED process, while others were not.

DO

- **Compatibility problems between LEED online and Skanska´s system.** LEED online is an online website where the use of FSC certified material was reported in project A. The system in itself was not difficult to handle, the problem was that Skanska's accounted figures were not compatible with

LEED online. LEED online requires information on cost per unique product, whereas Skanska collects and gathers information per unit in the construction plan. For example, in a Skanska project, costs could be accounted and summarized for all doors on a specific floor in the building.

- **Difficulties in making costs estimations.** LEED requires a minimum of 50 % (based on cost) of timber products to be FSC certified. An important step was to perform a first estimation of timber costs in the project. If costs are far from reaching the goal, the credit might become down-prioritized in favour for other credits in LEED. If, on the other hand, costs look promising, more effort might be put into finding appropriate FSC material. In project A, the process was very complex. Since the LEED decision was decided fairly late, some timber material was already ordered. Additionally, the budget was not determined from the start. In conclusion the estimation make on how much timber the project would use, was very difficult to make.

- **Lack in suppliers' knowledge.** The project engineer was mainly in contact with sales people from the suppliers and these persons rarely had any knowledge in the subject of certified timber. Thus, it was difficult to find suppliers that could provide FSC material. When contact was made with the managers at the suppliers, they could offer FSC certified products, however, they did not know how to work with it in practice. The project engineer therefore had to translate the parts of the LEED manual that concerned the suppliers, and thereafter teach them how to handle the LEED requirements.

- **Lack of proper documentation.** The most challenging task in taking the CoC credit was to get hold of the right documentation from suppliers. Documentation includes invoices that state the % of FSC that is being delivered to Skanska. Suppliers had agreed to provide documentation, however, in the end, the project engineer had to hold back payments until documentation was provided as promised.

- **Lack in supply**. The access of FSC certified timber products was considered to be non sufficient, at least not within the strict time frame that the project was performed within. One of the suppliers meant that the demand for FSC is increasing and the supply likewise. The important thing for the supplier is to be notified in advance so that they have enough time to find material. According to the supplier, this was sometimes a problem in project A.

- **Unclear client demand.** Initially, the project had a fix quote material list, but as the list of materials had to be changed repeatedly according to the client's wishes, the fixed material quote had to be changed into a variable material quote. A lot of time was spent on finding specific material according to changing preferences from the client and with regards to finding FSC certified material, this behaviour became a real challenge.

- **Lack in customer demand.** The client only cared about getting the LEED Gold certification level, whatever credits that were taken was not considered as important. Therefore, the project engineer had a hard time convincing the client that the CoC credit was important when difficulties arose.

CHECK

- **Lack of control mechanisms.** It was impossible for the project engineer to control and check upon every supplier, that they in turn had responsible sub suppliers. It was only possible to assure that the first hand supplier was certified according to FSC.

- **Lack in support.** The project engineer felt that they needed more support from the Environmental Support at Skanska. There were people to ask, but there were no tools or administrative resources to facilitate the work with LEED. Additionally, there were several situations where no guidance could be provided. The subject is new to everyone at Skanska and there are no best-practices projects to consult. Furthermore, it is difficult for someone who knows LEED, but not the construction process, to help out in this question. A more operative LEED support function would be useful. There was also support available at LEED online, these services we considered to be too expensive.

ACT

- **Limited knowledge transfer.** The project engineer, that had the main responsibility over the MRc7 credit, will not continue working within this field in her next project. Instead, the Environmental Support at Skanska will collect all lessons learned from Project A. The project engineer expressed herself that she would be happy to share her experiences. All information about suppliers that were able to offer FSC has been documented. Still, the project engineer expressed that the experience probably would get lost.

- **Lack of project models.** The project engineer experienced that it was a great disadvantage that there were no earlier projects to look at in the process. When project A is finished, the different LEED credits taken in project A will be presented internally.

7.2.2 Project B: ABB Fastigheter

Project B is a new construction project of industrial premises in Gothenburg. The client requested a LEED certification for the building. In Table 7.3, the details for project B are presented. In the following text, the challenges in project B are

presented according to the PDCA. Challenges include different activities and settings that complicated the situation.

Table 7.3 Project B

Project/Concept:	B: ABB Fastigheter
Type of project:	New construction
City:	Göteborg
Project deadline:	2010
Eco-certification:	LEED Gold, MRc7 Certified Wood
Responsibility of CoC:	LEED AP (Accredited Professional)
Material list:	n/a
Status:	The MRc7 was not successfully taken.

PLAN

- **The decision on CoC came too late**. When deciding that the MRc7 credit in LEED should be aimed for, the walls in the building had already been built and some timber material had been purchased. A scorecard was used to evaluate the different LEED credits in the beginning; however, this could have been done more carefully for the MRc7. The LEED AP, being in charge of the LEED credits, believed that the CoC credit could be taken, but misjudged the work load. In conclusion, the project realized that the process should have started earlier if wanting to succeed in taking the CoC credit. Project B was the first project at Skanska that aimed for the MRc7 credit.

- **Complicated instructions in LEED.** It was difficult and tiresome for the project to work with the LEED instructions since the manual was large and complicated. As a result, no one understood what actually had to be done to receive the CoC credit.

- **Lack in customer demand.** The customer only cared about getting the LEED Gold certification level, whatever credits that were taken was not considered as important. This resulted in less effort put in by the project in taking the CoC credit.

- **No fixed material list from start.** To be able to succeed with the MRc7 credit, a material list should have been determined from start. From this, it would have been possible to see if the credit could be taken or not. For large volumes of timber it would have been good to secure that suppliers could deliver FSC certified timber.

DO

- **Increasing costs.** When changing the normal way of purchasing, extra costs occurred. A lot of time had to be spent on finding suppliers who could offer FSC certified timber, and the problem was that nobody was interested in taking this new cost.

- **Unclear owner of responsibility.** According to the LEED AP, the purchasers need to handle the material question with regards to CoC; they already have relations with the suppliers and are the ones that can take the discussion about FSC supply. In project B, the material responsibility was put on the LEED AP, who did not have the same knowledge about the procurement process.

- **Lack in suppliers' knowledge.** When Skanska purchased FSC timber, the suppliers sometimes sent PEFC, instead of FCS, which is not accepted according to LEED. The suppliers did not see any difference between the two. It was difficult to work with suppliers in this question, since it was the first time they received specific demand on FSC certified timber.

CHECK

Project B did not continue trying to take the CoC credit. Check is therefore not applicable.

ACT

Act is not applicable.

7.2.3 Project C: Moderna Hus

In Table 7.4, the details for project C are presented. As stated before, project C differs from the other two. To begin with, the item of study is a concept that has been developed by Skanska Residential Development. The result is a prefabricated apartment complex. The concept development phase has thus been regarded as a project in this thesis. In the development phase, the CoC question came down to creating a material list and finding suppliers that could agree to deliver CoC certified products on the list. What is more, the Svanen label for apartment complexes was not completed when project C started, but has been developed simultaneously by Nordisk Miljömärkning (NM). In the following text, the challenges in project C are presented according to the PDCA cycle. Challenges include different activities and settings that have been experienced by the interviewees.

Table 7.4 Project C

Project/Concept:	C: Moderna Hus
Type:	Concept. A pilot project for Svanen certified apartment complexes (prefabrication).
Project deadline:	Early 2012
City:	Söderköping
Eco-certification:	The Svanen label
Responsibility CoC:	Purchaser in Moderna Hus
Material list.	Fixed
Status:	Moderna Hus is Svanen certified.

PLAN

- **A complicated start-up phase.** The start-up involved a rather problematic collaboration between the technical, environmental and procurement unit at Skanska. Everyone had different views on how a question should be answered or how to solve a problem in becoming Svanen certified.

- **Lack in knowledge at Svanen.** Nordisk Miljömärkning (NM), who is responsible for the Svanen label, lacked competence in the area of construction. In the beginning, the Svanen label included many criteria that were not possible to achieve in the construction process as it is in the construction industry today. Moderna Hus therefore had to educate NM and not the other way around.

- **No earlier experience to be found**. Since it is the first time that a new built apartment complex is being Svanen certified in Sweden and at Skanska, a material list that agreed with the requirements in the Svanen label, had to be brought forward from scratch. This was a very demanding and time consuming job.

DO

- **Increasing costs.** When demanding certified timber from suppliers, purchasing costs increased.

- **Unclear owner of responsibility.** It became clear in project C the CoC question required more work than one person could handle. Therefore, many people handled the CoC issue. However, between these people, responsibility was not determined, which made it very difficult to take decisions.

