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Objectives

Environmental arguments in the marketing of intermodal transport have not been used to their full potential in practice. A number of research studies have recently focused on this area and a number of surveys¹ and projects like PROPS² are beginning to shed light in this area. The objective of this study is to establish a conceptual model that incorporates shippers' transport characteristics, decision processes, buying behaviour and choice criteria in order to identify the conditions and opportunities for using environmental factors in the marketing of maritime intermodal transports. Market segmentation and differentiated marketing will be considered.

Target Stakeholders

- Shippers and freight forwarders on how they influence shipping lines to act in a sustainable direction
- Transport operators, particularly ports and ship and logistics operators, on how they can improve environmental performance in order to meet the environmental demands from certain customer segments among shippers.
- Policy makers to select an appropriate set of indicators to support decision making.

Glossary terms

In marketing, product differentiation can be used by a seller emphasizing and promoting product characteristics that differ from competitors' alternatives. One opportunity is to provide a maritime transport that is superior from an environmental point of view to these customer segments that consider this an added value. However, information about how different shippers value environmental performance is needed. A review of research, surveys and projects may contribute to this.

¹ The Potential for Water Freight in the UK – A Survey of Business Attitudes and Opinions”, A Report by Sea & Water (2006) for the Department for Transport

² PROPS- Promotional platform for Short Sea Shipping and Intermodality www.props-sss.eu

Approach

The work is based on the research carried out by Catrin Lammgård at UGOT for intermodal rail-road transport. The maritime transports often have a value-adding dimension regarding their environmental performance per ton kilometre, similar to the intermodal rail transports.

The report starts with a literature review, along with an examination of contributions by related EU projects and other relevant studies. The relevant issues for marketing strategies are identified and a model is presented together with recommendations.

Specific issues and topics to be addressed

- a. Strategies for sustainable transport regarding maritime transports*
- b. The valuation of environmental factors among shippers*
- c. Practical classification of shippers based on their valuation of environmental factors*
- d. Review of empirical material on valuation of environmental aspects in buying behavior*
- e. Best practices for sustainability management for port, ship and logistics operators*

Strategies for sustainable transport regarding maritime transports

In marketing, product differentiation can be used by a seller emphasizing and promoting product characteristics that differ from competitors' alternatives. One opportunity is to provide a maritime transport that is superior from an environmental point of view to these customer segments that consider this an added value.

Value can be considered from different perspectives and the most obvious one has to do with finances. The fundamental purpose of a business is to build financial value, i.e. to earn more than the cost of capital. However, the *stakeholder value* is based on the view that a company has responsibilities to many stakeholders, not just investors, including employees, customers, suppliers, society and the environment. (Mathur and Kenyon 1997). This is in accordance with the stakeholder theory (Freeman 1984) that has been applied to environmentalism in business in various studies. Fineman and Clarke (1996) identified the pressure from "green stakeholders". Banerjee et al. (2003) identified four important antecedents to "corporate environmentalism" where environmental concerns are integrated into a company's decision-making process: public concern, regulatory forces, competitive advantage and top management commitment. Waddock et al. (2002) found that demands for managing responsibly derive from three general sources: primary stakeholders (e.g. owners, employees, customers, suppliers); secondary stakeholders (e.g. NGOs, activists, communities, governments); and general societal trends and institutional forces. In sum, the

pressures from various stakeholders force companies to take an active stand in environmental issues. This includes companies offering logistics services, which play a vital role in all supply chains.

In the customer perspective, value represents the attributes that companies provide through services and products, to create loyalty and satisfaction in targeted customer segments, and also including image. Environmental aspects are attributes of a transport service that may affect the company image. However, not all customers are interested in environmentally better transports, but by identifying those who are, target groups for marketing of these transports can be defined, and environmental considerations can be used as a competitive advantage in selling freight transports. In a marketing perspective, customer value is essential.

Environmental marketing is a balanced approach to social, technological, economic and physical aspects of businesses and societies, but it should be recognized also that consumers and societies have multiple and sometimes conflicting wants and needs. This last point is relevant to have in mind regarding the marketing of environmental aspects of freight transports. In marketing strategies, differentiation can be used based on the analysis of potential target groups since there are many stakeholders interested in minimizing negative environmental effects from freight transports; politicians, creators of public opinion and last but not least, the public.

