# Innovation in buyer-supplier relationships: an international study of the wood industry

# Innovasjon i kjøpar- leverandør relasjonar: ein internasjonal studie av treindustrien

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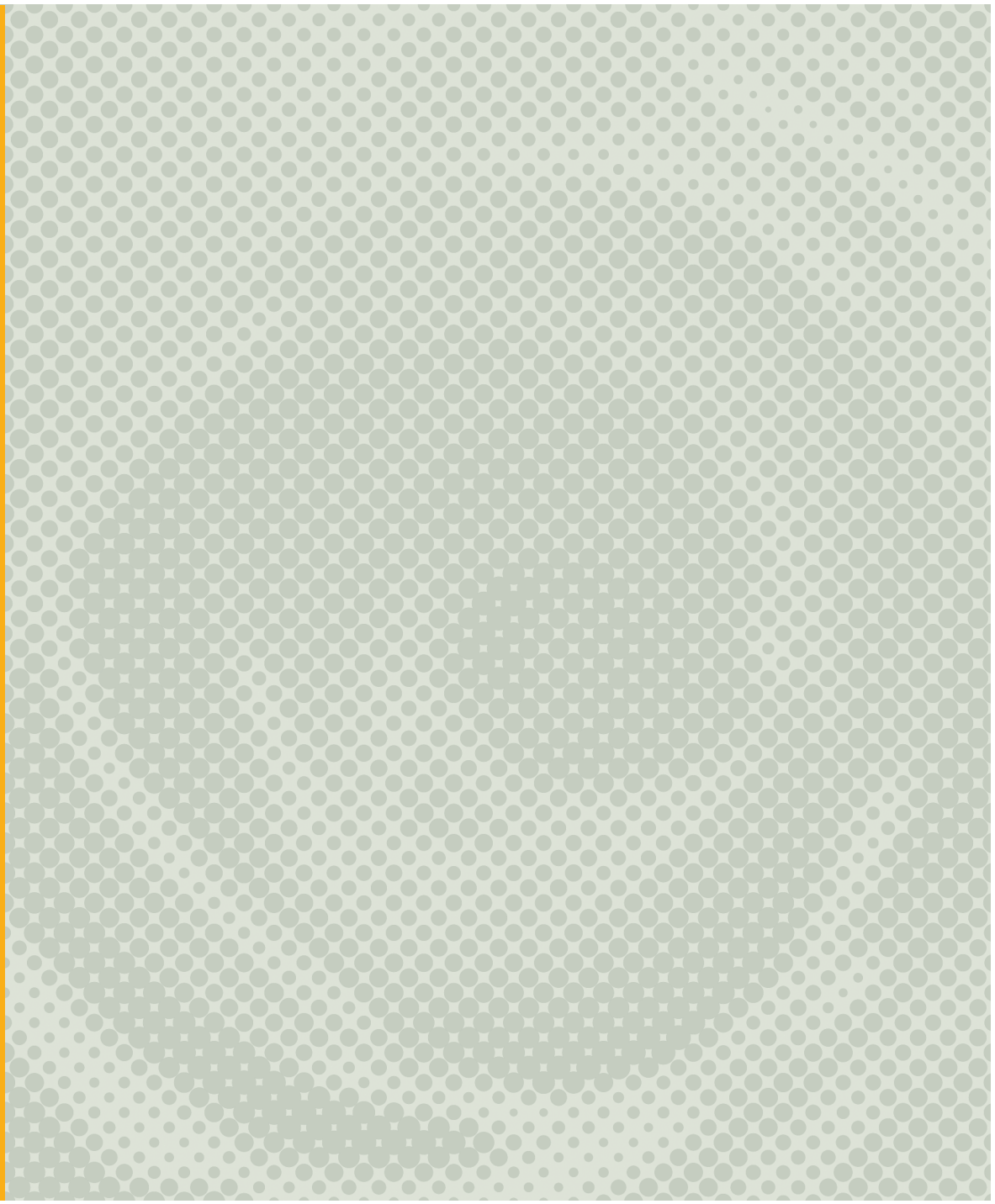

## Preface and Acknowledgements

This Master's thesis is performed on the behalf of the Norwegian Forest and Landscape Institute. This thesis is a part of an international research study on buyer-supplier relationships in the wood industry and how this relationship impacts innovation. I would like to express my appreciation to the Norwegian Forest and Landscape Institute for funding this research.

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Finally, I would like to thank my wife Sissel and my family and friends for their support and understanding during my work on this Master's thesis.

## Abstract

This thesis is an international study of wood impregnation and fire protection in the wood industry and is the first of a series of research articles related to this topic. The aim of the thesis is to close the gap in the literature regarding the nature of buyer-supplier relationships in the wood impregnation industry and how these relationships affect product and process innovation. This thesis is based on data collected from the USA, Central Europe, and Scandinavia, with a focus on the chemical supplier side of these relationships. Data were collected through semi-structured interviews of 14 managers in predefined roles. The sample frame of three supplier companies was selected with the help of industry experts based on set criteria. Customers of each supplier were chosen based on snowballing methods through dialogs with the chemical suppliers.

The results of this research demonstrate that both the suppliers and customers view these relationships as beneficial. Managers noted that the industry has been rather conservative and focused on research and development (R&D) for a long time. However, over the past several years, the wood industry has shifted toward more market-driven innovation. This study's findings indicate that buyer-chemical supplier relationships in the wood industry are often informal and based on handshake agreements instead of formal contracts. The level of formality depends on the duration of the relationship and the level at which the two organizations interact with each other. The findings also indicate that the main aim of both parties is to create a long-term relationship. Findings from Scandinavia, Central Europe, and the USA indicate that customers affect innovation by providing suppliers with market intelligence about end-user needs for product and process innovation. A small portion of customers in the wood industry focus on performing innovation on their own, and they mainly conduct process innovation. Chemical suppliers are the main drivers of product innovation in their relationships with the wood industry, but these suppliers depend on selected customers to test new product innovations in the customers' full-scale facilities. The key findings of this thesis have managerial implications and suggest topics for further research.

## Samandrag

Masteroppgåva er den første delen av ein større studie relatert til impregnering og brannvern i treforedlingsindustrien. Målet med masteroppgåva er å identifisere kva som karakteriserer «kjøpar-leverandør» forholda i treforedlingsindustrien og korleis dei påverkar produktet og prosessinnovasjon. Studien er empirisk og basert på kvalitativ metode med data samla inn frå USA, Mellom-Europa og Skandinavia. Leverandørar av kjemikaliar til impregnering og brannvern i treforedlingsindustrien er hovudfokuset for denne studien. Datamaterialet er samla inn gjennom semistrukturerte intervju av 14 leiarar i førehandsdefinerte roller. Utvalet består av tre «kjøpar-leverandør» relasjonar. Leverandørane er utvalde av fire industriekspertar basert på spesifikke utvalskriterium. Kundane er identifisert ved hjelp av «snøballmetoden» gjennom dialog med dei kjemiske leverandørane.

Resultata frå casestudien viser at dei kjemiske leverandørane og treforedlingsprodusentane meiner at forholdet til partnarane sine er gunstige for innovasjon. Respondentane peikar på at denne sektoren har vore konservativ over lang tid. Tidlegare var innovasjonen i industrien styrt av forsking og utvikling (FOU), men dei siste åra har treindustrien gått gjennom eit paradigmeskifte og innovasjonen har vorte meir marknadsstyrt. Funna i denne studien viser at relasjonar mellom «treindustrikjøpar» og kjemiske leverandørar ofte er uformelle. Avtalane er ofte baserte på handtrykk og gjensidig tillit, i staden for formelle kontraktar. Graden av formalisering er avhengig av kor lenge forholdet har eksistert. Vidare viser funna at begge partane har som mål å skape langsiktige relasjonar med sine samarbeidspartnarar. Funn frå Skandinavia, Mellom-Europa og USA tyder på at kundane påverkar innovasjon gjennom å gi leverandørar marknadsinformasjon om kva sluttbrukaren har behov for. Dette gjev viktig grobotn for produkt- og prosessinnovasjon. Resultata viser at berre ein liten del av treindustrikundane fokuserer på innovasjon. Kundane utfører i all hovudsak prosessinnovasjon. Sjølv om dei kjemiske leverandørane er den viktigaste drivaren for produktinnovasjon i treindustrien, er dei avhengig å teste nye produkt i fullskala anlegg hjå kunden. Basert på funna frå denne studien har ein presentert implikasjonar for leiinga i både kjøpar- og leverandørbedrifter. Desse implikasjonane er relatert til handtering av kjøpar - leverandør forholda for framtida og tiltak knytt til innovasjon i treindustrien. Masteroppgåva har også identifisert spørsmål for vidare forsking.

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## 1.0 Introduction

The wood industry has experienced an extremely difficult period over the last several years due to increasing global competition and the recent financial crisis. For example, thousands of jobs were lost in the USA prior to the financial crisis because of increased competition (Hansen, 2010), a situation that was worsened due to the financial crisis, leading to decreased demand and thus even stronger competition (Hodges et al., 2011). As a result, governments around the world have introduced strategies to boost innovation in the wood industry (Hansen, 2010). Hansen (2010) notes that there is an insufficient amount of literature on innovation in the wood industry and that research institutions must conduct additional studies on this topic.

Increased knowledge about relationships between wood industry buyers and chemical suppliers is important to enable managers in the industry to create and develop their relationships with the aim of increasing performance and growth. Wynstra et al. (2001) argue that the supplier's involvement in the buyer's innovation can have both positive and negative outcomes on the buyer's performance. This thesis examines how suppliers affect innovation in the wood impregnation industry.

## 1.1 Theoretical focus

The theoretical focus of this thesis is on buyer-supplier relationships and the innovation literature. Buyer-supplier relationships can be managed so that they assist the participants in gaining a competitive market advantage and in increasing their economic performance (Jap, 1999). Jap (1999) argues that the economic context of the buyer-supplier relationship is important. Relationships are affected by various factors, such as communication, trust, and proactive conflict resolution (Tuten and Urban, 2001). Tuten and Urban (2001) argue that the balance of power in a relationship is important to its value.

Hansen et al. (2007) have contributed one of the key articles inspiring this thesis on the subject of innovation and innovativeness in the wood industry. Hansen et al. (2007) describe how wood managers perceive innovative companies. They also note the link between innovativeness and improved competitiveness.

## 1.2 Research gap

Countless studies have been conducted on innovation and innovativeness, some related to the wood industry (Hansen et al., 2011, Nybakk et al., 2011). These studies, among others, have identified how innovation managers in the wood industry perceive innovation (Hansen et al., 2007) and described strategies for creating an innovation climate in the wood industry (Nybakk et al., 2011). The buyer-supplier relationship is another topic of frequent study (Scheer et al., 2010, Prashant and Harbir, 2009), with studies describing the structure of buyer-supplier relationships (Prashant and Harbir, 2009), enablers of collaborative relationships (Spekman and Carraway, 2006), and the impact of these relationships on financial performance (Carr and Pearson, 1999). However, previous empirical studies have not investigated *the nature of buyer-supplier relationships in the wood industry and how these relationships affect innovation.* Examining buyer-supplier relationships in the wood industry context is important for several reasons. First, it is a mature industry that is struggling to achieve adequate profitability. The industry is undergoing many changes as result of competition from other industries, market changes and new regulations(Husso and Nybakk, 2010). Second, focusing on a single industry reduces the variation of unknown external factors that can occur when we multiple industry sectors are studied at the same time(Nybakk and Jenssen, 2012).