- **Lack in suppliers' knowledge.** The suppliers had very different knowledge about certified timber. Their supply of timber also differentiated a lot. In one situation, the project had to contact Södra, which is a Swedish forest organization, to get them to help out one of Skanska's small suppliers with their supply.

- **Lack of proper documentation.** It was difficult to get suppliers to sign agreements with a guarantee on CoC, since they had never guaranteed it before. The suppliers were afraid of the consequences of a revision.

- **Lack in Supply.** Moderna Hus could not be flexible when purchasing timber because of the small supply that was available.

- **Lack in collaboration between different BUs and departments at Skanska.** In project C, it became clear that the procurement at Skanska Sweden is not adapted to the environmental initiatives taken by Skanska AB. Furthermore, there is a gap between FWAs and the concepts at Skanska. FWAs are revoked at a strategic level and category managers do not understand how this affects Moderna Hus and their fixed material list.

- **Changing well-established routines.** One of the largest challenges was that the normal working process was changed, both for project planning and purchasing. This affected the work for many people.

- **Lack in engagement from top management.** Management did not understand the vast amount of time and energy that project C had to put in to become Svanen certified. Everyone loves the environmental aspect of construction, as long as they do not have to work with it at an operational level themselves.

CHECK

- **Lack of control mechanisms.** It was impossible to check when a task was completely done. For example, when a supplier said that they could offer certified timber, the project waited for documentation before they could be completely sure that they had succeeded.

ACT

- **Limited knowledge transfer.** The purchases, that had the main responsibility over the CoC question, will continue working within the Svanen label. It is problematic, that even though knowledge transfer is desirable, is has to be transferred in a secure way. The way of working with CoC in Moderna Hus is a competitive advantage for Skanska Sweden that cannot be spread to competitors.

7.2.4 Summary on Challenges in Projects at Skanska Sweden

As described above, it has been very challenging to work with CoC for all of the three projects. In Table 7.5 below, the challenges are summarized in the different phases of the PDCA.

Table 7.5 Summary on challenges in projects

PDCA phase	Project A	Project B	Project C
PLAN	The decision on CoC came too late.	The decision on CoC came too late.	A complicated start-up phase.
	Difficulties in identifying timber material.	Complicated instructions in LEED.	Lack in knowledge at Svanen.
	Unclear owner of responsibility.	Lack in customer demand.	No earlier experience to be found.
		No fix material list from start.	
DO	Compatibility problems between LEED online and Skanska´s system.	Increasing costs.	Increasing costs.
	Difficulties in making costs estimations.	Unclear owner of responsibility.	Unclear owner of responsibility.
	Lack in suppliers' knowledge.	Lack in suppliers' knowledge.	Lack in suppliers' knowledge.
	Lack of proper documentation.		Lack of proper documentation.
	Lack in supply.		Lack in supply.
	Unclear client demand.		Lack in collaboration between different BUs and departments at Skanska.
	Lack in customer demand.		Changing well-established routines.
CHECK	Lack of control mechanisms.	N/A	Lack of control mechanisms.
	Lack in support.		Lack in engagement from top management.
ACT	Limited knowledge transfer.	N/A	Limited knowledge transfer.
	Lack of project models.		

As seen in Table 7.5, the projects have experienced extensive challenges in especially the *plan* and *do* phase of the projects. As stated before, an important aspect of the PDCA is the quality improvement that can be achieved by the continuous

improvements cycle. Consequently, the four phases can never be separated. (Cheng et al. 2008) It is therefore interesting that the challenges in the *do* and *check* phase concern a lack of routines to complete the cycle. As a result, little is learned from the projects that can be spread throughout the organization.

What becomes clear from the outcome of the study is that time is a critical success factor. In the LEED projects, the decision to go for the CoC credit was established too late, which made it difficult to integrate the LEED requirements in the procurement process. Moreover, all projects have experienced difficulties as a result of unclear roles and responsibility in the CoC question. A Recurring theme is also a knowledge gap among suppliers and difficulties in retrieving the right documentation.

Internal challenges include communication and conflict of interests between different functions at Skanska Sweden. Internal systems and other resources also have to be adapted to the requirements in LEED and Svanen to facilitate the operational work in projects. Another aspect that is brought up during the interviews is that there is little room for knowledge transfer and organizational learning in the CoC question at Skanska Sweden. People tend to leave projects and/or the company before their knowledge is captured. It is also important to be careful in knowledge sharing to avoid that valuable information leaks to Skanska's competitors.

All in all, it is clear that the procurement process in projects specific purchasing and FWAs needs to be adapted to the environmental focus set by Skanska AB. To fully succeed in working with CoC, organizational change is also required at all levels in the company; strategic, tactical and operational. A discussion on possible ways to handle the challenges will be further developed in the next chapter, where the most important findings from the study of the business environment and construction projects will be analyzed within the theoretical framework of the thesis.

8 Implementing Chain of Custody in the organization

Question 4: How should Chain of Custody, as a procurement strategy, be handled organizationally in a construction company?

In this chapter Skanska Sweden will be referred to as Skanska.

Based on thorough research, the aim with the final research question was to give practicable recommendations to Skanska on how to handle the Chain of Custody (CoC) issue. Suggestions and recommendations have been discussed and confirmed in a focus group consisting of employees from the Nordic Procurement Unit (NPU) and the eco-certification group at Skanska.

From the research, it was clear that CoC needs to be handled at all purchasing levels in the organization. Skanska is characterized by a high degree of decentralization, why a majority of the procurement decisions are made in the projects (Skanska 2008). Therefore, it is not possible to adapt CoC only to central agreements and leave out the project specific purchasing. Furthermore, the strategic level at Skanska plays a very important role when working with CoC, by showing the rest of the organization that they are fully committed to the CoC strategy. The different working levels in which CoC needs to be integrated are presented in Figure 8.1.

Figure 8.1 Purchasing Levels at Skanska

Today, at a strategic level at Skanska AB, CoC is discussed as an important question in Skanska AB's sustainability strategy. The guidelines presented in chapter 4.3,

regarding CoC implementation in framework agreements (FWAs), are brought forward by Skanska AB. At the moment, they are being implemented on a strategic purchasing level at Skanska Sweden. (2nd half of 2011). Thus, CoC is not yet incorporated in existing FWAs. Category managers must therefore for each LEED project find certified timber with existing FWA suppliers or negotiate and support the projects in their project specific purchasing. Today, a CoC KPI is also measured and reported for call offs on FWAs, see chapter 4.3.

At an operational level, Skanska work with CoC only in their LEED and Svanen projects. As explained before, the challenges associated with CoC for project C, Svanen, were substantial in the development of the concept. Obviously, the challenges will decrease significantly when the Svanen concept is up and running as prefabrication projects. It is likely that the concept development group will not encounter the same type of problems until the next time the material list has to be updated or new agreements have to be signed. As a result of this, the authors have decided to answer question 4 with regards to CoC in LEED projects. LEED projects are returning projects at Skanska and it is therefore highly relevant to find a method that handles the difficulties with CoC. In addition to this, a large investment on LEED projects will take place in the near future at Skanska. However, suggestions and recommendations are based on findings in all of the three projects studied, since they are regarded to be similar in many ways.

In Figure 8.2, the background to the suggestions and conclusions is displayed. As seen, the first three research questions have given input to question number 4. Furthermore, as mentioned, a focus group and theory have been advised when developing the recommendations.

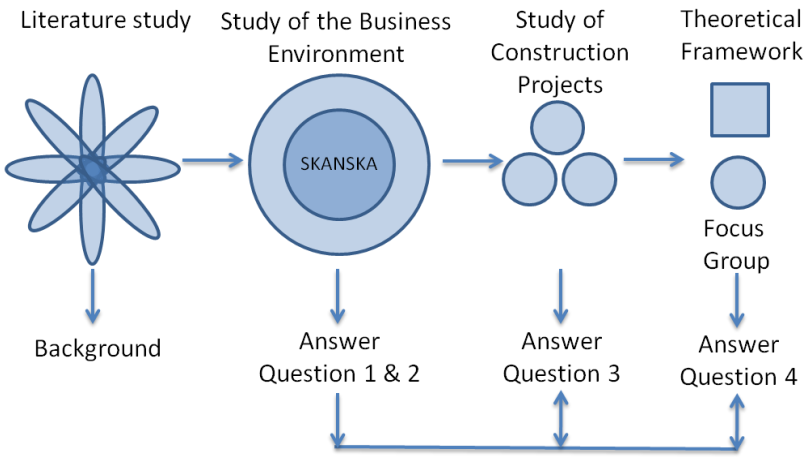

Figure 8.2 Research basis, question 4

8.1 Strategic Level

At a strategic level, the most important aspect is to clarify the CoC strategy so that everybody in the organization understands what CoC is all about, what the purpose is for Skanska to work with CoC and that CoC is a prioritized issue at Skanska. In the following text, suggestions at a strategic level are discussed.

