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Scandinavian Forest Economics
No. 44, 2012



Proceedings of the Biennial Meeting of the
Scandinavian Society of Forest Economics
Hyytiälä, Finland, May 2012

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Green business practices in the wood industry sector – A review

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Abstract

Environmental aspects of the wood product supply chain have been on the agenda for a couple of decades now. It is claimed that unsustainable forestry practices may damage biodiversity and the provision of forest ecosystem services, while wood is simultaneously perceived as a renewable material with a comparatively low carbon footprint. As is the case in other sectors, the role of the customer for fostering greener industry processes has also been highlighted, e.g. in forest certification. The development of even more environmentally friendly processes relates closely to how they are implemented and viewed among actors in the forest supply chain. The research on green practices in the wood industries has not been thoroughly collected and reviewed. An assessment of the present knowledge on the matter is needed to establish the state of the art and find approaches for future research efforts. This paper is an attempt to review and reflect upon the published business oriented research on green supply chains for wood products. The study is based on articles retrieved in relevant databases and we focus on how the literature has developed the main focus, approaches and main results. Many studies have investigated end-consumer preferences for eco-labeled wood products, mainly in North America and Europe, while fewer are oriented toward e.g. communication of green properties or business to business relations. The article provides an overview of problems that have been covered by research and identifies ‘white spots’ where knowledge still is sparse. Finally, we summarize main findings, based on the review, and suggest strategies to increase the industry and societal relevance of the research on this topic area.

Keywords: Wood industry, supply chain management, green marketing, sustainable business

1 Introduction

It is claimed that unsustainable forestry practices may affect biodiversity and the provision of other ecosystem services; while wood, if responsibly sourced, is simultaneously material with a comparatively low environmental footprint. Green business practices refer to a broad concept, normally involving industry or business processes that spare the environment from overuse and negative impacts. The concept also implies that workers, customers and users are not negatively affected along the supply chain (SC). Hence, it belongs to a 'family' of descriptions of an economy that conforms to the goals of the 1992 Conference United Nations Conference on Environment and Development (UNCED) and the Brundtland definition of sustainable development. Related definitions are sustainable/responsible business, green or ecological marketing and green supply chain management.

It is evident that these green practices have to be integrated and implemented by the industry in order to be effective – by firms that operate on competitive markets with imperative profitability requirements. One forest sector instrument emanating from the Rio conference and the following processes were the introduction of environmental forest certification (e.g. Forest Stewardship Council FSC, Programme for the Endorsement of Forest Certification PEFC). The activities have however been expanding, integrating other processes for measuring and improving environmental aspects in the production. Sustainability matters of the forest sector have been discussed within the United Nations Forum on Forests UNFF, The Ministerial Conference on the Protection of Forests in Europe MCPFE, Rio +20. National strategies are underway and most forest companies have adopted environmental management oriented strategies.

One may conclude that the forest industry is a key sector in the world economy where environmental aspects have been intensively debated. Various attempts have also been launched along the various forest-based supply chains to improve their environmental performance. The underlying objectives are diverse, efficiency upgrading, to conform to government regulations, avoiding bad publicity, and attract more trust and confidence from customers, Environmental Non-governmental organizations (ENGOS) and other stakeholders.

The practical task has consisted of implementing green practices at different stages of the forest SC. A range of studies have dealt with issues related to green SC implementation. To succeed in the achievement of green forest industry processes it is necessary to collect and assess basic knowledge about factors influencing the diffusion of these practices in the forest supply chains. In particular, we need 'hands on' empirical knowledge about actors and their preferences, perceptions, expectations and priorities. Further, this need for insights ranges from the forest owner to end consumers - and all stages in between.

Hence, this study is an attempt to review the literature on the subject. This may provide a foundation to craft future policies, draw industry and managerial conclusions, and identify areas for investigations and research. The main objective has been to assess the empirical studies that have provided original knowledge. We focus on the geographical and topical scope of these studies and attempt to identify gaps. Interesting and important research paths outside the topic in focus, e.g. on policy, strategy, engineering, econometric trade analysis, biology and ethics, or development issues, have not been investigated. Instead we deal mainly with original research that has disclosed new social science related knowledge about different stages in the forest SC.

2 Method

Databases solicited were Web of Science Citation Index, Scopus, and CABI Google Scholar. We applied a range of search words such as: Wood products, Forest products, Lumber, Sawnwood, Paper products, Joinery, Timber, Wood-based. They were combined with words defining our research subject: Green marketing, Environmental Marketing, Ecological Marketing, Certification, Forest certification, Eco-labeling, Green standards, Sustainable Forestry Initiative, Green consumerism, Green supply chain, Green/sustainable production.

In order to qualify, the papers had to contain original research based on empirical data. Hence, general overviews or purely theoretical papers were excluded. Criteria for being included in this study's database were also that they focused on sustainable SC, and involved business administration/social science oriented studies. The studies were organized and assessed according to year, geographic region, approach, results and conclusions.

3 Results

3.1 General characteristics of the articles

A total of 47 research articles were included in the study. Out of these, 37 were based on data originating from North America, whereas nine covered Europe, and one was conducted in New Zealand and China, respectively. Eleven studies presented the outcome of international comparisons. The by far most thoroughly studied country was the United States (33 studies).