## 1.3 Aim

The aim of this thesis is to close the gap identified above by providing more in-depth knowledge about the nature of relationships between wood industry buyers and chemical suppliers and determining the effects of these relationships on innovation in the wood industry.

## 1.4 Contribution of the thesis

The purpose of this study is to help stakeholders (business, governments, interest organizations, and research institutions) better understand how to stimulate innovation through relationships. This thesis contributes recommendations to managers on how to administer collaborative relationships to foster innovation.

## 1.5 Outline of the thesis

This thesis begins with a theoretical background explaining the concepts of innovation and buyer-supplier relationships and addressing innovation in the context of the wood industry. Qualitative interviews are used to answer research questions to close the gap in the literature. The data collected through these interviews will be analyzed and discussed based on the existing literature on innovation and buyer-supplier relationships. Finally, the results of this work are discussed, including summaries of the key findings and a discussion of the managerial implications of this work. The study ends with suggestions for further research.

## 2.0 Theoretical background

This section presents important theoretical perspectives from the literature in the areas of innovation and buyer-supplier relationships. Both innovation and buyer-supplier relationships are defined in this part of the thesis. The literature presented below was selected to address the research questions of this thesis. The academic literature introduced here is used to construct a framework for the case studies conducted in this work.

## 2.1 Innovation

The term *innovation* has received considerable attention in the media, education, and politics over the last several decades, but the phenomenon itself is very old, beginning with people improving the technologies or processes in their lives (Fagerberg, 2005). Many definitions of innovation have been provided in the literature (Garcia and Calantone, 2002), and as Tidd and Bessant (2009) argue, innovation has been defined in a variety of ways. Almost, all definitions highlight that new knowledge must be commercialized to be considered an innovation. Table 2.1 presents several definitions of innovation.

| **Selected definitions of innovation from the literature** |
|---|
| "Assumes that innovation is a process of turning opportunity into new ideas and putting these into widely used practice" (Tidd and Bessant, 2009 p 16). |
| "'Incremental innovations' incorporate product improvements (features, benefits, price, manufacturing, process) into innovations using existing technologies targeted towards existing markets. On a macro level, 'really new' product innovations result in either market discontinuities *or* technology discontinuities but not both and result in both types of discontinuities on a micro level" (Garcia and Calantone, 2002 p 126-127). |
| "Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice" (Fagerberg, 2005 p 4). |

**Table 1: Selected definitions of innovation from the literature.**

### 2.1.1 Definitions of innovativeness, innovation culture and innovation climate

Innovativeness is another import term used in the literature, and it is important to distinguish between innovativeness and innovation. Garcia and Calantone (2002) tie innovativeness to the degree of novelty an innovation brings to the market or existing technology. Firm innovativeness is a company's ability to adopt or create new business systems, products, or processes (Nybakk, 2012). The innovation climate of an organization is characterized by repeated patterns in attitudes, behaviors, and feelings (Tidd and Bessant, 2009). Innovation culture is a term used to address an organization's substantial norms, values, and beliefs (Tidd and Bessant, 2009).

### 2.1.2 Different types of innovation

Henderson and Clark (1990) state that there are different types of innovation, distinguished based on how products are assembled and on the newness of the innovation. Based on this principle of how products are assembled, the authors outline the following four types of innovation: *incremental, architectural, modular,* and *radical* (Henderson and Clark, 1990).

Tidd and Bessant (2009) advance the literature and promote the concepts of *platform innovation* and *discontinuous innovation.* Platform innovation is the creation of a concept that can then be continued in the form of new products with small improvements. Discontinuous innovation is when new products, processes, or services lead to a new paradigm.

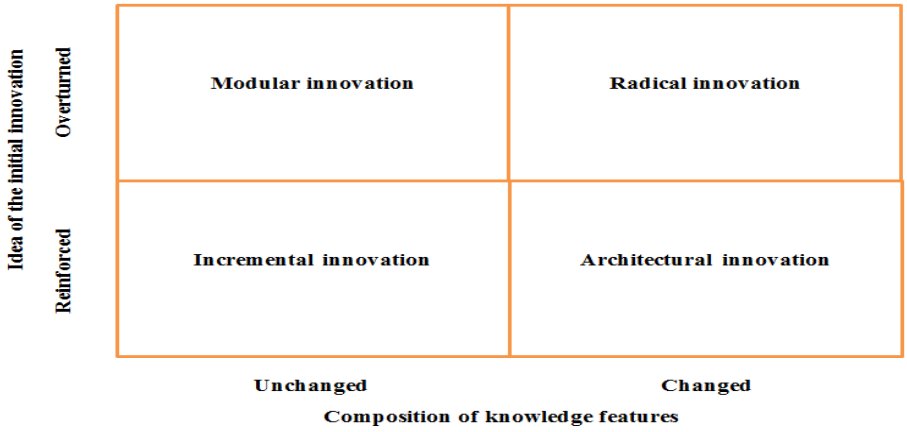


**Figure 1: Adopted from Henderson and Clark (1990).**

Tidd and Bessant (2009) claim that innovations consist of the following four dimensions: *product innovation, process innovation, position innovation,* and *paradigm innovation.* Further, they link the different types of innovation with incremental and radical innovation in all four dimensions. This study will further discuss and define the two dimensions of *product*

*and process innovation*, as these forms of innovation are possible outcomes of relationships between buyers and suppliers in the wood industry.

Product innovation is defined as a new product or service with enhanced performance (Edquist, 2005). Further, product innovation is defined in the literature as new products for the firm, new products for the market, and existing products with improved performance (Schilling, 2010, Smith, 2010, Weiss, 2011a). Product innovation can occur within each type of innovation defined by Henderson and Clark (1990).

Process innovations are improved or changed processes (Tidd and Bessant, 2009). Process innovations occur when a process is improved by new operational techniques or new technologies that improve tools, production, and services (Smith, 2010, Weiss, 2011a).

### 2.1.3 Levels of innovation

There are different areas of focus within the innovation literature. Innovation can be discussed on the following four levels: *the societal level, inter-organizational level, organizational level,* and *individual level* (Nybakk, 2009). The societal level has an impact on innovation thought political decisions. Asheim and Coenen (2005) demonstrate that various clusters and innovation systems affect innovation. Further, do they argue are different clusters are affected by different types of knowledge(Asheim and Coenen, 2005). The inter-organizational level refers to how the interactions and relationships between companies impact innovation. The literature has proposed that knowledge transfers are a benefit of inter-organizational relationships that can help the organizations to enhance their performance by creating a sustainable advantage (Dutta, 2012). The literature also points out that inter-organizational relationships can be organized in several ways (Prashant and Harbir, 2009).

The organizational level affects innovation through the following factors: organizational learning (Hurley and Hult, 1998), leadership and organizational culture (Sarros et al., 2008), and organizational structure (Tidd and Bessant, 2009). The individual level affects innovation though personal traits (Antoncic, 2009) and motivation (Shane et al., 2003).

## 2.2 Innovation in the wood industry

The wood industry is considered a low-technology industry because of its low research and development (R&D) intensity (OECD Directorate for Science, 2011). However, industries characterized as low technology do not lack opportunities for innovation (Tunzelmann and Acha, 2005). Innovativeness in the wood industry has not been a major focus, and firms often

have no defined procedures to identify and capture new ideas (Hansen et al., 2007). Studies have demonstrated that innovation and firm innovativeness occur in the wood industry, resulting in new processes, business systems, and products (Crespell et al., 2006, Hansen et al., 2007, Nybakk, 2012). Innovation in the wood industry is often facilitated through *interpersonal communication* rather than through R&D (Weiss, 2011b).

Studies have demonstrated that the type of innovation that occurs in the wood industry depends on where an organization is within its life cycle. At the start of the life cycle, product innovation is a high priority, whereas process innovation is a low priority, and the opposite is true at the end of the life cycle (Hansen, 2006). In the last several years, many businesses have changed from a production to customer focus. This trend has also affected the wood industry, which has become more focused on delivering products customized for customers' needs (Juslin and Hansen, 2011). This change in direction demonstrates that the wood industry is increasingly affected by new innovations.

A United Nations annual review described several segments of the wood industry that are related to innovation (United-Nations, 2012). One of the segments identified by the United Nations (2012) is *wood plastic composites.* According to the United Nations report (2012), *wood plastic composites* are an example of a new and innovative segment in the wood industry that have achieved high market penetration in the USA but have not had the same success in Europe. Further, the United Nations report (2012) claims that consumers are still using non-sustainable products even though new and innovative wood-based products are available.

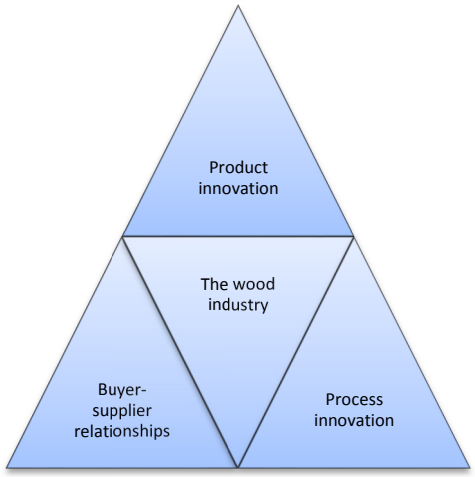


**Figure 2 - Framework of this thesis.** (In this study, the wood industry refers to companies that produce or use wood-treating chemicals)**.**

## 2.3 Buyer-supplier relationship

The literature often refers to relationships between manufacturers and suppliers as buyer-supplier relationships. This thesis divides the literature on buyer-supplier relationships into categories addressing the following issues: 1) types and structure of the buyer-supplier relationship, 2) key aspects that affect the relationship, 3) buyer perspective on the relationship, 4) supplier perspective on the relationship, and 5) business performance and innovation in the relationship.

### 2.3.1 Types and structure of buyer-supplier relationships

Business relationships have changed from transactional relationships to close collaborative relationships (Spekman and Carraway, 2006). Spekman and Caraway (2006) present a framework consisting of *drivers, facilitating capabilities,* and *fundamental enablers.* Further, they note that drivers of collaboration include how to gain value for both participants in a relationship. Spekman and Carraway (2006) highlight skill set, structure, and IT as some capabilities that help to establish a collaborative relationship that creates value for both partners. Collaborative relationships can evolve from traditional informal relationships to different forms of alliances or other arrangements (Prashant and Harbir, 2009).

Formal relationships are defined by contracts, whereas informal relationships are not. Formal relationship contracts reduce the chances of opportunism by the participants (Wuyts and Geyskens, 2005). Buyers' satisfaction and coordination with suppliers increases when relationships are formalized and ownership integration increases (Mohr et al., 1996). Further, Mohr et al. (1996) demonstrate that increased integration did not affect a buyer's (dealer's) commitment to the relationship with the supplier (manufacturer).

### 2.3.2 Key aspects that impact the buyer-supplier relationship

Speakman and Carraway (2006) argue that customer focus and trust are important enablers of collaborative relationships. Tuten and Urban (2001) also note that successful business partnerships are built on trust. Further, their study demonstrates that the following parameters are important for successful relationships: essential information is shared with partners and the partnership is grounded on a set of goals that will be met over the life of the partnership (Tuten and Urban, 2001).