- **Change the expression, CoC.** The word CoC, Chain of Custody, is not recommended to be used at Skanska. To begin with, it is a confusing word that has a difficult meaning according to many stakeholders both at Skanska and outside the company. For example, CoC is often used as an abbreviation for Code of Conduct. Furthermore, the word is not used by the external stakeholders. Instead, they rather refer to different certification systems when talking about CoC. Given that Skanska works with many certification systems that include FSC, PEFC and Svanen, it is not recommended to refer to a certain certification. As an alternative, it is suggested that the word *traceability* should be used when discussing CoC. Traceability is a word that covers what Skanska would like to work with, since it can include both responsibility and ethics. Also, it is more easily interpreted by people who are not familiar with the subject. To simplify for the reader in the following chapters of the thesis, the terminology of CoC will be kept.

- **Improve management commitment.** Top-management at Skanska is by tactical and operational employees not considered to be fully committed to CoC as a procurement strategy. Allocation of resources is not in line with the strategy and neither are reward systems or incentives. To start with, it is important that management have the organizational structure of Skanska in mind when CoC is being implemented. Preferably, operational employees should be asked for input in this process since the experience is that they do not have enough time to work with CoC. Secondly, as CoC might increase costs in projects, it is problematic that cost savings appear to be the only aspect that gives credit to employees at a tactical and operational level. The reward system has to be adjusted to be able to reward CoC achievements as well.

  Regarding the KPI on CoC (chapter 4.3), which has the potential to be used as an incentive for CoC, it is at the moment not serving its purpose. According to Sveder (2011), who reports the KPI to Skanska AB, it is incredibly difficult to report the KPI since no one understands the purpose of the KPI and how it should be reported. In conclusion, the KPI should be regarded as a future tool and incentive for measuring CoC on all timber. It is recommended that the KPI should be reported in LEED projects instead of FWAs as it is today. When the procurement function learns how to deal with the KPI in LEED projects, it will become easier to expand the scope of the KPI.

- **Clarify the connection between CoC and sustainability.** Today, it is unclear where the CoC concept fits in Skanska's sustainability work and CSR strategy. Only interviewees at a strategic level at Skanska refer to sustainability when discussing the purpose of CoC and it is clear that this vision has not successfully been communicated to the rest of the organization. There is also insecurity with regards to the owner of responsibility of CoC internally. All of this needs to be clarified in order to improve external and internal communication as well as the organizational structure on CoC. It is important that employees at all levels understand what Skanska AB´s goals are with CoC. CoC should not be regarded as yet another environmental initiative, but instead as a clear procurement process for reaching overall environmental objectives.

8.2 Tactical Level

At a tactical purchasing level at Skanska, the main focus is to secure and adapt resources such as tools, support functions and data systems, to facilitate the work with CoC for both category managers as well as for operational employees in the projects.

- **Clarify how Skanska defines timber and timber products.** The definition of timber is today not clear at Skanska. Skanska say that they would like to work with CoC for timber, but no one can answer the questions *"what is timber and timber products at Skanska?", "how much timber and timber products does Skanska buy each year?"*, "*how much of a specific project's costs is timber and timber products?".* A common definition is difficult to determine, since no measurement seems to be appropriate. For example, windows that have a wooden frame are called timber based products even though the main volume and cost is made up by glass. This is due to the fact that LEED requires a minimum of the total timber costs to be CoC certified. Therefore, it is an advantage to buy CoC certified windows since windows are generally expensive and the timber can be accounted for approximately 28 % of the total cost (Arnesson 2011). As a result, timber products reported in LEED projects are often the products that account for the largest costs in the project. All in all, accounting routines need to be improved so it will be possible to trace all timber material in a specific project.

- **Develop support functions.** The Environmental Support and the NPU need to develop tools, written material and other functions that can facilitate the work with CoC at a tactical as well as operational level. The Environmental Support at Skanska needs to add environmental data such as CoC certificates into existing data bases such as the *supplier portal.* It has to be easy for a project in the planning phase to get advice from earlier experiences of suppliers in the CoC question. On the intranet, easy accessed and comprehensible information should be available on why Skanska would like

to work with CoC and how it affects the operations. In addition, examples of successful projects and how they have handled the CoC issue should be made accessible on the intranet to serve as inspiration and guidance to new projects. Lastly, an evaluation template for LEED projects has to be developed. For the NPU, FWAs that include requirements on certified timber or FWAs that in other ways are in line with the criteria in LEED, need to be brought forward. By including CoC in large FWAs, the chances to be able to include CoC also in project specific purchasing increase. Additionally, the whole industry will eventually understand that CoC is an area that is prioritized by large actors in the construction industry. Many stakeholders have confirmed that Skanska have the ability to affect their suppliers in a preferred direction, because of their strong buying power.

Furthermore, documentation that can be used in project specific purchasing, for communication with suppliers and subcontractors outside of FWAs, needs to be formulated. Documents should include standard text to use in agreements. The text should specify which information that is required on invoices and certifications, in accordance to LEED. Additionally, informative material to educate the suppliers is necessary. Skanska needs to communicate to the suppliers the reason for Skanska to work with CoC and push the responsibility that suppliers have in securing CoC. With this approach, the long term goal is to make CoC a natural task for suppliers to work with.

To conclude, the first step for the NPU is to bring forward proper documentation that can facilitate the work with CoC. However, in a near future, routines for revising the suppliers need to be developed as well. Revisions could be performed internally, or external resources could perform revisions as to increase the objectivity.

- **Roles, responsibilities and authorities.** When it has been decided by management, what resources to appoint for CoC, the Environmental Support and the NPU have to define roles, responsibility and authority for the CoC question at all levels in the company. These descriptions should preferably be included in Skanska's environmental management system. In the LEED projects, there has to be one person that is responsible for the material question. This person can, to exemplify, work in 2-3 local projects at the same time and be in close contact with the project engineer, the purchasers and the Environmental Support. It is of high importance that this person has a solid understanding, both for CoC, environmental management systems and, not to forget, construction projects.

8.3 Operational Level

As the challenges in projects have been structured according to the phases in the PDCA (see Figure 5.10 on page 68) it is logic to structure the suggestions accordingly. By trying to improve the work method with CoC in all phases, the aim is to create a cycle of continuous improvement. In the following text, suggestions on how to work with CoC in LEED projects are presented. The suggestions are frequently connected to tasks that first have to be undertaken at a tactical and strategic level. Also, the suggestions are formulated as routines that should be followed in each LEED project that will work with CoC.

PLAN

- **Develop routines for how to include CoC in the planning phase**. If Skanska would like CoC to be a natural component in the daily work of projects, routines for how to do this in practice have to be developed. The study of the projects illustrated that it is of highest importance that projects start the planning phase with a discussion concerning CoC and eco-certifications. The earlier a decision is made, the more likely it is that the project will succeed in finding certified timber and taking the CoC credit in LEED. The decision-making process usually includes activities such as material identification and cost estimations, and this task would be facilitated by more specific layouts for projects. The layouts must indicate what built-in material that is timber and the estimated total amounts of timber. It is also critical that material lists are specified as early as possible. If a material list cannot be completely specified at an initial stage, it is recommended to at least specify the material that constitutes the largest costs.

- **Roles, responsibilities and authorities.** In the early planning phase, resources have to be appointed according to the suggested description in the environmental management system. The CoC issue has to be communicated to the rest of the project and other people that are concerned in the question. In short, every individual should be informed about his or her responsibility and how each and everyone's job assignment is affected. This is preferably done during a meeting where there is room for questions and reflections from the construction workers.

DO

- **Communication with the client and suppliers.** It is important for the project to inform the client about what requirements and compromises that a CoC commitment bring about. For example, a LEED project demands longer forward planning and less flexibility in material choice. The client has to be aware that late changes adventure the chance of taking a certification and large costs could end up being wasted. To improve client understanding,

focus should be on specific credits, instead of the LEED certification at a whole, in discussions. For example, it could be explained that marketing can be improved by saying that a building is not only *LEED certified* but *LEED certified with met requirements on traceability for timber material*. This would increase the credibility for the certification and the company.

In communication with suppliers it is central to include the supplier in the early discussions and to get agreements signed at an early stage. It is important to ensure that the supplier has sufficient knowledge in the subject. For this purpose, informative material compiled by the support function can be used.

CHECK

- **Support.** During the project it is important that the NPU follows up on how the workload with CoC is proceeding. A conversation needs to be established between them and the project to be able to check and follow the progress with CoC. Also, the Environmental Support needs to participate in this process to be able to improve tools.

