



Environmental considerations and trade-offs in purchasing of transportation services



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ABSTRACT

Many companies want to reduce the environmental impact of their transports, especially CO₂ emissions. This paper examines the importance large shippers attribute to environmental aspects when purchasing freight transport services and the trade-off with other aspects, specifically how these have changed over the last decade. The starting point is a proposed theoretical model for the marketing of environmental advantages in transportation services. Results from two studies are analyzed, including data from two telephone-initiated surveys in 2003 and 2012 with regard to the purchasing of freight transportation services among large shippers in manufacturing and wholesale companies in Sweden. The response rates were high (64% in 2003 and 30% in 2012) and represent a solid number of responses (in 2003, n = 406 and in 2012, n = 175). The results show that the attributed importance to environmental aspects has been stable over time. Basic service aspects of transportation services related to the reliability and transport quality were the top priorities for logistics managers when selecting transport providers, in addition to geographic coverage and a low price. Price is however most important when selecting transport solutions. Transport providers need to know shippers' preferences when considering marketing of environmentally preferable transport services.

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1. Introduction

Global warming is a fact and CO₂ emissions are a large contributor to this. This development has driven companies to take action in reducing CO₂ emissions, often as a part of their CSR. It is a way of reducing business-related risks such as supply chain risks (e.g. vulnerability of suppliers), regulatory risks (e.g. the Emission Trading Scheme in the EU for air transport), physical risks (e.g. plants destroyed due to a changing climate with floods, etc.) and reputational risks (e.g. impaired brand value when associated with non-sustainable practices) (Lash & Wellington, 2007). However, reducing CO₂ emissions is increasingly a strategy for gaining a competitive advantage. Suppliers with this competitive advantage can highlight environmental advantages in their marketing of products and services, new or existing ones (Unruh & Etnenson, 2010). The logistics and transport sector is calculated to account for 5.5% of the total greenhouse gas emissions globally (equivalent to 2800 mega-tonnes CO₂e), for which transportation constitutes the major part (World Economic Forum, 2009). The transport sector accounted for 30% of the CO₂ emissions in Europe in 2009, but the

most problematic aspect is its high growth rate in comparison to all the other sectors that have stabilized to a larger extent (European Commission, 2012). For freight, an increased share of road freight transport as opposed to other transport modes has supplemented the increased transport demand for goods (European Environmental Agency, 2009). This inertia to change within the freight transport industry can partly be explained by the fact that many transportation efficiency measures are ambiguous and often involve uncertainties with regard to the costs and benefits for the actors in the system (Arvidsson, Woxenius, & Lammgård, 2013). The magnitude of the climate change problem now also occupies company environments and strategies as a response to both internal and external pressures from various stakeholders (Nair & Ndubisi, 2011).

For logistics operations, in which transport services are included, four reasons why sustainability is important have been identified by Dey, LaGuardia, and Srinivasan (2011): brand value, misuse of resources, government intervention, and international standards and regulations. Large third-party logistics (3PL) providers have environmental sustainability goals and a commitment to these despite the recession (Lieb & Lieb, 2010). This conclusion was based on two surveys, in 2008 and 2009, among CEOs of 3PL providers operating in North America, Europe and the Asia-Pacific region. Interestingly, they reported in the 2009 survey that nearly two-thirds of the customers of these large 3PL providers were giving at least moderate attention to sustainability issues during the economic downturn. Based on these results, it is highly

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likely that the same applies to transport service customers as well, as transport services are included in the business area of 3PL providers. However, other studies have shown that 3PL providers and transport providers perceive that their customers are not willing to pay a premium price for more environmentally efficient logistics services (Lamngård, 2012 and Rossi, Colicchia, Cozzolino, & Christopher, 2013). Rossi et al. (2013) found that LSP managers consider the customer to be the main driver towards eco-efficiency, followed by regulations and marketing in this order.

For purchasing, environmental considerations have become a significant issue over the last decade (Min & Galle, 1997 and Preuss, 2001). Ultimately, it is the buyers that decide what importance they attribute not only to the environmental aspects of the products and services purchased but also to other aspects. Bournakis and Melewar (2011) pointed out in a review of the research on outsourcing logistics that there are contrasting views in logistics literature about which selection criteria dominate supplier evaluation decisions. Given examples are Kremic, Tukel, and Rom (2006) and Wilding and Juriado (2004) who suggest that cost is always a key, or even a top priority, while Sink, Langley, and Gibson (1996) note that the core competencies of 3PLs are the leading motives during these decisions. Regarding freight transport services, there is a contextual influence on the configuration of the purchasing processes as highlighted by Rogerson, Andersson, and Johansson (2013) for cases in which the selection of the transport provider is dependent on service type (defined by material flow characteristics), purchase task (type of relationship with supplier), and the importance of other various aspects (e.g. cost).