Another important aspect of a relationship is power. Power in buyer-supplier relationships is divided into *individual, relational, and organizational* aspects (Meehan and Wright, 2012). Further, they argue that both parties in a relationship have their own perception of power, and

these perceptions affect the method of communication within the relationship. One party's perceptions of the other relationship partner affect the level of trust and *psychological contract violation in the relationship* (Hill et al., 2009). Further, Hill et.al (2009) study argues that the supplier's trust in the buyer can decrease even if the supplier does not express unhappiness with the relationship.

Buyer-supplier relationships are affected by social capital through interaction (Hughes and Perrons, 2011). Tidd and Bessant (2009) define social capital as how managers use their networks to exert influence, gain access to information, and exert power and control. Mohr et al. (1996) argue that collaborative communication can be a form of governance style and that it has the same advantages as traditional forms of governance without the same disadvantages.

### 2.3.3 Buyer perspective

In this study, manufacturers in the wood industry are considered the buyers/customers in the buyer-supplier relationship. A customer can be in a relationship with a supplier because their business depends on access to the supplier's products or services (Scheer et al., 2010). Scheer et al. (2010) present a model that identifies the following forms of dependence: *benefit-based dependence and cost-based dependence*. They present benefit-based dependence as a relationship in which the customers depend on the relationship due to the benefits they gain through the cooperation. Scheer et al. (2010) define cost-based dependence relationships as relationships in which the buyer's cost would increase if the relationship ended.

Cost-based dependence is related to the principle of switching cost, as a customer will be more likely to stay in a relationship with a supplier if the switching cost is high (Kim et al., 2010). Further, Kim et al. (2010) note that a buyer must trust the supplier to stay in the relationship. A supplier can reduce a buyer's uncertainty and build trust by investing in the relationship and demonstrating that they want to share risk with the customer (Gao et al., 2005).

Buyers want to engage in relationships with suppliers to obtain better-quality services and products, increase competitive advantage, reduce cost, and increase sales and profit performance (Tuten and Urban, 2001).

### 2.3.4 Supplier perspective

This section considers what suppliers have to offer and gain from relationships with buyers. Kalwani and Narayandas (1995) demonstrate that suppliers in long-term relationships or that perform business though transactional agreements do not exhibit a difference growth. Further, they argue that suppliers that operate in long-term relationships will reduce their costs over time and thus increase their profitability.

Another important advantage that suppliers can gain though long-term relationships with their customers is better insight into the needs of the customer in terms of products and services (Kalwani and Narayandas, 1995). A supplier must build trust through involvement in the relationship, and this trust can then lead to reduced uncertainty for the buyer (Gao et al., 2005). If the supplier manages to reduce their customers' decision-making uncertainty by forming relationships with their customers, can suppliers build customer loyalty through their capabilities and core offerings (Scheer et al., 2010).

### 2.3.5 Business performance and innovation in the relationship

Supplier involvement in innovation is a key element of this thesis. The goal of supplier involvement in the development process is often to reduce the cost and time to bring new products/services to the market (Wynstra et al., 2001).

Supplier involvement can have both positive and negative effects on manufacturer performance. According to Wynstra et al. (2001), the negative outcomes can be divided into three main issues: 1) the supplier lacks capabilities, 2) the manufacturer fails to lead the supplier in the correct direction, and 3) relationship issues. Further, Wynstra et al. (2001) argue that these problems can be solved though proactive activities by the manufacturer (customer). They argue that it is important for manufacturers to integrate suppliers into product development and to have a clear plan for the development process. Manufacturers must develop a shared understanding with their suppliers on how product development is carried out (Wynstra et al., 2001).

Innovation itself will not lead to increased profits for both parties in a relationship, but it can lead to increased profits and improved business performance if market demand increases due to innovation (Kim, 2000). An involved buyer-supplier relationship can contribute more to a transfer of knowledge that can be valuable for both parties than can a more distant relationship (Hartley et al., 1997).

Hartley et al. (1997) argue that manufacturers experience fewer delays in product development when they have highly skilled supplier. Further, they report that suppliers' actions affect the duration of buyers' development projects. Buyer-supplier relationships can improve the financial performance of the parties involved if relationships with vital suppliers are strategically managed (Carr and Pearson, 1999). Further, Carr and Pearson (1999) note that suppliers can hold knowledge that can decrease costs for manufacturers, such as alternative lower-cost materials, and this knowledge can be beneficial for both manufacturer and supplier performance (Carr and Pearson, 1999).

Buyers can also contribute to improved performance through the buyer-supplier relationship by developing suppliers through investments in different assets and infrastructure (Humphreys et al., 2004). A supplier-customer relationship in which the participants are well-suited to each other has a positive effect on the success of innovation projects performed within the relationship (Wagner, 2010).

## 2.4 Problem definition

The theoretical background presented here represents the framework for the problem definition and research questions. This thesis aims to answer the following main research question:

*What is the nature of buyer-supplier relationships in the wood industry and how do these relationships affect product and process innovation?*

The problem definition and research questions are based on the theoretical background discussed above and represent the foundation for the questions posed to interview subjects. Table 2 provides the research questions and links them to selected parts of the theory above. This table was developed to establish the connection between the theory presented here and the questions included in the interview guide.

| Table of research questions and theory |
|---|
| **Wood industry as the context** |
| **What characterizes the wood industry and innovation in this context?** |
| A low-technology industry (OECD Directorate for Science, 2011), the industry is under-going changes as result of competition from other industries, market changes and new regulations (Husso and Nybakk, 2010),product and process innovation varies with the industry life cycle (Hansen, 2006), innovation in the industry includes new processes, new business systems and new products (Crespell et al., 2006, Hansen et al., 2007, Nybakk, 2012, Weiss, 2011a), and customized products (Juslin and Hansen, 2011). Consumers are slow in adopting new and innovative wood-based products (United-Nations, 2012). |
| **Innovation** |
| **How do you structure/organize buyer-supplier relationships to foster product and process innovation in the wood industry?** |
| The organization of relationships (Prashant and Harbir, 2009), collaborative relationships (Spekman and Carraway, 2006), formal relationships reduce the chances of opportunism (Wuyts and Geyskens, 2005), inter-organizational relationships affect innovation (Dutta, 2012). Buyers' satisfaction and coordination with suppliers increases when relationships are formalized and ownership integration increases(Mohr et al., 1996). |
| **Buyer-supplier relationships** |
| **What aspects affect buyer-supplier relationships?** |
| Information sharing (Tuten and Urban, 2001) trust (Tuten and Urban, 2001, Spekman and Carraway, 2006) decision-making uncertainty (Gao et al., 2005) customer loyalty (Scheer et al., 2010) perception of power and method of communication (Meehan and Wright, 2012). |
| **Performance of the buyer-supplier relationship** |
| **How do buyer-relationships affect the performance of the innovation?** |
| Participants are well-suited to each other has a positive effect on the success of innovation projects(Wagner, 2010), supplier involvement in the development process reduces the cost and time required to bring new products/services to market (Wynstra et al., 2001), manufacturers experience fewer delays in product development when they have highly skilled supplier (Hartley et al., 1997), buyer-supplier relationships can be managed to achieve competitive market advantage and increasing the economic performance (Jap, 1999). |

**Table 2 Research questions and theory.**

# 3.0 Methodology

This section describes the following aspects of this study: 1) research design, 2) sample, 3) data collection, 4) analysis and encoding of collected data, 5) validity 6) reliability, and 7) ethical considerations of the methods used in this thesis.

## 3.1 Research Design

The research question posed in this thesis is answered using a combination of theory and qualitative case studies. The qualitative case studies consist of one case from the USA and two cases from Europe. Yin (1994) makes the following statement about what can be achieved using case studies: "In other words, you would use the case study method because you deliberately wanted to cover contextual conditions – believing that they might be highly pertinent to your phenomenon of study" (Yin, 1994 p 13). As captured in this statement, case studies can identify not only the phenomenon but also the context in which it appears. As this study attempts to identify how relationships between buyers and suppliers in the wood industry affect their ability to innovate, case studies were chosen as the research design. The case study was performed with *exemplary case design* (Yin, 1993). This method is based on the use of positive examples to enlighten the phenomenon under investigation, with cases selected by a screening process (Yin, 1993). Triangulation is required to confirm the findings using different approaches and data sources (Miles and Huberman, 1994). In this study, triangulation was performed through data collection from both primary and secondary sources.

## 3.2 Sample

Askheim and Grenness (2008) argue that when data are collected through interviews, it is important that respondents have in-depth knowledge in the research field. Sample selection was performed based on the following criteria. The sample is restricted to cases from Europe and the USA. The selected suppliers are large chemical companies specializing in wood and fire protection treatment. Another criterion is that the companies be informative and that they are significant participants in the wood protection industry. Four industry experts helped to select the companies that participated in this study. They identified two chemical suppliers in Europe and two in the USA. Unfortunately, one of the companies in the USA was not able to participate in the study. Respondents from the customer side of the relationship were chosen based on a snowball sampling method (Goodman, 1961). Interviews were performed with employees with different responsibilities. Respondents in the supplier companies had the following positions: R&D manager, marketing manager, and field sales/technical

representative. These individuals were chosen based on their in-depth knowledge of the buyer-supplier relationship and their knowledge of innovation. As the supplier perspective is the main focus of this thesis, three respondents were chosen from each supplier company and at least one respondent from each customer. The three customers were represented by their CEOs. Two of the companies chose to include additional representatives with in-depth knowledge about the chemicals and treatment process. To summarize, the sample frame consisted of case studies including three supplier companies and three customer companies. Interviews were conducted with 14 respondents divided among these six companies from Scandinavia, Central Europe, and the USA.

## 3.3 Data collection

First, secondary data were collected about the industry and the companies under study. The secondary data were collected from the company's website and other websites related to the industry. Before the interviews were performed, the respondents received a brief description of the study and its purpose via email. Data collection was performed through interviews. These interviews were performed with a semi-structured interview guide. All data were anonymized, and participation in the study was voluntary (Askheim and Grenness, 2008). The interviews lasted from 40 to 100 minutes. Notes were taken during the interviews, and interviews were recorded when the respondents gave permission.

On the supplier side, all nine interviews were conducted face-to-face. Two of the customer companies were interviewed face-to-face. Interviews with one of the customer companies were performed by phone because of the time limitations of the study. All interviews were transcribed after they were conducted. One interview was performed in a Scandinavian language. The data consisted of approximately 144 pages after interview transcriptions and the inclusion of additional data. After the interviews were transcribed, they were sent back to the respondents to give them the opportunity to change or add important aspects of their answers. The interview that was performed in the Scandinavian language was first transcribed in that language. Then, it was sent to the respondent, who was able to add or change anything according to the same procedure as the other transcripts. The interview was then translated into English using Google Translate, and grammar and other mistakes were corrected. This procedure was followed to ensure that the interview content was expressed as closely as possible to the respondent's answers in the interview. Approximately one third of the respondents revised their interviews, whereas the remaining respondents did not make any changes.