- **Evaluation and documentation.** When a project is finished, it is extremely important that the project gets the opportunity to evaluate and document how their work with material purchasing and CoC proceeded. A template should be used in order to be able to compare different projects. The template has to be simple and not too time-consuming. In this stage it is also important that the project reports to the category manager at the tactical purchasing level which suppliers that could or could not deliver FSC timber. This dialogue has to take place in order to improve FWAs and standard agreements in project specific purchasing. In conclusion, extra time needs to be appointed to handle the evaluation and documentation tasks at both an operational and tactical level.

ACT

- **Knowledge transfer.** To be able to improve how a project should handle CoC in the best possible way in LEED, it is vital that knowledge from earlier projects is being recognized at Skanska. Based on the evaluation from each project, this knowledge should be spread to other LEED projects at Skanska that are in the early planning phase. The NPU and the Environmental Support should be responsible for the knowledge sharing.

  Today, only two projects have aimed for the CoC credit in LEED and non have succeeded. This is a clear sign that Skanska is in the learning phase of working with CoC and all lessons learnt have to be dealt with. Whenever

new important experiences are made, these have to be communicated to new LEED projects, for example in the form of educational workshops. Also, tools and written routines have to be constantly updated in the early stage of working with CoC in LEED projects.

This chapter has discussed the challenges and possible solutions associated with CoC at Skanska. The suggestions and recommendations could, however, be applicable for any construction company that would like to work with CoC. A summary of the recommendations is presented in Table 8.1.

Table 8.1 Recommendation to Skanska Sweden regarding CoC

Strategic purchasing Level	Tactical purchasing level	Operational purchasing level
Change the operational name from CoC to *Traceability*.	Improve accounting routines for timber.	Take initial decision on CoC and certifications.
Align resources, reward systems and incentives to the CoC strategy.	Extend data bases with CoC data, where certified suppliers can be found.	Specify the material list at an early stage.
Report the CoC KPI in LEED projects as a first scope.	Compile informative material on CoC for the intranet and suppliers/ clients.	Define roles and responsibility for CoC in the project.
Clarify the connection between CoC and sustainability/CSR at Skanska.	Develop evaluation templates for the CoC work in LEED projects.	Inform the employees in the project about CoC.
Communicate the CoC strategy, both internally and externally.	Include CoC in FWAs and in category management.	Include both the client and suppliers in the CoC work as early as possible.
	Compile standard agreements on CoC for project specific purchasing.	Sign agreements that include CoC with suppliers.
	Write routines for roles, responsibilities and authority for CoC.	Perform an evaluation of the work with CoC in each project.
		Report back to the category manager for timber about materials and purchases.
		Ensure that the NPU and the Environmental Support secure knowledge transfer to new projects.

9 Discussion on Chain of Custody as a Procurement Strategy

In the following chapter the most important aspects concerning Chain of Custody (CoC) implementation on timber will be discussed. The strategic gain of working with CoC will be discussed, as well as the challenges that a construction company might encounter when trying to implement a CoC strategy. To round of the chapter, the future of CoC and the authors' conclusion and recommendations will be covered. The thesis has so far illustrated that one way to work with sustainable construction is to include CoC on timber in the procurement process, thus working with Social Responsible Purchasing (SRP). When changing the normal process of purchasing by taking new aspects such as sustainability into account, organizational change also becomes necessary. CoC on timber is a complex issue that requires change and collaboration at different purchasing levels.

9.1 The Strategic Gain of Including Chain of Custody in Procurement

The Natural Resources Stakeholder model, the NRS-model, brought forward by the authors, has been an important business environment model in this study. The model displays which stakeholders that influence companies, such as Skanska, that use natural resources in their operations. By investigating the views on CoC among these stakeholders, the model has in extent captured the market input in the issue and also given information about the timber utilization in the construction industry. In accordance to several researchers, one of them being Freeman (2003), it is crucial to know the stakeholders that influence a company to be able to make the right business decisions. Before this research was constructed, Skanska was, according to the authors, in the start-up phase of working with CoC, not having reviewed the issue to its full extent. One important aspect in this research was therefore to thoroughly investigate whether or not CoC should be prioritized in the construction industry. By using the NRS-model to identify stakeholders and making them talk about the subject of CoC, it became easier to clarify this.

The study of the business environment clearly illustrated that it is recommendable for Skanska to continue working with CoC on timber. To begin with, it became obvious that no driving force alone will be able to lead the development of CoC in the construction industry. However, the broad spectra of existing driving forces for CoC could imply that CoC is not very likely to be a temporary trend. For example, a substantial driving force that was identified was the new EU law on timber that will come into effect in 2013. The restrictions on imported timber are getting tougher with this law and importers will be forced to be able to prove the origin of their timber. This development will most likely increase the awareness of CoC in the construction industry and affect Skanska.

Furthermore, a majority of the stakeholders considered the rise of CoC on timber to be due mainly to industry push, as a result of CSR, rather than customer pull. Clients today, do to some extent, ask for eco-certifications to be able to show that the building is green and sustainable. However, they do not ask specifically for timber, being sustainably purchased. A conclusion from this is that timber utilization, compared to energy usage or water consumption, might be considered as less important by clients. Accordingly, the construction industry is pushing the demand for CoC. For Skanska, to be among the first actors to engage with CoC, could be a competitive advantage. To take the lead in new areas, also shows that Skanska are serious about their sustainability investment since they are subject to increased risks, by being first-movers. In 2010, Skanska´s CEO expressed a vision for Skanska to *"be the leading green project developer and contractor".* (Karlström 2010) Engaging within CoC can thus be regarded as a step towards this vision. By working with CoC, Skanska can ensure that they build with sustainable materials and minimize their environmental, economical and social impact with regards to timber logging. Also, a few stakeholders argue that it is Skanska and other large actors' obligation to start prioritizing sustainable purchasing regardless of demand. According to van Weele, (2005, p. 385) companies should most definitely engage within SRP. Accordingly, procurement is an area, where companies can prove that their CSR or sustainability engagement is integrated in the daily operations.

Another identified driving force that is a result of the CSR trend is the media attention. Leire & Mont (2008) confirm that media is a reason why companies would like to take responsibility. The reason for this is to avoid the risk of ending up in the media for bad handling of timber. The long-term consequence of such media could be devastating for a construction company's image.

The authors' recommendation for Skanska in their work with CoC is that the issue needs to be handled at all purchasing levels in the organization. Skanska is characterized by a high degree of decentralization, why a majority of the procurement decisions are made in the projects (Skanska: 8 2010). Therefore, it is not possible to only adapt central decisions to CoC. At a strategic level, management have a very important role by showing the rest of the organization that they are fully committed to the CoC strategy. This can be done by aligning resources, reward systems and incentives to the CoC strategy. At the tactical purchasing level, the main focus is to secure and adapt resources such as tools, support functions and data systems. This should be done to facilitate the work with CoC both for category managers as well as for operational employees in the projects. Today, the tactical level has a somewhat undefined role, trying to serve and satisfy both the strategic and the operational purchasing level. At a strategic and operational level, CoC is also handled in a KPI that has existed for four years and is reported for FWAs. The KPI is at the moment not serving its purpose and no one understands how it should be reported (Sveder 2011).

At an operational level, three projects have included CoC in their projects, when working with eco-certifications for buildings. All projects experienced a lot of difficulties with undefined roles and responsibility. In addition, lack of knowledge among suppliers and employees in the project and at the support functions at Skanska was also noticed. However, eco-certifications still provide some structure for the work and also guidance on how to handle the COC issue. By working with CoC in eco-certification projects, knowledge and experience on how to handle the challenges will increase among operational employees. This knowledge can then transfer to the support functions for environment and procurement. For example, it should be reported which suppliers that could offer approved timber and what problems that were encountered. Further on, such information could provide help on what to include, with regards to CoC, in central agreements and data bases. A project purchaser at Skanska also explained that the most successful ideas usually travel from the bottom of the organization to top-management, and not the other way around. This confirms that it is recommended for Skanska, in the early phase of CoC, to focus on CoC in eco-certifications for buildings. Nevertheless, it is important to secure the knowledge transfer from the projects to tactical and strategic levels. Also, it is clear that routines for handling CoC have to be further developed and adapted to the procurement process at Skanska. More detailed recommendations on this can be found in chapter 8.