The environmental purchasing of transport services is greatly influenced by management, company image, customers (of shipper), carriers, and the means of control applied by the government and other authorities (Björklund, 2011; Walker, Di Sisto, & McBain, 2008). Philipp and Militaru (2011) showed that ecological buying behavior among shippers was more influenced by company-specific antecedents than relational aspects and regulatory constraints. One practice is to place environmental demands on transport suppliers such as having an ISO 14001 accreditation and/or demand specific technology of the vehicles in use (e.g. EURO class on engines and alternative fuels). A study by Large, Kramer, and Hartmann (2013) surveyed purchase and logistics managers and included the “choice of transport provider under considerations of sustainable aspects” as a field of activity when procuring logistics services. The results depicted a relatively strong correlation between the importance and the consideration of sustainability as a selection criterion. Regarding modal choice, few logistics managers exerted influence on the use of railway and/or inland vessels. Also, the direct influence of purchasing companies on logistics service providers' sustainable actions is put into effect specifically when trying to achieve economic goals at the same time. To sum up, it is the rated preferences of transport purchasing companies (shippers) that form the demand. There are various preferences that have to be taken into consideration, which subsequently results in a trade-off between environmental criteria and other aspects, especially price and service aspects. Individual studies using survey data have identified the importance of environmental aspects or demand among shippers at a given time, but the change over time can only be measured by multiple studies.

The purpose of this paper is to examine the importance large shippers attribute to environmental aspects when purchasing transport services and the trade-off with other aspects, specifically how these have changed over the last decade. The scope of this paper targets the attitudes and preferences of the shippers, which constitute the demand for freight transport services. The supplier side of the marketing of freight transport services is not a focus of this study, although implications from this research are highly relevant for transport providers in their marketing of transport services. This paper is divided into four sections. Firstly, the methodological choices are discussed. Secondly, a conceptual model for the marketing of freight transport services based on environmental advantages is presented, which is based on a review

of research. Then the results from two surveys among shippers are presented. Thirdly, the findings and a discussion follow. Finally, the implications for management are shown, followed lastly by implications for scholars.

2. Methodology

The research problem was approached in two steps. First, starting in theory, a process-focused model for the marketing of freight transport services based on environmental advantages was developed. This is the point of departure for the research, with the model defining the scope and direction of the data collection. Secondly, in order to use the environmental arguments of the marketing of freight transport services, the shippers' evaluations of environmental aspects had to be quantified. This was achieved by the use of the results from two separate surveys in 2003 and 2012. By combining theory and empirical data, a richer description of the demand for environmentally sustainable freight transport services is presented, especially in looking at if this is changing over time. The surveys covered the same topic: the purchasing of freight transportation services among manufacturing and wholesale companies in Sweden. The findings from 2003 showed that 96% of all shippers in Sweden regardless of sizes contracted transport providers. For the targeted shippers in this paper (companies with more than 100 employees), this share was 88% among the respondents in 2003. These large shippers purchased a majority of the freight volumes sent in Sweden, more specifically about 98% of total transported freight covered in the survey in 2003, which is equivalent to 72% of all freight sent in its tonne equivalent in Sweden (Lamngård, 2007). All of the respondents in the 2012 survey contracted transport providers.

The same frame was used for the two surveys, Statistics Sweden's Business Register, and in 2012 there were 953 local units³ identified in our target group (762 manufacturers and 191 wholesalers). A simple random sampling was used for selecting 715 units based on the aim of reaching at least 150 answers. After removing 129 foreign elements from this sample, 586 units were left. The 2012 survey was aimed at only large shippers, but the survey in 2003 originally included a representative sample of all sizes of companies, for which only those with more than 100 employees have been included in this article. However, this means that the 2003 survey originally had a much larger population, and a simple stratified random sample (from each stratum) of a total of 1800 local units was drawn from the frame. After a phone screening (to identify those involved in long haul transportation), there were a total of 1154 local units left, of which 631 belonged to the target group of this study, i.e. large shippers (see Table A.1). They were represented by a solid number of responses; N = 406 in 2003 and N = 175 in 2012. The response rate was 64% in 2003 and 30% in 2012 (but if based on the number of questionnaires distributed by mail, the response rate was 51% in 2012). In both surveys, a telephone-initiated method was used and if a person agreed to answer the survey, a link to the web-survey in 2012 (and by post in 2003) was sent by e-mail. Several call-backs were done if there was no answer, with a maximum of 22 attempts. Finding the proper respondents by telephone increased the response rate and, above all, the validity of the results. We have also participated in all stages of the process and followed closely the established procedures throughout the data collection and feel confident in the validity, reliability, and conclusions drawn.

There were several data analyses made in this paper, mainly exploratory factor analysis (principal component analysis) and ANOVA tests. The suitability for doing a factor analysis for the survey data from 2003 was tested⁴ and supported. The two main data analyses in this

³ A local unit is each address, or building(s), where a company carries out economic activity (SCB, 2013). In the 2012 survey, “company” was equal to “local unit” though.

⁴ The KMO value was .87 and the Bartlett's Test of Sphericity reached a statistical significance. The eigenvalues of the components extracted exceeded 1. Cattell's scree test was also done.

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