## 3.4 Analysis

The collected data were analyzed to identify key elements of the collected data. Data were extracted from the interview through careful reading of the transcripts. When important elements were identified, they were systematically categorized and encoded with a number according to the method of Miles and Huberman (1994). The key patterns were encoded first, followed by additional subjects. The results of this analysis will represent perspectives from both the buyer and supplier sides of the relationship. The main focus of this study was on the supplier side, but the views of buyers are also included to explore how buyer-supplier relationships affect innovation. Table 3 illustrates how the data were encoded and analyzed.

| | |
|---|---|
| **Wood industry as a context** | |
| 5.1 Innovation in the wood industry in general | 5.1.1 Fire protection segment<br>5.1.2 Main customers of the chemical suppliers<br>5.1.3 Impact of the financial crisis on the wood industry |
| **Innovation** | |
| 5.2 Innovation in the case companies | 5.2.1 Innovation culture within the companies in the industry<br>5.2.2 Product and process innovation<br>5.2.3 R&D or market-driven innovation<br>5.2.4 Suppliers' perspective on innovation in the industry<br>5.2.5 Buyers' perspective on innovation performed by suppliers |
| **Buyer-supplier relationship** | |
| 5.3 Buyer-supplier relationship | 5.3.0 Types and structure of buyer-supplier relationships<br>5.3.1 Transactional relationship versus formalized relationships |
| 5.4 Key aspects that affect the buyer-supplier relationships | 4.3.1 Formal or informal relationships<br>4.3.2 Strong or weak ties<br>4.3.3 Trust<br>4.3.4 Power |
| **Performance of the buyer-supplier relationship** | |
| 5.5 Performance of the buyer-supplier relationships | 5.5.1 Benefits of buyer-supplier relationships for the supplier<br>5.5.2 Benefits of buyer-supplier relationships for the customer<br>5.6.1 Impacts of collaborative buyer-supplier relationships on innovation |

**Table 3: Analysis and encoding of data.**

## 3.5 Validity

Askheim and Grenness (2008) argue that validity refers to whether research answers the intended question. Validity also refers to whether the work that has been performed can be trusted. Further, they note the importance of operationalized terms and concepts to reduce the likelihood of making validity errors in a research study (Askheim and Grenness, 2008).

According to Askheim and Grenness (2008), operationalization entails defining terms and concepts based on theory to demonstrate how you understand these terms/concepts, making it possible to measure the terms and concepts. Further, they argue that validity also refers to how well terms and concepts are operationalized (Askheim and Grenness, 2008).

Many of the terms and concepts in this study were defined in the literature review to increase the validity of the thesis. The validity of this study is also reinforced by the breadth of the literature review on the topic of innovation and inter-firm relationships. Extensive literature on the wood industry has also been reviewed to obtain in-depth knowledge on the research topic. Further, the questions posed during the interviews were developed based on existing literature and knowledge on these topics to ensure the validity of this Master's thesis.

After the interviews were transcribed, all of the respondents were able to review the transcripts. They also had the opportunity to add or change anything in the interview within one week. This step was another measure performed to increase the validity of the thesis.

## 3.6 Reliability

Askheim and Grenness (2008) state that reliability refers to how external conditions affect the results of a research study. Further, they debate the importance of performing several independent studies on the same research subject to determine whether an individual study was affected by external factors. They state that this practice secures the reliability and inter-subjectivity of the study (Askheim and Grenness, 2008).

Askheim and Grenness (2008) state that reliability also refers to whether other researchers would obtain similar results if they performed a similar study based on the same terms. The data collection methods are described in this thesis and the interview questions used during the data collection process are provided in the attachments to make the thesis as reliable as possible and to enable other researchers to duplicate this study.

## 3.7 Ethical considerations

All data collected and recorded will be stored at the Norwegian Forest and Landscape Institute, which holds a general license to conduct research and store data. As this study did not collect data containing sensitive information, all respondents are anonymized, and all data are stored at the Norwegian Forest and Landscape Institute, this thesis is exempt from the requirement to notify Norwegian Social Science Data Services (NSD).

## 5.0 Results

The results consist of four main parts: 1) the context of the wood industry, 2) innovation in the case companies, 3) the buyer-supplier relationship, and 4) the performance of the relationship.

## 5.1 Innovation in the wood industry in general

The wood industry has been a conservative industry, with few changes occurring in the last century. This study finds that new national, regional, and global regulations have forced the industry to change over the last decade. These regulations required the respondents to increase their level of innovation in the wood industry. This study finds that changes in the wood industry have resulted from external pressure rather than from the initiative of firms within the wood industry.

> "The industry itself is quite conservative, but we often have to adjust to regulatory changes and conditions" [R&D Manager – Supplier 1A - Europe].

> "If you take the traditional impregnation which I referred to as copper impregnation, that is volume product, it has been reasonably conservative. That's not to deny that the changes that have occurred from CCA [Chromated copper arsenate] to copper have likely been influenced by other external things outside the industry" [CEO - Customer 1B - Europe].

The respondents discuss architectural innovation, including improved chemicals that add new colors to the products. Managers also spoke about new chemicals without metal with the same effects as the current chemical treatments and referred to this new approach as a possible "game changer". In general, suppliers appear to stick to the same initial idea for chemicals in wood protection, with innovation introduced to change the design of the original concept. Thus, suppliers are performing architectural innovation. Wood industry companies carry out incremental innovation, changing wood profiles or the sawing or treatment process. This study finds that most of the innovations in the cases examined here are incremental or architectural innovations. According to the participants in this study, two radical innovations were accepted in the market over the last decade: modified wood and plastic wood composites. It is important to realize that these innovative products are no longer natural lumber. As both chemical suppliers and wood industry customers are increasingly focused on

innovation and product development, the future may bring new modular and radical innovation to the market.

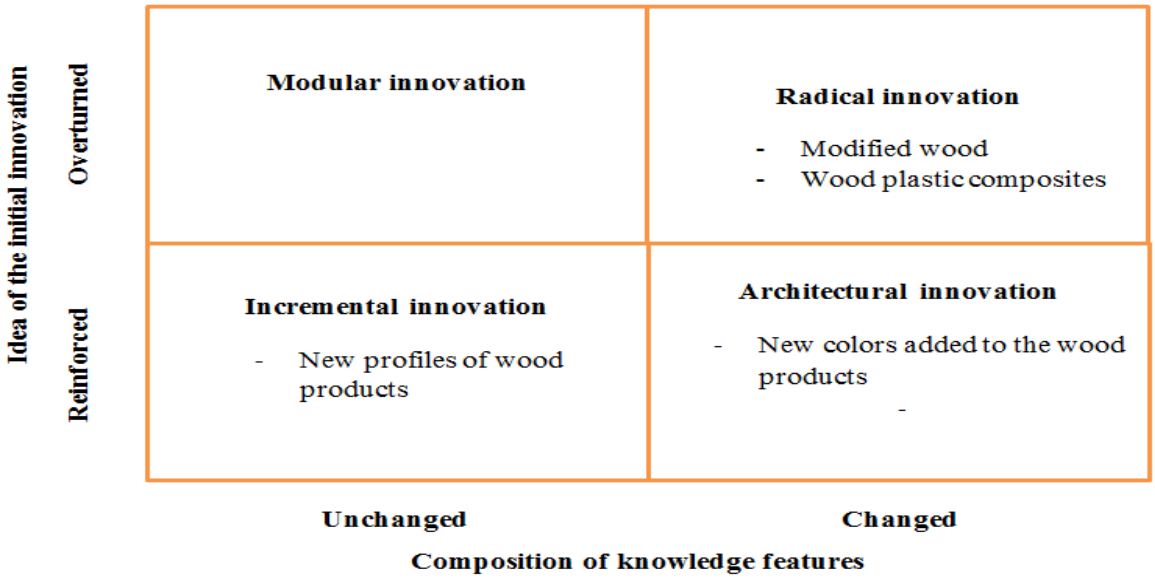


Figure 3: Adopted from Henderson and Clark (1990).

One of the obstacles for this industry is to convince the end user that a product is innovative. End users often buy wood substitutes, for example wood plastic composites as replacements for natural lumber. One of the managers of the American supplier stated that the industry has changed toward a more innovative industry over the last decade and that this shift has shortened the product lifecycle in the wood industry.

> "You have the 60 years with the same preservative utilities and over the past 10 years we have had 6 step changes. So that life cycle of products has exponentially shortened. So we are getting to a more market driven standpoint" [Marketing manager – Supplier 3A – USA].

New environmental regulations in Europe are forcing the wood industry to innovate. American managers noted that European regulations were driving the introduction of new chemicals for impregnation and fire protection into the American market. This industry features intense competition because of cost pressure but also because of competition from substitute products, such as wood plastic composites, steel, and aluminum. An issue for innovation for chemical suppliers in the USA was that the end user did not have knowledge of the products or what was innovative.

> "That is the biggest hindrance on innovation. It is not what we are actually doing in the laboratories and as an industry. Internally, I think we are really innovative, but to get the consumers of the products to understand that what we are doing is innovative, that is another whole aspect in itself" [Marketing manager – Supplier 3A – USA].

### 5.1.1 Fire protection segment

The fire protection segment of the wood industry encompasses two main technologies: impregnation of chemicals into the wood and a coating that is either sprayed or painted on the wood. Although the fire protection segment is a small percentage of the market in both Europe and the USA, the majority of respondents discussed a bright future for the fire protection segment. Managers are optimistic regarding the fire protection segment because of the trend toward building more new governmental and industrial buildings using wood due to environmental regulations.

> "[Fire protection] is a very important segment. We are already in this business, and we are expecting future growth" [Sales Manager – Supplier 2 A- Europe].

> "I don't know what the percentage is, but for us, it is now a very small percentage of our business" [R&D manager – Supplier 3A – USA] .

> "From my point of view, [fire protection impregnated into wood] is a growing market throughout Europe… The business in France is growing. In Germany, it is a potential market. I think the business is going up. The USA still has a large market regarding fire retardant for interior and exterior fire retardants" [R&D Manager – Supplier 2A – Europe].

> "There has certainly been a slight growth [in fire protection impregnated into wood], but I think that it is still a very small market" [CEO – Customer 1B – Europe].

One of the managers in Europe expressed that legislation on the fire protection segment was still unclear from some governments, and this unclear legislation is one element of uncertainty in how the market will progress in the future.

> "[The fire protection segment] is definitely something that is important and growing. From my point of view, the problem is that legislation is indecisive here, so you still have national regulations on this and the market; the national markets are typically

very small at this stage, and some markets have the feel of authority and don't know what to do with it" [Sales Manager – Supplier 1A – Europe].

Fire protection impregnation provides wood products with similar fire-resistant properties as concrete, aluminum, and steel. Wood products with fire protection can achieve a competitive advantage because they are environmentally friendly, which will likely make those wood products more commonly used in commercial and private buildings in the future. The American managers on both the supplier and customer sides stated that although several different fire protection technologies are available on the market, at this point, the customers are using the lower-cost chemicals because it still meets the requirements. This thesis finds that better-quality fire protection exists but remains too expensive at this time. These findings suggest that this market will experience significant growth if fire protection regulations are specified for wooden buildings.

"Fire protection is an exotic product" [Marketing manager – Supplier 2 A- Europe].