In conclusion, the recommendation to start working with the CoC issue in connection to eco-certifications is applicable to all large actors in the Nordic construction industry. Decentralization with a majority of the procurement decisions being made in projects are common characteristics for the whole industry. Also, the markets and business models for constructions are somewhat similar. This common setting makes it likely to believe that also challenges with CoC will be similar. Last but not least, the eco-certifications, Svanen, BREEAM and LEED are international certifications that are highly respected in the Nordic countries.

9.2 Challenges When Changing the Procurement Process

Working with CoC might sound like an easy task to take on by a large and profitable construction company. However, the size and the structure of the industry, with thousands of projects that work differently, becomes an obstacle when working with CoC. The challenges of working with CoC have been proven to be numerous in this research. To mention a few, the market for CoC is immature and the concept has no common definition. A low willingness to pay for CoC among the clients also exists. According to Smith (2011), the UK market is much more mature and that is the reason for Skanska UK being further ahead in their work with CoC. The UK can be viewed as a good example in the area of CoC, however it should be remembered that the market, legislation and the infrastructural setting differ a lot from Sweden. Another challenge being faced is that CoC forces companies to become more dependent on their suppliers. When a supplier guarantees that the sold timber is CoC certified, the purchaser has to rely on this information since it is very difficult to

affirm every single purchase. Because of this, long term relationships built on trust are important. Well established business-to-business relationships are needed, but also reliability among employees who truly need to understand why reliability is important when dealing with CoC.

Raps (2004) denotes that when implementing a strategy, four critical success factors exist; culture, people, organization and control systems & instruments. All of these factors have been identified as problematic at Skanska today.

- **Culture.** At Skanska, the company culture seems to be conservative which makes strategy implementation an even more difficult task. An employee talks about the culture at the company, by saying:

  > "It's very difficult to change things at Skanska. There is one right way to do everything and that way is ingrained in the walls. It's the Skanska spirit."

  Furthermore, the diversified structure in construction companies creates problems in people management. The projects are a part of the company, but work as separate entities, and a feeling of *"we and them"* is often present. Even more, this culture is seen between different functions in the company such as the different support functions.

- **Organization.** In the CoC issue, different business units within Skanska have to collaborate. As stated by a purchaser at Skanska: when something new is being implemented, the message must be, *"we are in this together".* Thus, neither procurement nor the Environmental Support can push this question alone, all units have to be involved and collaborate. This suggestion is also supported by van Weele (2010, pp. 59-62) who denotes that purchasing decisions cannot be made in isolation since they affect other business units in the organization.

- **People.** Raps (2004) argues that to be able to succeed with strategy implementation, the employees have to be in focus. Without cooperation, confidence and competency in an organization, no one will succeed with strategy. The following quotation clearly illustrates that the CoC strategy has not been effectively communicated throughout the organization. As one employee at Skanska expresses:

  > "Often, new focus areas appear from top-management in the organization, but if no one understands the purpose, what is then the point of working with it?"

Raps also explains that the willingness to change routines and patterns is low for many people in organization. Implementing a CoC strategy will change the purchasing behavior and force employees to adapt to this change.

- **Control systems and instruments.** According to Raps (2004), it is recommended to have a clear time frame for the strategy implementation phase. At Skanska, there is no time frame set for the CoC implementation and one employee expresses;

  > "The guidelines for the CoC implementation have waltzed around in the organization for a long time now. A formal work method is needed to be able to evaluate and improve them."

  In conclusion, a clear time frame needs to be established for the CoC implementation to be able to make sure that change is taking place as expected.

As stated by Corboy & Currbui (1999), one of the largest challenges with strategy implementation is to create a common vision of where the company is heading. Communication is said to be the key for strategic success. Top management has to sell in the importance of the strategy during the whole implementation phase, so that customers and employees understand the purpose and the goal. Hence, in a construction company it has to be communicated why it is valuable to work with CoC and SRP for timber. This has to be done over and over again to all employees, at all levels of the organization to make sure that everyone is clear with what the changes will be and how they are affected in the process.

9.3 The Next Step for Chain of Custody

An important area to get back to in this final discussion is the reason for the construction industry to start engaging in CoC on timber. It must not be forgotten that CoC is about preventing illegal timber logging and timber trade to take place, and to be able to prove to consumers that the timber origins from sustainably managed forests. Consequently, to work with CoC is more than just handling a promise on a piece of paper, in form of a certificate stating that the timber is legally harvested. The concept of CoC contains a responsibility aspect which denotes that each party in the supply chain must guarantee that what is being promised is actually held. The situation as it is today, however, does not permit this responsibility commitment to be fully carried out. To be able to truly guarantee that all purchases in a company are responsible, frequent revisions and controls have to play a significant role in the work. Revisions are already taking place in third party certifications for timber, but the construction companies need to act in this area as well, in a future perspective.

It might be argued, that the new EU law for import of timber, will solve the situation with illegal timber trade in Europe. However, history and present situations clearly show that legislation is not observed when it comes to forestry. As presented in the introduction chapter, it was recently revealed that 37 % of the timber logging in the province of *Dalarna* did not follow Swedish law (SR 2011). This alone shows, that legislating is not enough to solve the problem. Control over timber procurement in the construction industry is a necessity rather than a choice, even in countries like Sweden, which is known for sustainable forestry. Moreover, even if legislation in theory could solve the problem in Europe, illegal timber trade is far wider. In a global society, we cannot ignore the problems taking place at other continents.

Finally, an interesting discussion concerns the future for CoC. Will all suppliers around the world be offering certified timber and will clients be taking certified timber in their buildings for granted? Or, will third party certification systems have developed into a somewhat corrupt system, where primary focus is on profit rather than sustainable forestry? Is perhaps increased governmental support, like in the UK, necessary for companies to be able to handle the CoC issue? No one can answer these questions with certainty, and it is either way clear that working with CoC has to be a process of continuous improvement. In the construction industry, improvement does not necessarily have to take place within the same material category. Instead, the concept could be expanded to include material such as quarry and bio-fuels that are natural resources that have the same environmental, social and economical aspects as timber tied to them. All in all, CoC is and will be a complex area to handle for any company handling natural resources. Nevertheless, by actively working to support sustainability, value is created both for the company and the environment.

10 Conclusion on Chain of Custody in the Construction Industry

Chain of Custody (CoC) is a new and unexplored area for the construction industry, and the purpose of this thesis was thus to explore the driving forces and the challenges with CoC

- **The perceptions** of CoC are plenty and there is *no common perception of CoC*. The concept is therefore difficult to define and work with. An important finding is that there are *many stakeholders* in the issue of CoC on timber. For a company in the construction industry it is very important to analyze the stakeholders in order to find an appropriate way to communicate a CoC procurement strategy. The conclusion is that *a more appropriate word is traceability*, since it covers what a construction company would like to achieve with a CoC strategy.

- **The driving forces** for CoC are many; however, no single driving force can drive the development of CoC alone. The most recognized driving force among the stakeholders is CSR, which is a trend that encourages companies *to take responsibility of the environmental, social and economical impact* of their operations.

- **The challenges** with CoC include both external and internal organizational factors. The *market for CoC on timber is immature* in Sweden, with little or no demand from clients. The ignorance in the area of CoC is also obvious. Organizational challenges were found at all procurement levels at Skanska: there was *lack of commitment* to the CoC strategy and *lack of internal infrastructure* that could support the handling of CoC on a tactical level. In the projects, *roles, responsibilities and working routines* were not clearly defined, which made it difficult to handle problems.

- **The solutions** to the challenges with CoC, require change in the organization. Strategically, the most important aspect is *to clarify the CoC strategy* so that everybody in the organization understands what CoC is all about, what the purpose is and that CoC is prioritized by top-management. At a tactical purchasing level, the main focus is *to secure and adapt resources* such as tools, support functions and data systems to facilitate the work with CoC. Also, communication with suppliers is obligatory. At the operational level, in the projects, it is important *to integrate CoC in all phases* of the project, according to the PDCA cycle. What has turned out to be especially important is planning, to define roles and responsibility and to evaluate the work process.

10.1 Evaluation and Further Research

At the end of this thesis, it is worth reflecting upon the research undertaken and the results presented. The first thing to evaluate is what we could have done differently, if we had the opportunity to perform the study once again. The answer to that is obvious; we would have changed many things. To mention a few; it would have been beneficial to include a larger amount of stakeholders in the study of the business environment and to study more projects. The Natural Resources Stakeholder model would also have benefitted from being tested on other industries than the construction industry. However, the time frame for this study, did not allow a more comprehensive study of the business environment nor testing the model in a different setting. With regards to the study of the construction projects, there were at the time of the research being performed, no more projects to be found at Skanska Sweden. Moreover, as this study was first planned, the ambition was to study a best practice or a success project on Chain of Custody (CoC). The aim was to investigate what these projects had done that had led to a success in the work with securing CoC. Such projects could be found at Skanska UK. However, it was decided not to include such projects, since this study is viewed as a first step in a much longer process of finding practicable ways to work with CoC in the construction industry. The study of CoC at Skanska UK could thus be appropriate in a later stage.

