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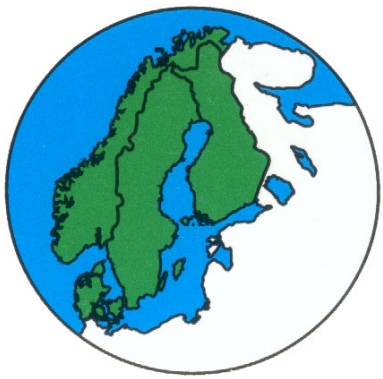

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Proposing a Research Agenda for Swedish Sawmill Distribution Channel Challenges

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Abstract
Purpose: The purpose of this study is to identify distribution channel research needs given the variety of distribution channel challenges among Swedish sawmill companies.
Design / methodology / approach: Explorative case study research
Findings: The paper proposes a typology of sawmill distribution channel challenges, as well as aligns research needs with distribution channel type. The typology is based on i) number of sawmill units within the firm, in combination with ii) distribution channel heterogeneity. Significant management decisions and research needs are identified for the different types.
Research limitations / implications: This research makes tentative statements regarding typology of sawmill distribution channel challenges and potential research needs in the Swedish sawmill industry with regards to the respective typology. However, further research is needed in order to validate these results.
Contribution: This paper focuses on the sawmill industry distribution channels, which is a neglected but important area for sawmills' competitive advantage. The paper also contributes to research by applying contingency theory and typology as an approach to deal with the variety of sawmills' distribution channel challenges.

Keywords: Typology, distribution channel challenges, research needs, and Swedish sawmill industry

1. Introduction

Softwood lumber is in many cases referred to as a commodity product (Roos et al., 2002) and it is thereby produced in general standard lumber sizes (Hansen et al., 2002). Competition amongst suppliers of commodity products is primarily based on price (Shapiro, 1979) and the focus is efficiency through stability and control (Pine, 1993). Further, commodity products are characterised by consistent quality, stable demand, large homogenous markets, and long product life cycles (Pine, 1993). In general, the production of commodity products implies strong cost-effective

production capability and a general tendency towards automated equipment and fixed costs (Shapiro, 1979). A majority (53 per cent) of the Swedish sawmills are commodity-oriented with a cost leadership orientation. If the sawmills whose value-added activities consist of planing and drying were also added to the group, the share would further increase by about 10 per cent (Roos, 2002). The number of sawmills decreases and existing sawmills need to further increase their production volume, which is a result of continuous improvements of the existing sawmills' productivity. The productivity in terms of cubic meters per working hour has increased by about 15 per cent from 1995 to 2000 (Staland et al., 2002). The annual production of softwood lumber has increased at the same time as the export share has remained stable (Skogsstyrelsen, 2002). The production equipment is general and available to all members of the sawmill industry (Johansson, 1995). The general profit margin of the purchasing sawmills is about 3-4 per cent, which has been enabled by the increased prices for softwood lumber during the past year. Generally, however, the export price of softwood lumber has dropped from an index of 100 in 1990 to one of 89 in 2003 (Skogsstyrelsen, 2005). Hence price competition within the sawmill industry is intense, and its situation is challenging; suppliers are focused on high timber prices, at the same time as some customers purchase softwood lumber at the lowest price offered, while others are traditionally connected to their suppliers. Substitution of construction material is an on-going affair at the same time as new entrants are about to start selling softwood lumber on the Swedish market.

To companies, management of logistics functions is essential (Ballou, 1992). Logistics being "the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory (and the related information flows) through the organization and its marketing channels in such a way the current and future profitability and maximized through the cost-effective fulfillment of orders" (Christopher, 2005) i.e. logistics contains three main functions; procurement/purchase, production, and distribution (Jonsson, 2008). Further, the logistics system, both between each logistics function and to the other members in the distribution channel, is built around different flows, which could be grouped into tangible flows and intangible flows (Couglan et al.., 2006). The management and performance of these functions hence become essential for the survival of each sawmill, particularly for those delivering commodity products. Hence in order for the individual sawmill to become and stay competitive on the market, knowledge and understanding of the logistics functions become important.