### 5.1.2 Who are the main customers for the suppliers?

The main customer base for suppliers in both Europe and the USA consists of sawmills, wood treatment companies, and other participants in the wood processing industry. Managers in Europe discussed the following two segments: customers treating their products with vacuum pressure or dipping treatments. The American managers on both the supplier and customer sides discussed residential and industrial customers. Although they characterize their customers using different terms, the suppliers have the same main customers across the continents studied here.

"The main customers are treaters, who treat the wood, with one side being those that use the vacuum pressure treatment and the other side being those that perform the dipping treatment" [R&D Manager – Supplier 2 A- Europe].

"Our main customers are the preservative treaters; we also supply lumber mills and white producers with our antisapstain products" [R&D manager – Supplier 3A – USA].

"Our customers are 100% sawmills and treaters. The wood industry company is clearly very important for us" [Marketing manager – Supplier 1A – Europe].

This information about chemicals suppliers' customer base demonstrates their dependence on wood industry customers. All supplier companies in our study noted that their wood product chemicals are intended solely for the wood industry. As the chemical suppliers depend on their customers, buyer-supplier relationships are crucial for this industry. At the moment, suppliers are offering products with little differentiation, increasing the importance of relationships. Thus, it is important to study how these relationships impact innovation and to consider suppliers' options for differentiation.

### 5.1.3 The impact of the financial crisis on the wood industry

The wood industry has experienced hard times before and after the financial crisis. The 2008 financial crisis led to increased competition because of the decrease in demand. The fall in demand varied among countries and regions. In Europe, the fall in demand was higher in southern Europe than in northern Europe.

> "In general, the construction industry got hit by the crises, so you will definitely see that in our figures as well. If we just look at existing customers, of course, if you add customers to counteract, then hopefully, you will still have growth, but we could definitely see that there is a decline in the demand of existing customers" [Sales Manager – Supplier 1A – Europe].

In the USA, the recession led to the consolidation of the wood industry. The wood industry also became more cost sensitive because of the economic collapse. Both supplier and buyer companies in the industry became even further driven by cost. Reduction in cost is one of the goals of process and production innovation in the wood industry. The financial crisis augmented the financial trouble, particularly for wood industry treaters, which have not kept up with new environmental regulations. Respondents from customer 3B in the USA noted that during the financial crisis, owners of other treatment facilities came to them almost every week trying to either sell or give away their plants because of economic issues related to environmental regulations and decreased demand.

> "However, I think what the recession did for us was that strategically, we have begun to look at the market that is going to consolidate even more rapidly than we expected" [CEO – Customer 3B – USA].

Respondents argued that the wood industry market is slowly recovering from the recession. Further, managers on the supplier side in the USA did not believe that the market would reach the same level as before the financial crisis.

> "You start to see some recovery in 2011; 2012 was pretty good in retrospect, and 2013 is fairly similar to 2012" [Sales manager – Supplier 3A – USA].

## 5.2 Innovation in the case companies

### 5.2.1 Innovation culture within the companies in the industry

Interviews also touched on the innovation culture within the companies under study. In one of the supplier companies, respondents stated that their company was based on innovative wood preservative chemicals. Other case companies did discuss an innovation climate, including how their innovation-related behaviors and activities were performed. All managers on the supplier side claimed that they focused on innovation culture and their ability to innovate.

> "Company 1A is based on innovation. The founder of the company was an inventor of wood protection products. You can say that innovation is in the DNA of the company" [Marketing manager – Supplier 1A – Europe].

> "We are very innovation focused. Within the wood group itself, we are likely more focused on product development than true innovation."[R&D manager – Supplier 3A – USA].

Managers from both sides of the relationships discussed several different reasons why their companies focus on innovation or new product/process development. The companies presented the following reasons for their innovation: growth opportunity, regulatory, cost reduction, new technology, customer demands, and differentiation from the competition.

> "We innovate mostly because customers are asking for it, but there are two reasons for innovation:
>
> - One is in the products to customers. We try to find new trends and bring new products to the market to have an advantage over our competitors.
> - The second one is to have new technology in our production to minimize cost or improve the quality of the product. Just now, this week, we are changing our

process for coating our products. We are using a new plane or sanding technique" [CEO – Customer 2B – Europe].

"I would say that there are maybe four different triggers for innovation:

1) Economics, which is always important, which can mean that we try to reduce the cost of our wood preservative or make it more effective, thereby reducing the retention, making it more economic.
2) Improving technical properties, such as penetration, durability of a color, appearance, or weathering stability. There are also process innovations (e.g., to improve impregnability), but mostly, there is the adjustment of a product to the existing process.
3) Adjusting to regulatory requirements or even future requirements. We always try, especially in this aspect, to be the first ones, and therefore, we do have close contact with the authorities to see what new legislation comes up or might be next.
4) Then, we actually have new technology. This type of innovation is more technologically driven first, but later, it will also be market and regulatory driven" [R&D Manager – Supplier 1A – Europe].

Although the suppliers state that they have a major focus on innovation and a strong innovation culture, the findings from this study demonstrate they are more focused on R&D invention. The suppliers' weakness is the commercial introduction of new products that the market is looking for and the ability to convince the end user of their ability to innovate. The findings also demonstrate that suppliers are trying to improve commercial introduction processes by performing market surveys, establishing relationships with customers on collaborative innovation projects, and entering into a dialog with end users through social media; however, there is still a long way to go.

"The biggest thing [hurdle for innovation] is likely cost. There is a certain window that you can typically hit, and you know what our costs are now, so if you are bringing something new to the market, ideally it would be as cost neutral to our customer as possible. Sometimes what is happening is that a customer wants something but is not willing to pay for it. We can provide it, but it is going to cost 30% more than they are at now. Although they think it is a great idea, they don't think that their customers want to take it, then don't want to pay for it" [Sales manager – Supplier 3A – USA].

One of the hurdles to innovation in the wood industry is cost. As the industry has experienced few significant changes over the last century, cost reduction has been a major focus. The increase in competition since the financial crisis has increased the focus on cost even further. Suppliers are struggling to sell new and innovative products at a premium price because of the cost pressures in the wood industry.

### 5.2.2 Product and process innovation/development

Wood industry customers depend on their chemical suppliers to make new and innovative products. Wood industry customers perform innovation themselves through improved internal and external processes. Internally, customers innovate through the production process. In Europe, a customer had participated in a joint development project with a supplier focused on aesthetic aspects in which new colors were developed for wood impregnation.

> "I hope the treaters don't mind, but the technology is rather simple. I mean that the principle stayed the same for decades. Of course, nowadays, the plants have electronic control systems and elaborate ways to measure solution uptakes. However, the principle of the process has been the same for 100 years now, and therefore, we have some process innovations, but most of it is that we adjust the product to the existing process. Then, when we do something completely new; it is also an important requirement for us because we are not an engineering company, so we are interested in using what is available. It can be something that is new to us or new to the industry, but it should not be new altogether" [R&D Manager – Supplier 1A – Europe].

According to the managers of the American supplier, approximately 15-25% of wood industry customers are looking for new and innovative products and processes. The remaining companies are not looking for innovative products on their own but rather are waiting for suppliers to bring them new and innovative products.

> "I would say that when you are talking about a customer innovation standpoint, you have 85% of them; they are just waiting on us to bring them something. Then, you have 15 % of them, there is good communication, and they are trying to think ahead of the game" [Marketing manager – Supplier 3A – USA] .

The American customer noted that they were also working on innovation through external processes. They were constructing a new business system with other parts of the value chain to develop a new innovative process that could contribute to the business performance. This

initiative demonstrates that some of the participants in the wood industry are pursuing innovative strategies without relying on suppliers.

In both Europe and the USA, suppliers often depend on their customers to test new products in their facilities because chemicals can react differently in a commercial plant than in a small-scale research lab. Although the buyers are often not developing the new chemicals, they are aiding the suppliers in the innovation processes and in making the new products ready for the market by performing full-scale testing at their own facilities. These findings demonstrate that the suppliers depend on their customers to introduce new products to the market.

> "If Supplier 3A comes out with a new chemical, we want them to knock on our door and say we just came up with this, the latest and greatest juice, to keep something in wood if it is fire retardant or a preservative, or whatever it is. We want you guys to try it for us. [The chemical suppliers] have done in-house testing in their little R&D laboratory, but making something in a six-inch-diameter tube and it looks good, then a six-foot-diameter tube, getting through the pumps, line, and work tag is a total different ballgame" [COO – Customer 3B- USA].

> "…and we need the opportunity to do some tests on the customer side. We have some special tests in the laboratory. We have some tests in the pilot plant, but we also need the experience onsite. At the treaters, if the stability of the color is okay regarding weathering and the treating solution…" [R&D Manager – Supplier 2A – Europe].

> "When you have a strong tie to a customer and where it is a nice open relationship, a lot of the times, those are the customers… we may have something that we think may work, you want to try it? There is nothing like doing it in a real commercial facility, and you see things that you wouldn't and cannot see at a small scale" [Marketing manager – Supplier 3A – USA].

### 5.2.3 R&D or market-driven innovation

The suppliers in the wood industry have previously innovated based on R&D. They have developed new products and have gone to the market with a strategy to push those products. Sales and marketing managers have argued that the industry has changed from an R&D focus to a focus on market-driven innovation. However, the R&D managers in Europe spoke of innovation focused on R&D, even if they gather information from many external sources.

> "It is just a research focus. When we have the opinion that this can be a new product or something new for the markets, we will work on this. Sometimes, we do include some market data, but mainly, are we working without those data" [R&D Manager – Supplier 2A – Europe].

> "I think it is both [R&D and market-driven innovation]. I couldn't say that it is completely driven by customers, that would not be true, but it is not also the other way around that all comes from R&D. We listen to the customers, e.g., via market research. A European market study across the value chain, where we asked saw mills, treaters, retail, and end consumers about the buying criteria for treated timber or substitutes. That was one way to listen to drive innovation. On the other side, we received a lot of input from R&D, i.e., what techniques are there that we can adopt, but there must be a story and a business case, so it is both" [Marketing manager – Supplier 1A – Europe].

> "I would probably say that it is market driven" [CEO - Customer 1B - Europe].

The American market has likely developed faster toward market-driven innovation, as companies in this market report using social media to talk to end users to collect information about the customer's needs; however, there is still a long way to go for the industry to become fully market driven.

> "If you look at how our market has changed historically, if we were still doing CCA [Chromated copper arsenate] for everything, then my answer would be completely different because that preservative has been around for 70 years, nothing has really changed, one was happy with the way it was. However, as soon as the regulatory drivers, once that preservative system started to be restricted, it forced companies to become more market driven" [Marketing manager – Supplier 3A – USA].

> "I don't know about the industry as a whole, I can just speak to our company. I think we try to be market driven. I don't know how successful we are at that" [R&D manager – Supplier 3A- USA].

### 5.2.4 Supplier perspective on innovation in the industry

Managers representing the supplier companies noted that their chemicals are important for the buyer's opportunity to innovate. These managers also said that the customer could perform innovation without their products through process innovation or by using new materials, through new manufacturing innovation, or through business system innovation.

> "It is our goal to offer our customer innovative products that give them the chance to launch innovative products themselves. Our focus is always quality driven. Through the fact that all of our products are developed with a high-quality focus, we support the reputation of the wood impregnation industry" [Sales Manager – Supplier 2A – Europe].
>
> "The chemicals can play a huge role in the possibility to differentiate, but, of course, it is not the only one" [Marketing manager – Supplier 1A – Europe].
>
> "I think our products are important, they can only go into special markets, for example playground areas, if they have well-impregnated wood, or without our products or the competitors' [products], they have no entry into this market" [Marketing manager – Supplier 2A – Europe].