The authors can conclude that the research topic of this thesis is new and unexplored in the literature. CoC has proven to be an important area that influences purchasing decisions in a construction company. The theoretical contribution of this research consists of a stakeholder model that can be used by any company handling natural resources in their operations. Additionally, the research has resulted in an organizational work method that construction companies can use when implementing CoC on three different purchasing levels. The work method is regarded as valuable for other construction companies, apart from Skanska, that work with timber and Social Responsible Purchasing. In spite, further research in this area is needed to be able to learn more about CoC and how companies can contribute to a sustainable society through their procurement.

Further research could include a benchmark of best practices at Skanska. It would also be valuable to investigate the supply chain of timber in further detail. Visits to timber yards, suppliers and logging sites could provide a better understanding of the difficulties with securing CoC and also the seriousness and the implications of illegal logging. The recommendations in this thesis are built upon the belief that the third party certification, FSC is credible enough to be utilized at this point in time. In spite, it would have been interesting to investigate and confirm the credibility of the organization before giving recommendations that include the FSC certification. Yet, in this research, the authors refer to WWF, who announces that FSC is considered the most credible certification system to ensure environmentally responsible, socially beneficial and economically viable management of forests (WWF 2011).

11 List of References

11.1 Printed and Electronic References

Allen B. (2006). *In pursuit of responsible procurement,* Summit, Vol: 9, No 4, p. 7

American Forest & Paper Association, prepared by Seneca Creek Associates LLC and Wood Resources International, (2004). *Illegal Logging and Global Wood Markets: The Competitive Impacts on the U.S. Wood Products Industry.* Accessed 2011-02-14, http://www.illegal-logging.info/uploads/afandpa.pdf

Ammenberg J. (2004). *Miljömanagement,* Studentlitteratur

Arveson P. (1998). *The Deming Cycle,* The Balanced Scorecard Institute, Accessed 2011-03-14, http://www.balancedscorecard.org/BSCResources/ArticlesWhitePapers/TheDemingCycle/tabid/112/Default.aspx

Bacallan J. (2000). *Greening the supply chain.* Business and Environment, Vol: 6, No 5, pp. 11-12

Bala G., Caldeira, K., Wickett, M., Phillips, T.J., Lobell, D.B., Delire, C., Mirin, A. (2007).*Combined climate and carbon-cycle effects of large-scale deforestation*. Proceedings of the National Academy of Sciences, Vol: 104, pp. 6550–6555

Bengtsson L. & **Skärvad**, P.H. (2001). *Företagsstrategiska perspektiv,* Studentlitteratur, Lund

Björlingson E. (2011). *Presentation of the project specific purchasing process*, Gothenburg, 2011-03-30

Borglund T. (2006). *Aktieägarvärlden i fokus.* Doktorsavhandling för Ekonomie doktorsavhandling, Handelshögskolan Stockholm, pp. 77-78

BREEAM (2009:1). *About BREEAM Buildings,* Accessed 2011-02-23, http://www.breeam.org/page.jsp?id=13

BREEAM (2009:2). *BREEAM International 2008,* Assessor Manual, BREEAM International, BRE Global Ltd. Garston, Watford, Hertforshire

Bryman A. & **Bell** E. (2007). *Business research methods*, 2. ed. Oxford: Oxford University Press

Brundtland Report (1987). *Our Common Future*, Oxford: Oxford University Press

Caroll A. (1996). *Business & Society: Ethics and Stakeholder Management,* South-Western College Publishing, Cincinnati

Carter CR. (2004). *Purchasing and social responsibility: a replication and extension*, Journal of Supply Chain Management, 40(4), pp. 4-16

Chen L., **Liu** W. (2010:1). *Research on Operational Risk Management Framework for Commercial Banks in Internet World - Based on McKinsey 7S Model,* 2010 International Conference on Internet Technology and Applications, IEEE, pp. 1-6

Chen Z., Liu G., Ning J. (2010:2). *PDCA Process Application in the Continuous Improvement of Software Quality,* CMCE, p. 62, Accessed 2011-03-13, http://ieeexplore.ieee.org.ludwig.lub.lu.se/stampPDF/getPDF.jsp?tp=&arnumber=05609635&isnumber=5609592

Cheng J., Ba L., Cao S., Du Q. (2008). *Application of PDCA Cycle in the Performance Management System,* International Conference on Wireless Communications, pp. 1-4, Accessed 2011-03-14, http://libhub.sempertool.dk.ludwig.lub.lu.se/libhub?func=search&libhubSearch=1&query=PDCA

Cidell J. (2009). *A political ecology of the built environment: LEED certification for green building,* Local Environment, Vol: 14, No 7, pp. 621-633

CITES (2011). *The CITES Species*, Accessed 2011-02-25, http://www.cites.org/eng/disc/species.shtml

Corrbui D. & **Corrbui** M. (1999). *The seven deadly sins of strategy,* Management Accounting

Crane A. & **Matten** D. (2004). *Business Ethics: A European Perspective,* New York, Oxford University Press

Davis K. (1973). *The case for and against Business Assumption of Social Responsibility,* Academy of Management Journal 16(2)

De Wit B. & **Meyer**, R. (2004). *Strategy,* Thomson Learning, London

DNV (2010). *Skogscertifiering enligt FCS eller PEFC*, Accessed 2011-02-14, http://www.detnorskeveritas.se/tjanster/certifiering/ledningssystem/miljo/fsc_skog_pefc/index.asp

Drumwright M. (1994). *Socially responsible organizational buying: environmental concern as a noneconomic buying criterion*, Journal of Marketing, No 58, pp. 1-19

Dyllick T. & **Hockerts** K. (2002). *Beyond the business case for corporate sustainability,* Business Strategy and the environment, Greener Management International 11(2), pp. 130-141, Accessed 2011-03-08, http://www.iwoe.unisg.ch/~/~/media/Internet/Content/Dateien/InstituteUndCenters/IWOE/Forschung%20NH/Beyond%20the%20Business%20Case.ashx

Emerald group (2008). *Case studies in CSR-How to move from gloss to strategy,* Strategic Direction, Vol: 24, No 1, Accessed 2011-04-06, http://www.emeraldinsight.com.ludwig.lub.lu.se/journals.htm?articleid=1641787&show=html

European Commission (2005). *Corporate social responsibility: A business contribution to sustainable development,* Accessed 2011-03-07, http://europa.eu/legislation_summaries/employment_and_social_policy/employment_rights_and_work_organisation/n26034_en.htm

European Commission (2011:1). *Illegal logging/FLEGT Action Plan*, Accessed 2011-02-10, http://ec.europa.eu/environment/forests/illegal_logging.htm

European Commission (2011:2). *FLEGT Voluntary Partnership Agreements (VPAs),* Accessed 2011-02-10, http://ec.europa.eu/environment/forests/flegt.htm

European Commission (2011:3). *Timber Regulations,* Accessed 2011-02-10, http://ec.europa.eu/environment/forests/timber_regulation.htm#products

Fassin Y. (2008). *The Stakeholder model Refined,* Journal of business ethics, Springer 2008, pp. 114-115

Frankelius P. (2001). *Omvärldsanalys*, 1. uppl. Malmö: Liber ekonomi

FSC (2011:1). *About FSC,* Accessed 2011-02-14, http://www.fsc.org/about-fsc.html

FSC (2011:2). *Types of FSC certificates*, Accessed 2011-02-13, http://www.fsc.org/types-of-certification0.html

FSC (2011:3). Forest Stewardship Council, *Chain of Custody certification,* Accessed 2011-02-28, http://www.fsc.org/chainofcustody.html

Freidman M. (1970). *The social responsibility of business to increase its profit,* New York Sunday, Times Magazine, 13 September, pp. 34-36

Gadde L. E. & **Håkansson** H. (2001). *Supply network strategies*, IMP Group, John Wiley & Sons Ltd

Greenpeace (2008). *Illegal logging,* Accessed 2011-02-14, http://www.greenpeace.org/international/en/campaigns/forests/threats/illegal-logging/

Halvarsson & Halvarsson (2009). *CSR,* Accessed 2011-03-09, http://www.halvarsson.se/en/Newsroom/2009/SKF-best-in-Sweden-on-CSR/

Hammonds K.H. (2001). *Michael Porter´s big ideas,* Fast Company magazine

Hoboken N.J., Wiley J., Kibert, C.J. (2005). *Sustainable construction: green building design and deliver*