Is *environmental product differentiation* possible? Reinhardt (1999) has proposed five ways of integrating the environment into management and one of them is through product differentiation. The idea behind environmental product differentiation is that companies create products or employ processes that offer greater environmental benefits or impose a smaller environmental cost than what those of the competitors do. This can raise the company's costs but may also permit the company to raise prices, to capture additional market shares or both. Three conditions must be met in order to successfully implement environmental product differentiation. First, one has to identify customers that are willing to pay more for an environmentally friendly product. Second, one has to communicate the product's environmental benefits in a credible way. And third, the company has to protect itself from imitators long enough to profit on the investment made. This analysis is based on the marketing theory of sustainable competitive advantage

The valuation of environmental factors among shippers

The marketing of freight transport services have two important features: it concerns services and professional buyers. Some differences from goods, is that services are generally produced after selling them and that services qualities can only be evaluated after purchasing and during production-consumption (Zeithaml 1981). Webster (1978) summarized sources of uniqueness in industrial marketing; including product complexity, a high degree of buyer-seller interdependence and complexity of the organizational buying process. The professional buyers buy at the quality levels the organization needs and usually negotiate contracts with particular suppliers for a period, often 12 months that are revised every year. A problem in studying industrial markets is whether to consider the firm or the individual buyer as the decision-making unit but Webster (1968) pointed out that both must be considered. This is applicable to the logistics managers as an individual buyer, whose attitudes towards e.g. environmental aspects may affect the freight transport buying behavior.

It is not only a transport service to be sold but a function, where the core service is to transport freight from point A to point B in the right time. However, there are other service quality aspects of interest, and among these can the environmental aspects of the transports be positioned. In reality, environmental concerns are taken into account when freight transports are purchased to a various extent. In Sweden, there have been a few studies in this area (Björklund 2005; Lammgård 2007). One practice established is e.g. the use of environmental evaluation forms (NTM 2005).

The transport buying companies constitute the demand for freight transports and it is normally the shipper that purchases transports to customers. Wu & Dunn (1994) showed in a model how logistics decisions interact with other business functions and concluded that logistics managers play a critical role in a company's environmental management program because their decisions have a direct impact on the environment e.g. choice of transport mode. Shipping do have an environmental advantage in many cases.

The main actors involved in the transport chain are the seller of goods (shipper), the freight transport provider (forwarder) forwarding the freight to the buyer (receiver). The environmental factor is one, among many, of shippers' transport service requirements. This is shown in a process-focused model based on marketing, logistics, purchasing and environmental management for the marketing of environmental advantage in freight transportation (Lammgård 2007). It can be used as a tool in analyzing how to create customer value for freight transport buyers. The customer value

created is then considered by the shipper together with the price. In the end, it is ultimately the shippers' choice.

The shippers' transport service requirements are based on their logistical, economic and environmental needs (valuation of environmental factors). These demands are put on the transport sellers and brought into their marketing context. This can be used by promoters and marketers of transports based on environmental advantages. The model shows that customer segmentation can be used in a differentiated marketing strategy including e.g. transport service differentiation and marketing communication with different segments. The result is customer value for the shippers, which is weighted together with price (originating from the transport sellers' service production context), which enable the shippers to make a final choice of transport seller(s).