Suppliers in both Europe and the USA are using stage-gate processes to select what new innovation projects they pursue. These interviews revealed the following reasons for innovation: regulatory, cost reduction, new technology, customer demands, and differentiation from the competition.

> "Typically, the way we operate, you have a pool of ideas, and then the management team would meet at some frequency to evaluate that pool of ideas and that includes some financial support for your idea. From there, we decide, in collaboration with all of the departments, which of the opportunities are best for the business and what is going to have the most return" [R&D manager – Supplier 3A – USA].
>
> "Supplier 1A uses a face gate-stage gate process. Stage gate is in the official name in the literature; we called the process face gate. It is a structured process, where you have some gates were you meet, talk about the projects and progress, and decide whether you are going to continue or stop it. It is about focus. We have a lot of ideas, but there must always be a business case behind it" [Marketing manager – Supplier 1A – Europe].

The interview also asked suppliers how they use and handle market information collected through collaborative relationships with their customers. Internal communication of important innovation ideas or expressed needs in both the USA and Europe is conducted by standard reporting. The reporting system consists of both written documents and personal meetings with management or other people who are important for the innovation process. Suppliers in

Europe are trying to improve their communication by implementing a customer relationship management (CRM) system, which makes it easier to share market information across departments and personnel. The fact that the European supplier is considering implementing a CRM system illustrates that suppliers are trying to organize and structure the market intelligence that they receive. This initiative can be an important step toward more market-driven innovation.

> "Our head of R&D joins the sales meeting. Moreover, we distribute information via email, phone, and our CRM system, which helps a lot to keep the projects on track. We have just implemented our CRM system. For that reason, just the sales staff has access to it" [Sales Manager – Supplier 2 A- Europe].

> "It could be a series of different things. We have sales meetings, where upper level management would be involved. Typically, each sales rep gives a brief spiel on their territory. We have reports every time you go to a customer site. Meeting reports or call reports that go out to the upper-level management. We have monthly R&D meetings, and we also have quarterly project meetings, and there is also the normal conversation of emails" [Sales manager – Supplier 3A – USA].

### 5.2.5 Buyers' perspectives on suppliers' innovation

Customers have a high degree of trust in their suppliers' technical and chemical ability to innovate. One of the customers in Europe was critical of the innovation process because they do not always have in-depth market intelligence on the market. Customers in Europe also noted that supplier innovation was driven more by what the supplier was able to do rather than by what the market was asking for.

> "It is a very good relationship. They're part of that (name of company and location) is professional in the highest degree. In a way, they are innovative in terms of chemical solutions that somehow fit the individual markets around Europe, for [they do not have] the same requirements" [CEO – Customer 1B – Europe].

> "It is not always what they think innovation is something that is suitable for the market. Sometimes [the chemical suppliers] come up with innovations and new products from what they are able to produce, not what the market is asking for, so it is always a discussion, it is not seldom that we tell them that is a good idea, but [the chemical suppliers] would not be able to sell this" [CEO – Customer 2B – Europe].

Respondents from the customer side in the USA believe that supplier innovation is heavily influence by new regulations on the chemical industry in Europe.

> "[The suppliers] are sitting there and looking what is going to happen over in Europe and in UK; as the rules are getting tougher and tougher, they know at some point it's going to trickle across the pond to the US." [COO – Customer 3B – USA]

## 5.3 Buyer-supplier relationships

This section discusses results on the following main topics related to buyer-supplier relationships: 1) the types and structure of the buyer-supplier relationships, 2) key aspects that affect the relationship, and 3) the performance of the relationship.

### 5.3.1 Types and structure of buyer-supplier relationships

Wood industry buyer-chemical supplier relationships are generally long term with a low degree of formalization. Customers do not shift suppliers often because of high transaction costs. Some of the costs related to supplier changes are changes in the production setup, cleaning out entire facilities, and discarding chemicals from the old supplier. Thus, close and long-term relationships are important for both sides, as they allow the party to know what the opposite partner needs and what it is able to do. The results of this study demonstrate that both parties are trying to create long-term relationships, with some buyer-supplier relationships lasting for over 50 years.

> "[Company policy] is to develop long-term relationships and partnerships with not only our customers but also suppliers. We are not always looking for the cheapest, and if someone is offering us something with a small advantage, we will not change. We have mostly very long-term relationships or partnerships with our suppliers. We have intimate personal discussions, so I think the supplier also knows what we need because he knows us very well. It is also necessary to understand what the possibilities of the suppliers are" [CEO – Customer 2 B- Europe].

> "I think, at least within North America, that the relationship between a supplier and customer is key" [R&D manager – Supplier 3A- USA].

Suppliers identify who they want to undertake collaborative innovation projects with through segmentation of wood industry companies. Customers who are "guinea pigs" are often leaders in the wood industry and have an innovation focus themselves.

> "The downside is that we probably taught them how to fix all of these problems. The guinea pig also helps these other guys, but I think anytime you can be ahead of the curve, I think anytime that you can get intel that gives you some arbitrage opportunity, that, to me, is a value proposition of a strong good relationship" [CEO – Customer 3B- USA].

> "Needs-based segmentation helps us pick out those customers with whom we want to work together in developing new products" [Marketing manager – Supplier 1 A- Europe].

### 5.3.2 How are relationships organized: transactional or with formalized contracts?

In both the USA and Europe, relationships in the wood industry are commonly sealed with handshake agreements. Buyer-supplier relationships that have lasted for over 20 years are still based on handshake agreements. Formal contracts do exist within the industry, but they are often short term. European respondents noted that relationships are more commonly based on trust rather than on a formalized contract.

> "I would say that all [contracts] end up being handshakes, but we do have some formalized documents. I would advocate that what we have with Supplier 3A is more for Supplier 3A to go back to their corporate to show that they have a formalized document. If I went to Supplier 3A and said I am dropping you, Supplier 3A is not going to sue me" [CEO – Customer 3B- USA].

> "No, we have a contract. The operator of the impregnation plant here, he makes booking races for what he needs fluid, how much he has in the tank" [CEO - Customer 1B - Europe].

> "It is both – there are a few contracts, but very often, it is a transactional relationship" [Marketing manager – Supplier 1 A- Europe].

The results of this study demonstrate that even joint developments are often based on handshake agreements and are not protected by any form of written agreement. Customers are

very loyal to their suppliers as long as the supplier delivers the products of expected quality at a reasonable price from the customer's perspective.

## 5.4. Key aspects that impact the buyer-supplier relationships

The interviews discussed the following key aspects of these relationships: 1) formal or informal buyer-supplier relationships, 2) strong or weak ties to the partner, 3) trust, and 4) power within the relationship.

### 5.4.1 Formal or informal buyer-supplier relationships

Several of the respondents noted that the industry was informal in its communication and in how business was performed. Managers' mode of communication varied according to the culture of their country, but overall, the wood impregnation industry was characterized as informal. The interviews demonstrate that the buyer-supplier relationships are more complex than they first appear. The degree of formalization can increase as the size of the customer company increases. Further, the relationship between the sales representative of the chemicals supplier and the contact person in the customer firm is often informal. These relationships tend to be informal because these individuals tend to have numerous personal meetings with frequent communication, often several times per month by telephone. However, these relationships can become more formal when other levels or representatives from both parties are involved, in part due to the lower frequency of contact.

> "[The level of formality] depends on the company. As a rule of thumb, you could say that the bigger a company gets, are they a multinational company kind of type, you tend to have a more formal relationship. The smaller the company is, that relationship is more important and then it becomes informal" [Sales Manager – Company 1 A-Europe].

> "It is different from country to country, but I would say that the industry by itself is rather informal" [Sales Manager – Supplier 2 A- Europe].

The findings demonstrate that relationships become more informal when they last longer, and many of these relationships lead to close friendships. The American customer said that they hold a social event every year to thank their suppliers. This social event was also a good way for them to get to know their suppliers better and was part of their approach to building informal and long-term relationships.

"It is informal. We also talk about private things. [The relationship] is really personal; to say it is a friendship is too much. It is a partnership" [CEO – Customer 2 B- Europe].

"From my perspective, it is more informal. They make regular calls, and there are often social situations. They sponsor social outings and different industry organizations to meet with customers. I think it is more informal, at least from my perspective" [R&D manager – Supplier 3A- USA].

### 5.4.2 Strong or weak ties

The strength of the ties between companies varies from relationship to relationship, as in all types of relationships. Both suppliers and customers focus on creating strong and long-term relationships with their partners. Frequent contact with partners at both the professional and social levels characterized the relationship examined in the USA. Those strong ties and open communication were noted as important for business performance.

"Definitely a strong tie. We consider ourselves as a market leader, and usually, in that position, you are trying to be premium. That is also definitely the basis of our daily work, so we try to offer a full package, including service, so we have a very close tie to our customers" [Sales Manager – Supplier 1 A- Europe].

"There are strong ties, of course" [CEO – Customer 2 B- Europe].

"We have a very strong tie. That is one of those customers that have been buying from us for over 50 years" [Marketing manager – Supplier 3A- USA].

The findings demonstrate that open communication makes it easier to solve problems within these relationships. Respondents discussed the disadvantages of strong ties, including the possibility that it could become difficult to be tough in business negotiations when a strong tie exists in the buyer-supplier relationship. The strength of ties differs from level to level within the organization, with stronger personal ties observed between people that have frequent contact. Suppliers have weak relationships with some customers that buy solely based on price, and this type of relationship is more common further down the supply chain.

"I think it is absolutely essential for us that we have a very strong tie. Of course, we don't do that with all of the customers. We don't treat them all equally, but we segment. Especially for us in R&D, it is important that we are not dealing with the

price buyers let's say, but we are in contact and understand what the needs of the innovation buyers are" [R&D Manager – Supplier 1 A- Europe].

"I would not say that it is either strong or weak, I would say that it is at the level it should be. We each have our commercial side to take care of, but I feel that it is an open and professional relationship" [CEO - Customer 1B - Europe].

"I would say extremely strong in our pressure treated industry. Most of the customers you have been with you for quite some time and there it is a lot of loyalty relationships and branding that are associated with that. As I mentioned, it is a pretty big deal for someone to switch over" [Sales manager – Supplier 3A- USA].

### 5.4.3 Trust

Both suppliers and customers focus on building trust through long-term relationships. Participants argued extensively that trust was fundamental for collaborative relationships. Managers spoke of trust as being more important than written agreements. Suppliers offer knowledge about chemicals, how to handle them safely, and provide other services to the customer to gain goodwill and trust. One customer said that the trust in a relationship could be challenged if another smaller customer obtained better conditions.

"From my point of view, it is all about creating a relationship with customers that are built on trust. This is much more important than a contract or written agreement with a customer, but we all know [that] trust comes with time, and if you offer your customers good quality, good services, and excellent communication, then usually, the customer appreciates exactly this, and trust is growing" [Sales Manager – Supplier 2 A- Europe].

"Our business model - technical selling – is based on having a good product but also scientific advice that we are providing to customers in every field - marketing, environment, health and safety, and especially technical service. The result of this partnership is a close relationship and trust" [Marketing manager – Supplier 1 A- Europe].