Hyvarinen E., Hyytiainen S., Jarvinen J., Kaila-Stenberg S., PerKlen E., Tornqvist J. (1998). *PDCA-cycle in Implementing Design for Environment in an R&D Unit of Nokia Telecommunications*, Nokia Telecommunication, p. 238, Accessed 2011-03-14, http://ieeexplore.ieee.org.ludwig.lub.lu.se/stampPDF/getPDF.jsp?tp=&arnumber=00675064&isnumber=14829

Höst M., Regnell B. & Runeson P. (2006). *Att genomföra examensarbete*, Lund: Studentlitteratur

Illegal logging: law enforcement, livelihoods and the timber trade (2007). London: Earthscan

Inspecta (2011). *Certifiering,* Accessed 2011-03-22, http://www.inspecta.se/vara_tjanster/certifiering.php?m=m3

Karlström J. (2010). *Urban Development Report No.1 – The Rise of Local Energy Communitites,* Accessed 2011-03-17, http://www.skanska.com/global/About%20Skanska/Our_Green_Initiative/GreenReport/GreenReport_20101130.pdf

Karlöf B. & **Lövingson** F. (2007). *Management från A till Ö-Förklaringar till 150 begrepp och modeller,* Stockholm, SIS Förlag AB

Korsnäs (2011). *Vad är FSC och PEFC?* Accessed 2011-02-14, http://www.korsnas.se/sv/Vart-foretag/Skogsbruk/Miljoarbetet/Certifieringar/FSC-och-PEFC/

Kotter J. & **Schlesinger** L. (2008). *Choosing Strategies for Change*, Harvard Business Review, July-August 2008

LEED NC (2009). *LEED Reference Guide for Green Building Design and Construction*, U.S. Green Building Council, Washington, DC

Leimalm M. (2011). *Company presentation,* Gothenburg 2011-03-28

Leire C. & **Mont** O. (2008). *The responsible purchasing in supply chains, Drivers and barriers in Sweden,* Social Responsibility Journal 5(3)

Leire C. & **Mont** O. (2009). *The implementation of Socially Responsible Purchasing*, Accessed 2011-02-02, http://www.lu.se/o.o.i.s?id=12588&postid=1497325

Li R. Buongiorno J., Tuner J.A., Zhu S., Prestemon J. (2008). *Long-term effects of eliminating logging on the world forest industries, trade, and inventory*. Forest Policy and Economics, Vol: 10, pp. 480-490

Lönn E. (2011). Interview at Skanska, Stockholm 2011-02-18

Maignan I., Hillebrand B., McAllister D. (2002). *Managing socially-responsible buying; How to intergrate non-economc-criteria into the purchasing process,* European Management Journal, Vol: 20, No 6, pp. 641-648

McGrath K., Gunther R., & MacMillan I. (2000). *The entrepreneurial mindset: strategies for continuously creating opportunity in an age of uncertainty*, Boston, Mass: Harvard Business School Press

Mohammad A. (2008). *Corporate Social Responsibility in Purchasing and Supply Chain,* Journal of Business Ethics, pp. 355-357

NBT (2011). *Environmental Impact*, Accessed 2011-03-25: http://www.natural-building.co.uk/environmentalimpact.html

Nellemann, C., Miles L., Kaltenborn B.P., Virtue M., Ahlneius H. (2008). *The last stand of the orangutan – state of emergency: illegal logging, fire and palm oil in Indonesia's national parks*, United Nations Environment Programme. GRID: Arendal, Norway. Accessed 2011-02-15, http://www.unepwcmc.org/resources/PDFs/LastStand/orangutanreport_1to11.pdf

Oxford University Press (2007). Gillespie: *Foundations of Economics-Additional chapter on Business Strategy,* Accessed 2011-02-25, http://www.oup.com/uk/orc/bin/9780199296378/01student/additional/page_11.htm

Panapanaan V., Linnanen M., Karvonen V., Phan T. (2003). *Roadmapping Corporate Social Responsibilities in Finnish Companies,* Journal of Business Ethics 44, pp. 133-148

Peloza J. (2006). *Using Corporate Social Responsibility as Insurance for Financial Performance,* California Management Review, 48(2), pp. 52-72

PEFC (2010:1). *Skogscertifiering,* Accessed 2011-02-14, http://www.pefc.se/

PEFC (2010:2). *Timber procurement*, Accessed 2011-02-14, http://www.pefc.org/index.php/certification-services/pefc-a-procurement-policies

PEFC (2010:3). *Fakta om Certifiering av Skogsbruk*, Accessed 2011-02-14, http://www.pefc.se/media/fakta_om_certifiering_av_skogsbruk_100415.pdf

PEFC (2010:4). *Certification Services*, Accessed 2011-02-14, http://www.pefc.org/certification-services/overview

Porter M. (2004 [1998]). *Competitive advantage: creating and sustaining superior performance.* New ed. New York: Free Press

Porter M. (2004). *Competitive Strategy: techniques for analyzing industries and competitors,* New York; Free Press Export Edition

Putler D. & Wolfe R. (2002). *How tight are the ties that bind stakeholder groups?,* Organizational Science, Vol: 13, Informs

Raps A. (2004). *Implementing Strategy- Tap into the power of four key factors to deliver success,* Strategic Management, Strategic Finance

Rowley T**.** (1997). *Moving beyond dyadic ties: A network theory of stakeholder influence*, Management Review

Shuttleworth M. (2008). *Abductive Reasoning*, Accessed 2011-03-01, http://www.experiment-resources.com/abductive-reasoning.html

Skanska (2007). *Environmental Policy,* Accessed 2011-02-28, http://www.skanska.com/en/About-Skanska/Sustainability/Environmental-responsibility/

Skanska (2008). *Vem gör vad när det- gäller inköp?* Document available internally at Skanska One, Accessed 2011-02-28

Skanska (2010:1). *Annual Report 2010,* Accessed 2011-04-04, http://www.skanska.com/Global/Investors/Reports/2010/Annual%20Report/Skanska_Annual_Report_2010.pdf

Skanska (2010:2). Our *History,* Accessed 2011-03-01 http://www.skanska.com/en/About-Skanska/Our-history/

Skanska (2010:3). *Chain of Custody for Timber-Guideline for implementation*, Document available internally at Skanska One*,* Accessed 2011-03-20

Skanska (2011:1). *Organizational chart*, Accessed 2011-03-01, http://www.skanska.com/en/About-Skanska/Our-organization/Organizational-chart/

Skanska (2011:2). *Our Targets*, Accessed 2011-02-28, http://www.skanska.com/en/About-Skanska/Our-targets/

Skanska (2011:3). *Environmental Strategy 2008-2010*, Accessed 2011-02-28, http://www.skanska.com/global/About%20Skanska/Sustainability/11EnvStrategy%20100110.pdf

Skanska (2011:4). *Social Responsibility,* Accessed 2011-03-08, http://www.skanska.com/en/About-Skanska/Sustainability/Social-responsibility/

Skanska (2011:5). *Economic Responsibility*, Accessed 2011-03-08 http://www.skanska.com/en/About-Skanska/Sustainability/Economic-responsibility/

Skanska (2011:6). *Skanska and Sustainability,* Accessed 2011-04-05, http://www.skanska.com/en/About-Skanska/Sustainability/Skanska-and-sustainability/

Smith J. (2011). Interview at Skanska AB, Stockholm 2011-02-18

Smith W. (2004), *Undercutting Sustainability*, Journal of Sustainable Forestry, 19: 1, pp. 7-30.

Spar D. & **Mure** L. (2003). *The power of Activism: Assessing the Impact of NGOs on Global Business,* California Management Review, 45(3), pp.78-102

SR (2011). *Skogsstyrelsen lade locket på om miljöbrister,* Accessed 2011-05-03, http://sverigesradio.se/sida/artikel.aspx?programid=83&artikel=4481483

Stark P. (2011). *Presentation of Framework Agreements,* Gothenburg 2011-03-30

Svanen (2011). *20 frågor om Svanen*. Nordisk Miljömärkning, Accessed 2011-02-23, http://www.svanen.se/Om-Svanen/Om-oss/Fragor--Svar/20-fragor-om-Svanen/

Svanen (2009). *Svanenmärkning av småhus, flerbostadshus och förskolebyggnader Version 2.0 15 december 2009 – 31 december 2014*, Nordisk Miljömärkning, Accessed 2011-02-24, www.svanen.se/sismabmodules/criteria/getfile.aspx?fileid=112779001

SVD (2009). *Möbeljätte saknar etiska regler, Accessed 2011-04-05, http://www.svd.se/nyheter/inrikes/mobeljatte-saknar-etiska-regler_3150933.svd*

Södra (2011). *Skogscertifiering enligt FSC och PEFC*, Accessed 2011-02-14, http://www.sodra.com/sv/Skogsagare/skogtjanster/Skogscertifiering/

TTF (2011). *Chain of Custody,* Accessed 2011-02-11, http://www.ttf.co.uk/Environment/Chain_of_Custody.aspx

Turner J.A., Katz A., Buongiorno J. (2007). *Implications for the New Zealand wood products sector of trade distortions due to illegal logging*. The New Zealand Ministry of Agriculture and Forestry, prepared by Scion.