Studies with regards to logistics in the sawmill industry is mainly focused on purchase/procurement. The procurement of wood has been studied from a planning perspective, see for instance (Harstela, 1993;

Harstela, 1997; Malinen, 2003; Palander, 1997; Skjäl et al.., 2009). Variations and trends in the sawmill wood procurement in North-eastern United States have been identified by Anderson and Germain (2007). The contributions have applied various Operations Research tools, for instance simulation, optimisation and decision support systems (Asikainen, 1995; Palander, 1998; Karlsson et al.., 2003; Sikanen, 1999; Harstela, 1997; Palander and Väätäinnen, 2005; Uusitalo, 2005) and wood procurement. Other research focuses on a broader perspective of wood procurement taking a part of the forestry-wood chain (Adolfsson et al.., 2000; Lindén and Rönnqvist, 2001; Palander and Väätäinnen, 2005; Helstad, 2006). Studies regarding sawmill production have been carried out by, for instance (Johansson, 2007; Todoroki and Rönnqvist, 2002; Kazemi Zanjani et al.., 2010; Maturana and Pizani, 2009). A study regarding logistics strategy has been conducted by Gustafsson (2006). Contingency variables stressing the connection between situational variables and distribution channel characteristics have been studied by Gustafsson and Rask (2010). Gustafsson and Rask (2010) conclude that there are differences considering sawmills distribution channel characteristics (i.e. structure and level of integration) depending upon sawmills' complexity (i.e. number of units) and the environmental heterogeneity[1]. From a sawmill perspective environmental heterogeneity regards supplier types, product line and markets. There are different ways for sawmills to acquire timber; they can purchase directly from forest owners, purchase from other sawmills or forest owners' associations, or through direct import (Harstela, 1993). Softwood lumber is a commodity material with a low level of product modification, and there is thus a low level of heterogeneity in the product line. However, in order to segment itself, there are sawmills that are continuously developing their products, for instance by pre-painting (Roos et al., 2002), which adds to heterogeneity of the product line. Sawmills have several types of customers; traditional retailers, DIY multiple retailers, house builders and other industries (Gustafsson, 2006) There are also a number of other intermediary firms involved in the distribution channel, such as export agents, importers, wholesalers and distributors. Fundamentally, a sawmill company consists of one or several different manufacturing units and the environmental heterogeneity is perceived to be either high or low. Other studies regarding sawmills' distribution channels appear to be absent. One exception is studies on intelligent timber logistics through bar coding in distribution of sawn lumber (Olsson, 2005; Skogsindustrierna, 2005). Experts point to the distribution channel as neglected and of great

[1] Chow et al (1995) define environmental heterogeneity as the degree of complexity in a firm's environment (product suppliers and markets/customers), and it may be reflected in, for instance, the number of products, customers, suppliers.

importance for the future for sawmills to develop (Skogsaktuellt, 2010-04-09).

This paper takes a starting point in the management of distribution channel development. Distribution channels do not only constitute a significant share of the total cost for supplying customers with products, they do also contribute to revenues by developing customer relationships. Companies with different strategy and structure have different challenges related to the distribution channel. Developing a competitive distribution channel is a long term investment in physical capacities, relations to partners in the channel and to markets and customers. There is a need for deliberate management decisions on distribution channel structure and integration and there is a need for improved knowledge and research in this area.

From an academic viewpoint, the lack of empirical studies regarding the distribution function in the sawmill industry stresses the need for further studies in order to leverage the distribution function into sawmills' business. Hence the following questions need to be asked; how should the individual sawmills fruitfully be classified based on distribution channel characteristics? Which challenges are the different sawmills (based on proposed typology) facing? and which research is needed accordingly? The purpose of this study is to identify distribution channel research needs given the variety of distribution channel challenges among Swedish sawmill companies.

2. Methodology

In general, the case study research method is used for exploratory research, in which no specific hypotheses are proposed; rather a basic understanding is sought of how and why different phenomena occur. The case study research method is particularly useful when the object of the study is a contemporary phenomenon occurring in a real life setting over which the researcher has little control (Yin, 2003). This study has been conducted as a multiple-case study, in which the differences between sawmills, such as size and complexity, have been sought for rather than the similarities. The interviewed sawmills are located in the south of Sweden. Six sawmills were identified by using an industry directory of sawmills (http://www.sawmilldatabase.com/) combined with advice from the trade association in question. Each sawmill was visited and the interviews with CEO focused on distribution channels and integration[2]. Further, in order to understand the need for research on distributions channels we have to understand what decisions management is confronted with in different

[2] Our understanding is that distribution channel challenges are managed through decisions on level of structure and level of integration, see Gustafsson and Rask, (2010).

situations and hence these questions were asked as well (changes done within the last two years and research needs). Background data on the situation of sawmills was collected by interview with the trade organisation[3], together with general information on the industry from industry media.

3. Empirical data

Studied sawmills display a large span of characteristics; ranging from the small one-unit company to the large multi-unit sawmill group. The companies studied also differ regarding, type of raw material suppliers, line of products and type of customers. An overview of the studied companies is provided in Table 1 below.