Managers from the American supplier noted that the trust in the relationship is particularly important because the supplier's brand name is often tied to the customer's products.

> "Much more with some than others, but if you look at [the trust level between customers and suppliers] from a broad brushstroke, I would have to say 50-50" [Marketing manager – Supplier 3A- USA].

> "For the most part, with the majority of our customers, it is a very trusting relationship, and we are very open with them and they are very open with us" [Sales manager – Supplier 3A- USA].

### 5.4.4 Power in the relationship

Suppliers have some power over customers because customers depend on suppliers to innovate. However, as suppliers are delivering almost equivalent products to the market, the customer has the power to choose which supplier to work with. When the customer has chosen a supplier, the power becomes evenly divided to approximately 50-50 because the costumer may incur a large transaction cost by changing suppliers.

> "I cannot speak for the others, but I can speak for Customer 1B, which is one of the largest customers of Supplier 1A. It is the case that there is not everything that we are willing to accept. There are two things that affect how you do procurement: the first is volume and the other is knowledge of what you are doing. A good combination of the two things makes you stand strong in a negotiation" [CEO - Customer 1B - Europe].

Findings from the study illustrate that customers in American market that are selling to the large retailers are pushing the suppliers harder to get what they want, and if they do not get what they want, they do go somewhere else. These customers often have power over the suppliers because they use a large volume of chemicals. One of the European customers also spoke of large volume as an important factor in power in negotiations with suppliers.

> "At the end of the day, it is the buyers who have the power. Because we are at the end of the value chain, we have the least amount of power" [Marketing manager – Supplier 3A- USA].

> "I think that it is a bit divided. I think if you have a volume or position, then please feel free to call it power when you have a better starting point than a minor player" [CEO - Customer 1B - Europe].

## 5.5 Performance of the relationship

### 5.5.1 Benefits of buyer-supplier relationships for suppliers

The results of this study demonstrate that the suppliers obtained the following benefits from their relationships with buyers. First, suppliers obtained market intelligence about the needs of customers and end users. This information is essential for suppliers in performing innovation and new product development. Second, these relationships result in loyal customers and continuity in demand and sales of chemicals. Third, the suppliers benefit from these relationships through the field testing of new chemicals in full-sized facilities. The fourth benefit to suppliers of close relationships is that the customer comes to the supplier if any problems occur, and the supplier can have the chance to fix the problem. Fifth, suppliers also view good relationships with customers as increasing the likelihood of reaching acceptable compromises in negotiations.

> "I guess the main benefit is that we get information at an early stage. For example, if problems occurs, that's what we need so the customer gets the support from us. It is the main; expect the wood preservative of course. I guess the support that we would give to our customers" [R&D Manager – Supplier 2 A- Europe].

> "It is definitely, having a good relationship definitely helps you. In your negotiations, so that's true for both sides, so if you have a good relationship, you would find a compromise that both can live with more easily" [Sales Manager – Supplier 1 A- Europe].

> "Obviously, you build trust when you are developing these relationships, and they are more willing to be our 'guinea pig' when we have a new product. They trust us to not come in and destroy their plant with that product. On the other side is building a relationship is really what you get out of that. Obviously, from the sales side too, if you build this relationship, they are less likely to leave you for price" [R&D manager – Supplier 3A- USA].

### 5.5.2 Benefits of the buyer-supplier relationships for the customer

The customer gains the following benefits from the close relationships with their suppliers. First, a customer that performs joint development projects with its suppliers can obtain exclusivity rights to the new product for a period of time or geographical area. Second, the customer also obtains market intelligence on what regulations are going to affect the market. Third, as the suppliers test new chemicals in the customer's facilities, these customers can obtain a competitive advantage through these relationships. Fourth, when wood industry customers faced hard times, suppliers did lower prices due to their strong relationships. Fifth, suppliers offer additional services to customers with these relationships: training and information on how the customer's employees should handle the chemicals help with marketing, and assistance with other technical questions. One customer noted a sixth benefit that they had hired highly skilled personnel from their supplier.

> "I just say market intelligence" [CEO – Customer 3B- USA].

> "I expect from a real partner to be treated as a best customer, always to have the best conditions in total show, and to get first information on all development in the market and with the products. In the case of Company 2A, are we the only customer getting this new product, with this colorless impregnation, with the grey color for example? Because they developed it for us, we have this advantage to be the only one" [CEO – Customer 2 B – Europe].

### 5.6.1 Collaborative buyer-supplier relationships affect innovation

Managers from both the supplier and customer sides agreed that buyer-supplier relationships had positive effects on process or product innovation. The buyer-supplier joint development process increases the chance of market-driven innovation. One of the American managers expressed that they were inspired to innovate more when one of their customers started to use an additional supplier.

> "By talking to the customers, you get a lot of input on the market. I think that is crucial so you steer the research in the right direction" [Marketing manager – Supplier 1 A-Europe].

> "Supplier 1A, it is an organization that is professional and has skilled people, so it is clear that they are interested in discussing the development and future with us, and they do this" [CEO - Customer 1B - Europe].

> "They make us want to innovate more. Knowing that they open the door to other companies, we want to prove them wrong…. for the decision they made to open that door, so it has a big impact on it" [Marketing manager – Supplier 3A- USA].

Innovations developed by suppliers alone are often built on good ideas but are not necessarily embraced by the end customer. Combining the supplier's knowledge of chemistry with the customer's market knowledge increases the chance of successful innovation in the wood industry.

> "It is not always [the case that] they think innovation is something that is suitable for the market. Sometimes, they come with innovations and new products from what they are able to produce, not what the market is asking for, so it is always a discussion, it is not seldom that we tell them that is a good idea, but they would not be able to sell this" [CEO – Customer 2 B – Europe].

# 6.0 Discussion

The main topics addressed in this thesis are 1) innovation in the wood industry in general, 2) innovation in the case study companies, 3) types and structure of buyer-supplier relationships, 4) key aspects that impact the relationship, and 5) the performance of the relationship. The main results and findings are discussed in the context of relevant theory and literature.

## 6.1 Innovation in the wood industry in general

The respondents described the wood industry as a conservative industry that has undergone few changes during the last century. However, the last decade has seen significant change as new regulations have forced the industry to come up with new and innovative ways to perform wood impregnation. The respondents expressed that the financial crisis impacted their numbers, and the level of this impact differed from market to market. This result confirms the findings of Hodges et al. (2011) that a decrease in demand after the financial crisis led to increased competition in the wood industry.

Managers on the supplier side indicated that their products life cycles have shorten. Chemical suppliers begin the life cycle of innovative chemicals, such as chemicals that add color to impregnated wood or introduce other modifications to wood. The wood industry is at a mature stage, mainly performing process innovation through internal or external processes. These findings confirm those of Hansen (2006) that product innovation is performed at the beginning of the industry life cycle. Process innovations become more frequent than product innovations further on in the industry life cycle.

## 6.2 Innovation in the case companies

Managers spoke of product innovation as new products with enhanced performance for customers, in agreement with the definition presented by Edquist (2005). Managers on the customer side said that suppliers contributed to enhancing process innovation in their companies. This finding is consistent with the definitions of process innovation presented by Tidd and Bessant (2009), Weiss (2011a), and Smith (2010).

We found that customers representing the wood industry in this study were particularly focused on how to innovate and that they were looking for new and innovative solutions for their company and the end user. One of the wood industry customers participating in this study even had an innovation manager and an employee working solely on innovation issues. Such dedicated effort illustrates that this wood industry customer was focused on innovation. The findings of this study demonstrate that these customers were trying to develop new

products, improve processes, and provide new services through new business systems. The results indicate that the firm innovativeness of wood industry customers has slowly started to increase. This finding contradicts the findings of Hansen et al. (2007) that wood industry firms do not have programs for innovation and are not able to capture new innovative ideas. Furthermore, it is important to note that the majority of wood industry customers are still not very focused on innovation, as described by Hansen et al. (2007).

Managers in both Europe and the USA on the chemical supplier side stated that they use a step-by-step approach to take an initial idea to the market. Managers said that this process was inspired by the literature and expressed that they had adopted the stage gate process of developing ideas into successful innovations (Cooper, 1990). Further, the stage gate system developed by Cooper (1990) has the goal of making innovation sustainable and converting innovation into competitive advantage through management.

An important topic of this thesis is whether the innovation in buyer-supplier relationships is driven by R&D or by the market. R&D managers said that their innovation was still highly influenced by R&D but that they did receive information about the market through different channels. Marketing and sales managers spoke about a shift in the industry from an R&D focus to a more market-driven innovation focus. Customers confirmed that they affected innovation by making requests of the supplier based on the demands of end users. These findings are in agreement with the study by Juslin and Hansen (2011), which argued that the wood industry's traditional focus on product development rather than market orientation is changing. This study confirms these findings, although the managers had varying views on this topic.

The product innovation carried out by wood industry buyers is heavily affected by the chemical suppliers. New chemicals provide the wood industry company with the opportunity to bring new and innovative products to the market. Some of these product innovations are affected by the market intelligence of wood industry companies, particularly those related to product design, such as changes in color or other aesthetic improvements. Customers and suppliers also perform a great deal of external and internal process innovations. These innovations can be in the form of better production, new business systems, or new marketing approaches. This thesis confirms the findings of Nybakk (2009) that innovation can be carried out on different levels, with this thesis findings suggesting that innovation is performed on the *organizational* and *inter-organizational* levels in the wood impregnation industry.

Managers stated that one hindrance to innovation was that customers lack knowledge regarding the wood protection industry. This lack of knowledge leads innovative products to struggle to obtain premium prices for their increased quality, as customers do not attach an appropriate premium to differences in quality that they do not understand. These findings are confirmed by the United Nations report (2012) stating that customers are not embracing new and innovative products but are instead continuing to use non-sustainable products.

## 6.3 Types and structure of buyer-supplier relationships

Managers spoke of buyer-supplier relationships as transactional relationships, but both suppliers and customers expressed a focus on long-term relationships. Buyer-supplier relationships appear to be affected by the industry context. The statements from the managers in this study support the argument by Jap (1999) that the context surrounding a buyer-supplier relationship is important.

Participants in the study spoke of a transactional approach, with many long-term agreements remaining handshake agreements. Some contracts existed, but this situation was not the norm of the buyer-supplier relationship in this industry. These findings agree with those of Prashant and Harbir (2009) that a collaborative relationship can be organized in different forms and with different structures.

## 6.4 Key aspects that affect the relationship

Although these relationships exhibit a low level of integration in the form of contracts codifying collaboration, some of these relationships last for decades. This thesis confirms the findings of Mohr et al. (1996) that *the level of integration* between the supplier and buyer does not affect their level of commitment to each other.

Managers in the supplier companies spoke of different types of customers, price buyers, and business partners. Managers highlighted the importance of trust when choosing collaborative partners. This finding supports those of Spekman and Carraway (2006) that trust and customer focus are *fundamental enablers* of growing a traditional relationship into a collaborative relationship. Further, managers underlined that trust was more important than a contract. Findings from the interviews confirm the importance of trust for collaborative relationships expressed by Spekman and Carraway (2006).