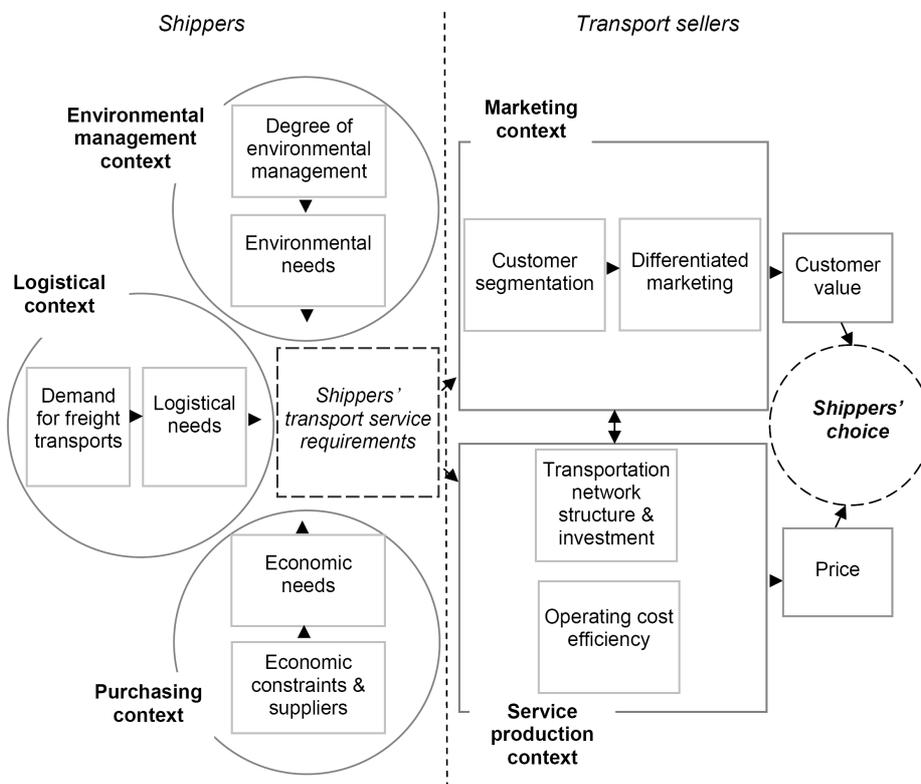


Figure 1: The marketing of environmental advantages in freight transportation (source: Lammgård 2007)

A customer segmentation of shippers was made in this study by Lammgård (2007) based on company size and trade of business in the first stage, and then further by classifying them based on their environmental needs, their priority of price and their potential for intermodal road-rail transports. The results show that the target groups for marketers of intermodal road-rail transports based on environmental arguments would mainly be large manufacturing companies, but also medium manufacturing companies and large wholesale companies.

Even though this model was produced for intermodal road-rail transport, it can also serve as a model for environmentally better-performed sea transport. The valuation of environmental factors is critical in the marketing since the preferences constitute the demand to be met.

Practical classification of shippers based on their valuation of environmental factors

A valuation of environmental factors brings measurement problems since the environment is a collective good that does not normally have a market price. In studies it is often measured by using a Stated Preferences method. Another way is to use some type of classification of groups based on their position in an index. This was for example done in Lammgård (2007) where the survey responses were used for segmentation of responding companies in groups based on size. This resulted in a marketing priority matrix (see Table below).

Segments (stratum)	Potential for intermodal road-rail transports	Environmental needs	Priority of price	Total marketing priority
Small wholesale	Low	Low	High	Low
Medium wholesale	Low to Medium	Medium	Medium	Medium
Small manufacturing	Medium	Low to Medium	Medium	Medium
Large wholesale	Medium	High	Low	High
Medium manufacturing	High	High	Medium	High
Large manufacturing	Very high	Very high	Low	Highest
<i>Total all</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>

Figure 2: Priority matrix based on shippers' needs and preferences, and a resulting total marketing priority for marketing efforts of intermodal road-rail transports based on environmental advantages (source: Lammgård 2007)

The environmental needs and the priority of price among shippers in Sweden can also be applied and used in shipping. This is when it is proven that a shipping company can offer an environmentally better alternative than road.

Review of empirical material on valuation of environmental aspects in buying behaviour

There are various empirical surveys ranking decision factors in freight transport based on their importance to shippers. However, it is important to keep in mind that the logistical decision-making process is complex and a simple ranking of factors may not give the whole picture. The purchasing process is many times a two-step decision-making process. First, there are a few criteria that have to be fulfilled before the seller of transports can be elected at all. These criteria can be a minimum level of environmental performance for example. After this pre-selection, price is usually the main factor for the selection. Now, when confronted by a ranking question on importance then it can be difficult to for example state the importance of environmental considerations in the decision-process, since it is a pre-qualifying factor. Nevertheless, the stated importance of different factors does give useful information.

Large survey of Swedish shippers

A large survey (Lammgård, 2007) was based mainly on an extensive survey³ conducted among Swedish shippers i.e. persons responsible for purchasing transports in manufacturing and wholesale companies in 2003. All companies in the sample of 1800 were contacted by telephone in order to find out the proportion of units in the sample that was in the target population i.e. had outbound freight transports exceeding 150 kilometers. The large-sized companies included all ones in Sweden and a stratified random sample was made in the other sizes of companies. This resulted in a random, stratified sample⁴ with a total of 1,154 local units in the target population. The number of responses was 567 and the final response rate was 49%, even though it was much higher among the larger companies with more than 100 employees. These groups have the largest volumes of freight transported.

The starting point was to establish what weight shippers attribute environmental aspects in comparison to other aspects. This was in focus in two data analyses conducted on the survey data:

Firstly, the importance of four factors was evaluated when selecting transport solution: price, transport time, on-time deliveries, and environmental efficiency. Price was valued the highest in all groups and was most important for smaller companies. The environmental efficiency (represented by emissions of carbon dioxide) was taken into account to a higher degree among those with more than 100 employees (i.e. the large and medium manufacturing companies along with the large

³ The survey was carried out with Bernt Saxin and Jonas Flodén.,

⁴ There was a simple, random sample within each stratum.

wholesale companies), where large manufacturing companies stated the highest proportion (10%). The shares among the other groups of companies were half these sizes, or less. The calculated ratios between the points attributed to price and to environmental efficiency showed that the willingness to pay for environmental improvements of the shippers' freight transports varied. Those who scored highest on importance of environmental efficiency were the least price sensitive. Also, the size had also a greater impact on the willingness to pay, than the trade of business among the manufacturing companies. The companies with less than 100 employees are more price sensitive, but those with an EMS show a much greater willingness to pay i.e. the ratio that was 2-3 times higher than those without one.