Table 1. Overview of studied sawmills

Saw-mill	Prod. volume/ yr	Number of units	Supplier type	Line of products	Type of customers
A	15 000 m^3	1	Forest Corporations	Specific niche products	Specialising carpenters
B	40 000 m^3	2	Directly from forest owners nearby	Standard product line	House building industry and Building materials merchants
C	160 000 m^3	1	Directly from forest owners nearby and purchasing company	Standard product line	House building industry and Building materials merchants
D	225 000 m^3	3 sawmills, 1 facility for value-adding activities and 1 terminal	Directly from forest owners nearby	Standard product line and value-added products	Building materials merchants
E	350 000 m^3	3 sawmills and 1facility for value-adding activities	Purchasing company within the group	Standard product line and value-added products	Building materials merchants
F	1 800 000 m^3	10 sawmills and units for value-adding activities and 1 terminal	Purchasing company within the group	Standard product line and value-added products	Building materials merchants

[3] Såg I Syd (http://www.sagisyd.se), is organizing the majority of sawmill companies in the south of Sweden.

During the last two years the case companies have taken decisions regarding their distribution channel. Some significant decisions are listed below together with the perceived need for improved information when taking decisions.

Table 2. Development of distribution channel during the last two years and perceived research need

Sawmill	**Development during the last two years**	**Perceived research need**
A	None	None
B	- Centralized the sales department	None
C	- Developed a web-based interface for order placement (for a selected customer)	Inventory location and levels Cost Benefit analysis for different distribution channel structures
D	- Increased number of customers (focused on small customers on behalf of large considering volume) - Hired purchasers of timber - Customized the product and services - Closed one sawmill and one terminal	None
E	- Has acquired one facility for value-adding activities, has developed a web-based interface for order placement (for all customers).	Modelling distribution channel costs Appropriate inventory levels
F	- Acquired sales companies in Denmark, The Netherlands, United Kingdom, Interior products, House Builder, and a waterproofing facility	How a sawmill could develop a brand name for their soft wood lumber Identify what the customers want? (develop a deal) Identify distribution channel costs

4. Discussion and tentative proposals

According to previous studies, based on Chow et al. (1995), see Gustafsson and Rask (2010) differences between sawmills' distribution channel characteristics depend upon sawmills' complexity (i.e. number of units) and environmental heterogeneity. Hence these are the variables constituting the foundation for the proposed typology. Number of units refers to the number of individual sawmills that belong to the sawmill company; sawmills with more than one unit is referred to a *network*, where as sawmills consisting of one unit is referred to as a *line*. Further, sawmills with a low environmental

heterogeneity experience a *homogeneous* environment as compared to other sawmills with a high *heterogeneous* environment. The proposed typology is illustrated in Figure 1.

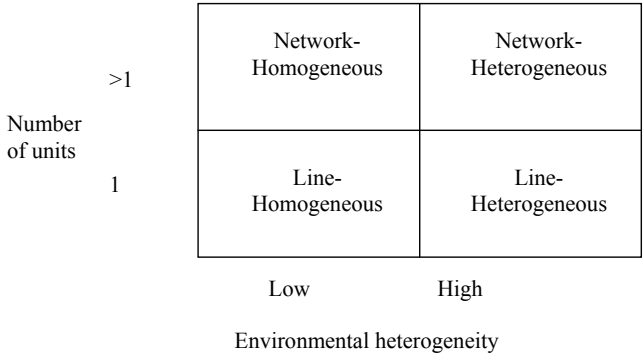

Figure 1. Proposed typology of DC characteristics

In line with the proposed typology of distribution channel characteristics, four different categories of sawmill distribution channels emerge;

- *Category Line-Homogeneous*; sawmills consisting of one unit with a standardized assortment aimed for a specific customer group on a predefined market. In this study; sawmill A
- *Category Line-Heterogeneous*; sawmills consisting of one unit which produces a variety of products aimed for several customer on different markets (this type of sawmills does strive to adjust their products to customer demand). Sawmills belonging to this type usually have an opportunistic strategy. In this study; sawmill C
- *Category Network-Homogeneous*; sawmills consisting of more than one unit which produces a standardized assortment aimed for a specific customer group on a predefined market. In this study; sawmill B
- *Category Network-Heterogeneous*; sawmills consisting of more than one unit which produces a variety of products aimed for several customer on different markets (this type of sawmills does strive to adjust their products to customer demand). Sawmills belonging to this type usually have an opportunistic strategy. In this study; sawmill D, E and F.