Managers from the supplier side spoke of frequent interactions and efforts to fulfill buyer's wishes through innovation. Managers from the customer side confirmed that they frequently interacted with their suppliers and also noted that they were focused on creating long-term

relationships with their suppliers. One customer noted that a close relationship made it easier for the supplier to know the customer's needs and for the customer to understand the supplier's capabilities. This study confirms the findings of Spekman and Carraway (2006) regarding the importance of customer focus to achieving long-term collaborative relationships.

Managers of supplier companies discussed and underlined the importance of market information and customer needs. Suppliers also indicated the importance of obtaining information about the end user. One manager noted that success stories were not only when they sold their products to their customers but when those products were passed further down the supply chain. These findings support those of Kalwani and Narayandas (1995) that long-term relationships give the supplier better insight into the needs of the customers in terms of products and services.

Managers also noted that wood industry customers depend on suppliers to perform product innovation. The findings of this study indicate that customers are interested in long-term relationships because of their transactional costs. These findings are in agreement with the study of Scheer et al. (2010) that presents a model of *cost/benefit-based dependence* within relationships in which the customers are dependent on their suppliers.

## 6.5 Performance of the relationship

Managers noted that the transfer of information is one benefit of these relationships. Knowledge transfer gives an advantage to the participants in buyer-supplier relationships in the wood industry. However, this advantage was not described as a sustainable advantage. Managers described transactional relationships as the most common relationships, which makes it easy for a competitor to gain knowledge by acquiring unprotected knowledge from different industry sources. This study confirms the findings of Dutta (2012) that knowledge transfer in inter-organizational relationships can enhance the performance of both organizations by providing sustainable advantages.

Managers noted another important reason why they develop new products together with customers. This practice enables them to obtain information about their customer's needs, end customers' needs, and their competitors. The findings agree with those of Wynstra et al. (2001) that the goal of the supplier's involvement in the product development process is to achieve reductions in the cost and time required to bring new products and services to the market.

Managers in Central Europe were highly focused on innovation and improving their business performance. Managers in one of the companies noted that their company was founded on innovation. They were always following regulations and the actions of policy makers that could affect the industry. Suppliers wanted to be proactive in providing products that comply with new policies, leading to their focus on new product development. The findings of this study confirm those of Hansen et al. (2007) that companies that are ready to invest in active development of *innovation capacity* will have major opportunities.

## 7.0 Limitations

Qualitative research has several limitations, which limit the results. First, this study is based on three cases linked to three wood preservative firms. However, the number of large chemical suppliers of wood preservative and fire protection chemicals is limited (less than ten suppliers in Europe and US) (WEI-IEO, 2013). Therefore, the selected firms should give a representative picture of the industry, but no significant generalizations can be made. More importantly, the aim of this study is to get in-depth knowledge into the supplier and customer side of wood protection industry rather than to generalize.

Second limitation of this study is that one is using *snowball sampling method* (Goodman, 1961), in which the supplier chooses the customers participating in the study, could bias the results if the suppliers chose those customers with which they had the best relationships.

Third limitation of the study is time, as it was performed between January and May 2013, and this time limitation constrained the number of cases and interviews that could be included in the study. Cases included in this research were spread across a large geographical distance, this magnified the time limitation.

## 8.0 Key findings and managerial implications

Although this study focused on the supplier side of the relationship, at least one participant was interviewed from the customer side of the relationship for each supplier. The thesis produced four key findings.

The first main finding is that the wood industry context is changing. The wood industry has been forced to change over the last several years because of the decrease in demand after the financial crisis, which led to increased competition. At the same time, new national and global regulations have forced the industry to change and develop new solutions. These changes in the marketplace and in the industry context have led a conservative and mature industry to become more innovative and exciting. Suppliers emphasized their focus on customer needs, and the industry has undergone a shift from R&D-driven innovation to market-driven innovation. Another interesting finding related to the wood industry context was that new regulations often occur first in Europe and then spread to USA. We found that the fire protection segment is still a small percentage of the market, but managers believe that this segment will grow in the future.

The second key finding is related to the organization and structure of the wood industry buyer-chemical supplier relationship. Respondents noted that buyer-supplier relationships were often handshake agreements and were not always confirmed with written agreements. Both suppliers and buyers mentioned that they were focused on developing long-term relationships and that they expended considerable effort to achieve this goal. The large transactional cost for customers to switch suppliers is one of the drivers for customers to develop such relationships.

Third, buyer-supplier relationships were characterized as informal relationships with strong ties between relationship partners. Managers highlighted the importance of good communication and trust to creating functional relationships, and these factors were described as more important than contracts. Both sides noted that power resided on both sides of these relationships, as customers were able to choose among competing suppliers and customers depended on suppliers to deliver their products to end users.

The fourth key finding was related to the problem definition of this thesis of how the buyer-supplier relationship affects innovation. Respondents suggest that both parties view these relationships as beneficial regarding innovation. Suppliers highlighted that these relationships did provide them with important information about their customers' needs and those of the

end users. This market information had important effects on how they performed innovation and ensured that they did not develop products without market demand. This study also found that innovation in buyer-supplier relationships was focused on product and process innovation. These relationships allowed suppliers to perform product innovation that led to new process innovation/development on the customer's side.

Customers viewed these relationships as beneficial because they enabled them to demand and express the types of products for which their customers were asking. Another advantage for customers was that they could obtain better deals by participating in the innovation process, such as exclusive rights to that product for a limited period of time or geographical area. This provided them with competitive advantages over their competitors and the ability to offer new solutions based on the product development/innovation relationship. Suppliers noted that joint product development or collaborative relationships with their customers mainly affected the aesthetics of the end products, with color as the most common new chemical characteristic affected by customers. Suppliers drive product innovations in the industry, but key customers are important for suppliers, enabling them to test new chemicals in commercial facilities before bringing them to market. According to these thesis findings, a small portion of customers in the USA takes the initiative to innovate for themselves or bring ideas to their suppliers. The majority of customers just waits for suppliers to bring them something new or do not want to change.

**Managerial implications**

Managers on both sides should keep developing close buyer-supplier relationships. They should increase their focus on sharing market intelligence. Suppliers have the technical chemical knowledge, whereas customers are the closest to the market, with the result that joint development projects can be win-win situations for both parties.

Wood industry customers across the world should learn from the American customer in this study that focuses on innovation and has a team dedicated to innovation activities. Further, customers should push for more joint development projects and should try to exert more influence on innovation. Customers should also ask suppliers to make more products based on market intelligence.

Chemical suppliers should perform more joint development projects with wood industry customers. Further, suppliers should try to increase the innovation orientation of their

customers by demonstrating the benefits of innovation and new product development to wood industry customers. Suppliers should frequently use digital or other means of communication with end users to obtain more information about end-user demands. Furthermore, it is important for suppliers to educate end users so that premium products will find increased acceptance and greater brand awareness. Suppliers should also implement customer relationship programs throughout the entire organization to make it easier for the entire organization from sales to R&D to communicate with customers regarding customer demands and supplier capabilities.

## 8.1 Further research and theoretical implications

This Master's thesis can lead to several new research studies and topics. This study was performed in the western part of the world. It could be important to study whether these relationships impact innovation in the same way in other parts of the world, such as Asia, Africa, South America, and Oceania. Other directions could include investigating external impacts on relationships and innovation. For example, managers mentioned the importance of regulations in the wood industry, suggesting that it would be valuable to study the level of influence of local, regional, national, and global regulations. It would also be interesting to examine the profitability or innovation abilities of companies operating in parts of the world with high or low levels of regulations.

This Master's thesis focused on one segment of buyer-supplier relationships in the supply chain. Based on this study, relationships in other parts of the supply chain or other segments could also be examined. This study indicated that managers expect the fire protection segment to grow, leading to various questions, such as what factors besides regulations could represent obstacles to the growth of this segment and where are the largest potential markets for these types of products. Further research can also be conducted to measure whether a firm's innovativeness and profitability increases based on long-term relationships or whether firms are better served by transactional relationships. Further research could examine transactional cost and transactional cost theory to measure the cost for a wood industry customer to switch from one chemical supplier to another.

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## 10.0 Appendix

**Interview guide - R&D Manager (Supplier side)**

**Background information about the case company**

1. Can you give us a short introduction to your background and what you do in your current position in the company?
2. Who are your main customers and what sectors do they represent? How important are wood industry companies for you?
3. With respect to innovation, can you describe the culture in your company?
    - Can you explain a bit about your approach to innovation/new product development (NPD)?
4. In general, is your NPD driven by R&D or customers?

**Relationship to the customer**

5. Does the R&D department have collaborative relationships with wood industry customers? With who (company name – wood industry)?
6. How would you describe that relationship?
7. In what other ways do you obtain information about customer needs?
8. Can you cite examples of products and/or services (solutions) created or adopted by company X from your company?
9. If so (from above), where did the idea come from (R&D or customer driven)/
10. How important are your chemicals (e.g., impregnation chemicals) for innovation performed by your customers in the wood industry?
11. Can you describe successful and failed development projects/NPD you have performed with customer X?

<u>Other external</u>

12. What are the main external factors inspiring product or process development for your company?

**Interview guide - Marketing Manager (Supplier side)**

**Background information about the case company**

1. Can you give us a short introduction to your background and what you do in your current position in the company?
2. Who are your main customers and what sectors do they represent? How important are wood industry companies?
3. With respect to innovation, can you describe the culture in your company?
    a. Can you explain a bit about your approach to innovation/NPD?
4. In general, is your NPD driven by R&D or customers?

**Relationship to the customer**

5. How do you market a new product to customer X? How often does this occur?
6. How would you describe your relationship with customer X? How does your relationship with customer X affect the way that you innovate?
7. Do you think that close relationships with your customers can contribute to better product development? Do you have a role in linking the customer's needs with the R&D department?
8. Can you describe successful and failed development projects/NPD you have performed with customer X?
9. Do you have a customer relationship management program?
10. How important are your chemicals (e.g., impregnation chemicals) for the innovation performed by your customers in the wood industry?

**Interview guide – Distribution/Sales Manager (Supplier side)**

**Background information about the case company**

1. Can you give us a short introduction to your background and what you do in your current position in the company?
2. Who are your main customers and what sectors do they represent? How important are wood industry companies?
3. How do you approach sales of new products in general?

**Relationship to the customer**

4. How would you describe your relationship with customer X? How do you get information about what customer X needs?
5. How do you transfer this information to other parts of your company (e.g., R&D department or who)?
6. Can you describe successful and failed development projects/NPD you have performed with Customer X?
7. What are the main drivers of product or process development in your company?
8. How important are your chemicals (e.g., impregnation chemicals) for the innovation performed by your customers in the wood industry?

**Interview guide – CEO (Customer side)**

**Background information about the case company**

1. Can you give a short introduction to your background and what you do in your current position in the company?
2. Can you describe the culture in your company with respect to innovation?

**Relationship to the supplier**

3. Do you include your suppliers in the development of new products/services? If so, how are they included?
4. Can you cite examples of product, process, or business system innovations that you have adopted from supplier X?
5. Can you describe the innovation culture within Supplier X?
6. How is the relationship with the supplier X coordinated? Are the relationships informal or formal?
7. How do you select suppliers with whom to undertake new product development innovation projects?
8. Can you describe successes and failures in product/process development relationships with supplier X?
9. Who takes the initiative to innovate, you or supplier X?
10. How would you describe the communication with supplier X?