Secondly, the respondents were asked to attribute weight to each of 31 listed items when selecting transport provider on a seven-degree semantic differential scale⁵. A Principal component analysis resulted in a seven factor solution⁶. The analysis shows that 'Basic aspects' were ranked the highest (where item means showed that "keep to time agreed upon" and "fulfills its commitments" were at the top of all 31 items, as reported in Saxin et al 2005), but 'Price' were also highly required by the shippers. 'Relational aspects' were more important than 'Loading/volume'. Not far behind, the factor 'Environmental aspects' was ranked higher than both 'IT and additional logistics services' and 'Modal aspects'. However, three items that contribute to the environmental impact of the transports were included in the factor 'Loading/Volume' instead: "offers coordinated shared deliveries with other companies in order to reduce empty load transports", "can coordinate our inbound and outbound transports", and "has a high loading factor of freight". The item 'Price' was highly valued by all.

Also in this analysis, the large and medium manufacturing companies along with the large wholesale companies (i.e. companies with more than 100 employees) received the highest mean on 'Environmental aspects'. The companies with more than 100 employees were responsible for 72% of freight equivalents weight sent.

This survey was conducted in year 2003 and the relevance of the environmental aspects of transports has increased. One of the main transport suppliers in Sweden, Schenker, noticed in 2008 that their Swedish customers mentioned this factor as number one when they were asked what would be the most important factor in the future. Previously, the environmental factor had been

⁵ where 1 equaled very low importance and 7 equaled very high importance

⁶ explaining a total of 55.7% of the variance

more or less on a seventh place. Therefore, all surveys conducted contribute to the complex picture of the demand in the countries in Europe.

MOSES

In the MOSES project, a survey of shippers and freight forwarders put forward eight predetermined transport attributes that the respondents ranked. One of them concerned “environmental impact” (CO₂). It received the lowest ranking among the attributes (8th place) but it was ranked higher in the evaluation of intermodal transport (including SSS) than in the evaluation of road-only. The decision makers opted for solutions with lower environmental impact as long as it is free of charge or for marketing reasons. However, the environmental impact was recognized as an attribute giving intermodal transport advantage over road-only. The conclusion was that this attribute was currently not considered in transport decision.

Sea and Water

Sea and Water (the UK’s Shortsea Promotional Centre) carried out a survey “The Potential for Water Freight in the UK-A Survey of Business Attitudes and Opinions”, measuring the attitude of the users of freight services with respect to water, road and rail. The results of this survey were based on the replies of these 187 companies in the UK which represents a 5% response rate. The results showed that 70% of organisations had a positive attitude towards water-freight transport as an environmentally-sustainable alternative to road. Moreover, 59% would choose water when considering the environment whilst 5% of respondents already use water as a transport mode because of environmental concerns. Reliability was more important than the cost in the choice of mode. The greatest opportunity for water was perceived to be in the movements of containers, recyclable materials, waste and aggregates. The ranking of 15 factors included three with a connection to environmental factors: air pollution (11th place), road congestion (8th place) and road accidents (10th place). The study draw the conclusion that pollution and safety were low ranked in the decision-making process for transport mode. It is interesting to note from a marketing point of view that “trust in brand” was rated on a 9th place.

According to freight users the biggest barrier to water freight was speed of delivery and its effect on just-in-time practices. The lack of commercial interest in water-freight opportunities is cited by operators as the most significant barrier to its growth. The conclusion was that it is a perceived need for the water-freight industry to promote itself in order to increase awareness of the opportunities as part of an integrated transport system.

PROPS

This ongoing FP7 funded EU project aims at developing solutions for the promotion of Shortsea shipping in collaboration with the Short Sea Promotion Centres (SPCs). In a report (PROPS 2009), an analysis is made summarising key parameters and recommendation for promotion of SSS/Intermodality and further work in PROPS. The areas that are included in the analysis are:

determination of mode preference and users' perception of SSS, environmental and social consideration in transport choice, perceived barriers to the use of water-freight transport and the strengths and potential for water-freight transport. There is a summarizing table of conducted studies on decision factors and the surveys mentioned concerning the "environmental impact" are identical to the ones above (MOSES and Sea & Water).