The most represented journals in the study were Forest Products Journal, Forest Policy and Economics, Wood and Fiber Science, Forestry, Journal of Forest Economics, Silva Fennica. It is evident that the research on these issues is mainly published in forest- or wood science journals. Journals with a disciplinary focus, e.g. on marketing, business development or supply chain management, are less common.

The output of studies in the area is fairly constant over time (yearly production is shown in Table 1). Here it should be added that articles on certification during the first part of the 1990s were mainly overviews describing the development, principles and ideas behind forest certification. Since they were not based on original data they are not included in this study.

3.2 Supply chain focus

The dominating topic, particularly during the 1990s, was investigations of preferences and willingness to pay for certified wood products (Table 2). However, a few other inquiries have also elicited underlying perceptions, attitudes and expectations among different actors along the supply chain, e.g. forest owners, managers, wood industries and industrial buyers.

Table 2 does not reveal any trend, e.g. of new issues being explored - and other topics abandoned. Rather, one can observe a clear dominance of consumer studies throughout the period; and that studies of other intermediate supply chain actors (wholesalers, secondary wood industries etc.) are less frequent, although a limited number are being produced.

Table 1. Number of papers per year

Year	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
No of research articles	1	3	3	4	0	3	4	5	6	4	4	2	3	0	3	2

Table 2. Research regarding stage in SC

Focus:	Year		
	1996-2000	2001-2005	2006-2011
Forest Owners	1	3	3
Forest industry, retail	4	8	4
End consumers	6	11	7
Total	11	22	14

3.3 Approaches

The majority of the reviewed articles have employed standard survey approaches combined with multivariate statistical methods such as cluster analysis, factor analysis, regressions, conjoint and segmenting techniques (Table 3). Comparative studies of different populations also exist. A small number of qualitative studies, content analysis of text materials and experiments have also been tried.

3.4 Findings of the studies

Main results are summarized in Table 4. The results indicate a certain inertia adopting green business practices and related communication at different stages in the SC. Low awareness at consumer level is often mentioned as an obstacle for advancing green practices. But also forest industry appears reluctant to take a proactive stance on advancing sustainability goals.

Table 3. Classification by research approaches

Approach	Number of publications
Surveys	39
WTP estimation	15
Conjoint analysis	5
Choice experiment	2
Qualitative studies	2
Content analysis	1
Experiments	1

NB. Categories can be overlapping

Table 4. Main results and conclusions in reviewed studies

Part of supply chain:	Key results
Forest owners	<ul style="list-style-type: none">• Owners and land managers have a positive attitude toward environmental forestry• They are however unsure about the benefits of certification• Some assume certification may improve credibility and public opinion towards forestry
Forest industry	<ul style="list-style-type: none">• Industries certify and eco-label products for various reasons: risk minimization, consumer confidence, relations with ENGOs and stakeholders.• But there is a low interest for eco-labels because costs appear larger than benefits for the industry• Low perceived customer interest from industry• Geographical differences exist – Nordic firms are more environmentally focused
Consumers	<ul style="list-style-type: none">• Consumers have a positive general attitude toward certification and sustainable forestry but quality and price are more important buying criteria• People are prepared to pay a limited green premium• Low awareness of forest certification• Green segments exist but they are hard to identify
Market communication	<ul style="list-style-type: none">• Green communication grows slowly• Modes of labeling and information influence customer interest to buy green

The studies to date have to a large extent contained analyses of consumer preferences and willingness to pay investigations. Fewer studies aim at increasing the understanding of the underlying values and processes that form environmental consumerism. The application of greenness in business relations, or implementation of green procedures in forest industries are other topics that have only been occasionally investigated.

4 Discussion

Studies are geographically oriented on Northern America and Europe. As global consumption shifts, there are probably under-explored emerging markets, which merit deeper studies on preferences for certified wood or how actors along the supply chain deal with sustainability issues.

The surveys often target populations of private or industrial consumers, or supplying firms. These survey studies have generated tangible results. However, more alternative and innovative approaches – e.g. case studies and experiments - have only been tested in a few cases.

The research to date has provided many important findings and it has also identified interesting new challenges for researchers. Further studies could possibly generate a more complete basis for developing sustainable supply chains in the forest sector. Based on the reviewed studies, social science research approaches would shed more light on the following aspects:

Broader geographical scope: What are the conditions for the implementation of green business practices in growing and “young” economies in Asia, South America, and Africa – i.e. outside the markets that traditionally have been investigated?

New topics: It is reasonable that environmental perceptions, intentions and attitudes about certification have received most attention. However, coming studies could deepen our understanding about how green practices play out in *business relations, organizational culture* and *adoption processes*. *Communication* of greenness is an additional field to explore.

New methods: Surveys represent a clear-cut procedure to define and test hypotheses market and industry practices. Challenging further investigations should of course continue these studies, maybe with a firmer theoretical connection. However, qualitative approaches may create deeper understanding and new methodological challenges. Other approaches include experiments, action research and document studies.

List of reviewed papers

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