USGBC (2009). *Green Building by the Numbers.* US Green Building Council, Accessed 2011-02-25, http://www.usgbc.org/ShowFile.aspx?DocumentID=3340

USGBC (2011). *Intro LEED,* Accessed 2011-02-23, http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

van Weele A.J. (2005). *Purchasing and Supply Chain Management,* Fourth Edition, Thomson Learning, London

van Weele A.J. (2010). *Purchasing and Supply Chain Management, Fifth Edition* Thomson Learning, London

Walsh P.D., Abernethy K.A., Bermejo M., Beyersk R., De Wachter P., Ella Akou M., Huijbregts B., Idiata Mambounga D., Kamdem Toham A., Kilbournk A.M., Lahmq S., Latourk S.A., Maiselsk F., Mbinak C., Mihindouk Y., Ndong Obiang S., Ntsame Effa E., Starkeyk M.P., Telfer P., Thibault M., Tutin C.E.G., Whitek L.J.T., Wilkiek D.S., (2003). *Catastrophic ape decline in western equatorial Africa*, Nature Vol: 422 no: 6932, pp. 611–613.

WBCSD (2005). *Joint Statement for the Forests Dialogue's First International Dialogue on Illegal Logging (8-10 March 2005, Hong Kong)*, Accessed 2011-02-28, http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=13627

West's Encyclopaedia of American Law (2011). *Chain of Custody,* Accessed 2011-02-28, http://www.enotes.com/wests-law-encyclopedia/chain-custody

Wikander J. (2011). Interview at Skanska AB, Stockholm 2011-02-22

World Bank (2006). *Strengthening Forest Law Enforcement and Governance: Strengthening a Systemic Constraint to Sustainable Development*, Report No. 36638-GLB.

WWF (2004). *Ett skepp kommer lastat- Ekologiska fotavtryck av Sverige virkesimport från öst,* Världsnatursfonden WWF. Accessed 2011-02-01, http://www.wwf.se/source.php/1116753/wwf-1074589.pdf

WWF (2010). *Skogscertifiering*, Accessed 2011-02-14, http://www.wwf.se/v/skog/skogscertifiering/1122963-skogscertifiering.

WWF (2011). *Forest Certification, Accessed 2011-0509, http://wwf.panda.org/what_we_do/footprint/forestry/certification/*

11.2 Interviews in the Business Environment

Arnesson Tanja, Eco-certification group Skanska. Personal interview 2011-02-24

Björs Mats, Chairman of Kretsloppsrådet. Telephone interview 2011-02-15

Edlund Anders, Manager of Procurement NCC. Email interview 2011-02-05

Forsberg Anna, Skanska: Green Business Officer. Telephone interview 2011-02-28

Hermansson Jörgen, Former purchasing manager at Inwido. Personal interview Malmö 2011-02-02

Isaksson Caroline, Skanska: Svanenmärkta Uniqhus. Telephone interview 2011-03-02

Johansson Olof, Environmental manager Sveaskog. Telephone interview 2011-03-03

Jönsson Maria, Quality manager Jeld-Wen. Telephone interview 2011-03-08

Lyngstad Heidi, Skanska: Climate and Energy consultant. Email interview 2011-03-02

Lönn Erik, Skanska: Category Manager Framework Agreements, Personal interview Stockholm 2011-02-18

Matenzidiz Mikael, Purchasing manager Inwido Sweden. Telephone interview 2011-03-13

Sjöström Peter, Product manager Beijer. Telephone interview 2011-02-25

Skoglösa Sofia, Skanska: Sustainability Manager. Telephone interview 2011-03-10

Smith Jamie, Skanska UK: Project Leader. Personal interview Stockholm 2011-02-18

Strömberg Jens, Environmental responsible Västra Götalands kommun. Telephone interview 2011-03-15

Stålhandske Pia, Skanska: Process Developer Sweden. Personal interview Stockholm 2011-02-18

Sveder Lundin Jeanette, Skanska: Environmental manager. Telephone interview 2011-03-01

Wannerström Agneta, Skanska: Coordinator Moderna hus. Telephone interview 2011-03-14

Wikander Johanna, Skanska AB: project manager Green Construction. Personal interview Stockholm 2011-02-22

11.3 Interviews in the Projects

Ballog David, Skanska: Moderna Hus. Personal interview 2011-04-19

Bomb Alexandra, Skanska: Moderna Hus. Telephone interview 2011-04-07

Granblom Thomas, Junkers (supplier to Rotundan). Telephone interview 2011-04-05

Jacobsson Monika, Skanska: Project engineer at Rotundan. Personal interview Stockholm 2011-03-23

Jansson Joakim, Skanska: Concept purchaser Moderna Hus. Personal interview, Kalmar 2011-03-31

Silverberg Per, Skanska: LEED AP. Personal interview Göteborg 2011-03-29

Österberg Ronnie, Manager In3prenad. Telephone interview 2011-04-11

11.4 Focus Group, Skanska Sweden

Arnesson Tanja, Eco-certification Group, Skanska Sweden, 2011-04-29

Ghadban Roba, Sustainability Manager Nordic Procurement Unit, Skanska, 2011-04-29

Kaplan Larissa, Group Manager Eco-certification Group, Skanska Sweden, 2011-04-29

12 Appendices

12.1 Appendix: I Abbreviations

BREEAM	BRE Environmental Assessment Method
BU	Business Unit
CoC	Chain of Custody
CEO	Chief Executive Officer
CSR	Corporate Social Responsibility
EMS	Environmental Management System
FLEGT	Forest Law Enforcement Governance and Trade
FSC	Forest Stewardship Council
FWA	Framework Agreement
G8	Group of Eight
KPI	Key Performance Indicator
LEED	Leadership in Energy and Environmental Design
NGO	Non-governmental Organization
NPU	The Nordic Procurement Unit (Skanska)
NRS	Natural Resources Stakeholder
PDCA	Plan Do Check Act
PESTEL	Political Economical Social Technical Environmental Legal
PEFC	Plan for Endorsement of Forest Certification
SRP	Social Responsible Purchasing
SC	Supply Chain
TQM	Total Quality Management
VPA	Voluntary Partnership Agreements
WBSCD	World Business Council for Sustainable Development
WWF	World Wide Fund for nature

12.2 Appendix: II Interview Questions to the Study of the Business Environment

What is your role and responsibility?

How do you define Chain of Custody (CoC)?

What is your experience of working with CoC?

According to you, what are the largest driving forces for CoC?

According to you, what are the largest challenges of working with CoC?

Which actors do you consider are important in the CoC issue?

Does your organization have any role models within CoC today?

Who demands CoC today? Clients?

What is your attitude towards FSC and PEFC as tools for CoC?

What is your attitude towards eco-certification systems and their demand on CoC?

Can you recommend us to talk to somebody else with additional knowledge about CoC?

12.3 Appendix: III Interview Questions to Construction Projects

Introduction

Can you tell us about the project?

Normally, how does a timber purchase take place in a project?

How much timber products did you purchase? What kind of timber products?

Plan

How was the decision taken, that the project should aim for CoC? (in LEED/Svanen)

When in the project phase?

Whose was the initiative?

What was the attitude toward CoC in the project?

How did the planning go for CoC, when having decided that the project was going to work with CoC?

Who attended the start-up meeting?

Was the client involved in the CoC discussion from start?

Costs? Flexibility? Ambitiousness?

Do

How did the suppliers react upon the request?

How much effort was put in, trying to find timber that was CoC certified?

How did the normal purchasing process change when involving CoC?

What problems, if any, occurred in the procurement process?

Check

How did you handle the challenges that occurred for CoC?

What was done facilitate for the next project?

If anything went well, when working with CoC, how did you capture this?

Did you get the support that you needed in the project?

Do you feel that you have enough knowledge to work with CoC?

What could have been done differently when working with CoC?

Act

What do you take with you to the next project?

Do you report the challenges that have existed in the CoC question to other projects or purchasing levels?

Will your or other people in the project continue to work with CoC in the next project?

Do people talk about CoC? Internally at Skanska and externally?