Best practices for sustainability management for port, ship and logistics operators

The next question is how the shippers can judge the environmental performance of a shipping company. In 2008, the Clean Shipping Project⁷ launched an index for comparison of environmental performance in shipping with the cooperation with the world's largest shipping operators. Twelve of Sweden's biggest importers and exporters have signed a letter of intent to place demands on their shipping suppliers and to use the environmental demands described by the project as part of their procurement criteria. In 2008, these companies asked 77 of the world's largest shipping operators to report environmental information through the Clean Shipping Index.

The index addresses 20 factors that can affect the environment including marine fuel, lubricants, bilge water, ballast water, antifouling paint, refrigerants and waste. After the data for a shipping line with vessels have been filled in, it receives a total score in percentage on a scale measuring how "green" the supplier is but also a score by vessel and a score by segment (including the segments Chemicals, NOx, CO2, SOx and PM, and finally Water, fuel and waste control).

A high ranking represents a competitive advantage and environmental gains both for the shipping operator and its customers. This driving force has been lacking previously in the shipping industry. The project leaders believe that Swedish operators are likely to be highly ranked by the index since the Swedish shipping industry are among the leaders when it comes to implementation of environmental measures. The Index is freely available for anyone to use and non-Swedish companies are also welcome to participate in the network. At present, the project leaders are looking into the possibilities to get accreditation for the system. This will guarantee that the reported values are judged in a neutral way and until then, the scores of companies are not publicized officially. The interest of the index has been high also from other countries than Sweden.

Conclusions

The superior sustainability performance of Shortsea shipping and intermodal transport is likely to have an increasing influence on buyers of transport services. The environmental demands on land

⁷ This project is driven by public authorities in Western Sweden and is also financed by the EU Structural Fund "Objective 2". The goal of this non-profit project is cleaner shipping and sustainable growth.

transports have been stronger than for the maritime transports so far. However, studies in the UK show that it is identified as an environmentally better transport mode among a large number of users of freight services although only a small share choose sea transport for this reason. The challenge for the maritime industry is to use these positive attitudes in order to pursue these transport buyers to make an active choice in favor of sea transport. These transport buyers that value environmental aspects high are also more willing to pay for environmentally better transports. Many do it for marketing reasons, which should not be underestimated. Another trend in favor of this development is the increased use of Corporate Social Responsibility Reports, where the environmental impact of the company's transports is often included. One interesting fact is that all companies in Denmark must produce one from 2010. This is a marketing opportunity for sea transport. To strengthen this trend the maritime stakeholders need to:

1. Understand clearly the market segments in which environmental and more generally sustainability performance ranks high on shippers' preferences.
2. Elaborate presentations of facts showing the superior value of sea transport.
3. Develop focused marketing campaigns for the targeted segments.
4. Strengthen the branding of Shortsea and Intermodality as the 'sustainability option'.
5. To show the intermodal option with sea transport as an integrated, environmentally better transport chain.

These actions demands collaboration among actors in the maritime industry but also with actors involved in the land-based transports for example land transport operators. The challenge is to capitalize on the marketing opportunity of sea transport as a sustainable transport alternative.

References

Key Publications

1. "Environmental Perspectives on Marketing of Freight Transports -The Intermodal Road-Rail Case", Catrin Lammgård, PhD Thesis, Göteborg: BAS Publishing.
2. "The Potential for Water Freight in the UK – A Survey of Business Attitudes and Opinions", A Produced Report by Sea and Water for the Department for Transport (2006), <http://www.dft.gov.uk/pgr/freight/waterfreight/pdfwaterfreightuk.pdf>
3. MOSES (2009) "Deliverable 27.1 Marketing Research Report 2008".
4. PROPS (2008) "D1. Analysis of EU goals and policies with references to SSS promotional issues", Marintek, Dec 2008,

Additional Publications

"Meeting the demand of goods transports-identification of needs and priorities among Swedish companies," Article by Saxin, Lammgård, and Flodén, Nofoma 2005.Copenhagen.

Key Projects

1. MOSES Project
2. PROPS
3. Clean Shipping Project

Key web sites

<http://www.cleanshippingproject.se/projektet.html>

<http://www.ntm.a.se>

www.props-sss.eu.

www.moses-eu-project.org.

Additional links

RailPort Scandinavia: The port of Göteborg in Sweden is developing a concept for promoting rail-sea intermodal transports. See <http://www.portgot.se>