The case companies and their recent decisions affecting distribution channel characteristics are presented below.

Table 3: The studied sawmills classified by typology and their recent distribution channel decisions

	Homogeneous	***Heterogeneous***
Network	**Sawmill B** Centralized the sales department	**Sawmill D** Increased number of customers Customized product and services Closed one sawmill and one terminal **Sawmill E** Acquired one facility for value-adding activities Developed a web-based interface for order placement **Sawmill F** Acquired sales companies in major export markets Acquired units for interior decoration wood products Acquired value-adding unit Invested in home building unit
Line	**Sawmill A** None	**Sawmill C** Developed a web-based interface for order placement (for a selected customer)

The studied sawmills have taken several decisions in order to manage and develop their respective distribution channel. However, these decisions are just a sample of a larger number of potential areas that management has to address. These decision areas being based on flows (tangible and intangible flows) within the distribution channel.

The defined typology is based on predefined variables; number of units and environmental uncertainty and hence four types of sawmill categories emerge; Network-Homogeneous, Network-Heterogeneous, Line-Homogeneous, Line-Heterogeneous. For the individual sawmill. Each of these categories is facing a different set of managerial challenges;

- *Network-Homogeneous*; Sawmills belonging to this category consist of several units and produce a standard set of products. These sawmills need to consolidate their production to a limited product range and they hence need to coordinate their units with regards to, for instance product line and transportation.

- *Network-Heterogeneous;* Sawmills belonging to this category consist of several units and produce a wide variety of products (also develop new products according to customer demand). These sawmills continuously need to coordinate their units, transportation, sales and product range. Further, for these sawmills it becomes important to control their distribution channels in order to continuously enhance cost reduction, increase value-added to the customers as well as to be able leverage customer service. Branding will also be important in order to "secure" customers.
- *Line-Homogeneous*; Sawmills belonging to this category consist of one unit and produce a limited product range. The sawmills focus on economies of scale in the distribution channel as well as in production and hence strive for stable and predictable flows.
- *Line-Heterogeneous*; Sawmills belonging to this category consist of one unit and produce a wide product range. These sawmills focus on cost efficiency in the distribution channel but they need to able to make changes as there is need for new products and a reconfiguration of the distribution channel structure.

As the characteristics of each category differ, the research need would also differ between the categories.

- *Network-Homogeneous*; Sawmills belonging to this category consist of several units and produce a standard set of products. These sawmills striving for economies of scale both within each unit but also between their units need to focus their research on production planning in network structures as well as optimal production deployment.
- *Network-Heterogeneous;* Sawmills belonging to this category consist of several units and produce a wide variety of products (also develop new products according to customer demand). The sawmills need strategies for developing their customized products in customer products as well as to developing their marketing and try to brand their products. Further, these sawmills need to be considered as a reliable supplier by the customers and thereby integrate forwards in their distribution channel.
- *Line-Homogeneous*; Sawmills belonging to this category consist of one unit and produce a limited product range. In order for these sawmills to achieve economies of scale in production and the distribution channel cost control methods are needed both with and without intermediaries.
- *Line-Heterogeneous*; Sawmills belonging to this category consist of one unit and produce a wide product range. In order for these

sawmills to achieve cost effective distribution channel structures with a variety of products (that also have a possibility change according to customer demand) studies of consolidating logistics in segmented distribution channels are needed.

Table 4 illustrates the managerial challenges the different sawmills (based on proposed typology) are facing and research needed accordingly.

Table 4. Managerial challenges and research need aligned to each category.

Category	Managerial challenge	Research need
Network-Homogeneous	Coordination of units and transportation Consolidating production of a limited product range	Production planning in network structures. Optimal production deployment.
Network-Heterogeneous	Coordination of units, Transportation, sales and product range Control of DC up to customer Branding of products	Strategies for developing commodities to products Effects of branding Methods for forward integration in DC
Line-Homogeneous	Cost efficient DC structure Cost efficient production and limited product range	Cost control methods in DC with intermediaries
Line-Heterogeneous	Cost efficient DC structure Sales organization Wider product range	Consolidating logistics in segmented DC.

This pre-study constitutes a base for an in-depth study of integration and efficiency in the distribution channel for softwood lumber. In order to validate and expand these tentative findings, additional cases are needed (possibly done in an in-depth study). The aim of the in-depth study is would be to create a model mapping the sawmill distribution channel costs, tied-up capital and logistics service quality, by illustrating the cost structure in the distribution channel; hence it is suitable for scenario writing, and consequently a tool for taking decisions on distribution channel structures.

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