

# TRANSPORT USER INVOLVEMENT

## - ANALYZING THE IMPACT OF SUSTAINABILITY ON FREIGHT TRANSPORT

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### Introduction

Despite the direct relationship between the demands of the transport user and the execution of freight transport, freight transport services are often considered to be inefficient to the extent that they therefore not environmentally sustainable (Sternberg 2011:1; Sternberg 2011:2; Kalantari 2012). This inefficiency can partly be explained by the deviating demands of the transport users and the economies of scale required for the transport service providers to be efficient in their operations (Kalantari 2012). Whereas transport operators want to have regular, predictable demand with wide delivery windows (and a full return load), transport users stress the need to be flexible (Mason and Lalwani 2006). Thus, demands by the transport users that deviate from the standardised way of handling the goods will cause effects that make freight transport less efficient and by that contribute to increased environmental damage.

Though efficiency sometimes refers to transport capacity, sometimes to energy and fuel use, and at other times to cost efficiency. In this paper we encompass any type of efficiency aspect in relation to sustainable development (WCED, 1987). This means that we encompass efficiency in terms of use of natural resources such as energy and fuel, efficiency in terms of lowest possible negative and highest positive impact on social aspects such as quality of life, and efficiency in terms of low economical costs and high economical gains.

In this paper we investigate the lack of information that is a direct consequence of the lack of information sharing between shippers and transport operators, and how this may lead to inefficiency. A possible explanation for the lack of information support in freight transport is that transport has been managed in a way that rather fits the needs of partnering supply chain functions, as “*a discrete and unrelated activity to the more important supply chain activities*” (Mason and Lalwani 2006). According to a recently made study of the Swedish road hauliers, transport users often underestimate the weight and volume of the goods (Pahlén and Börjesson, 2012). Thus, transport operators cannot rely on the information received by the shippers. According to Sanchez-Rodrigues et al. (2010) this type of spurious and inexact information is one of the causes for uncertainty in logistics operations. Transport operators have to be flexible in their operations (Stephenson and Willett, 1969). Therefore, any problem related to planning and forecasting will mean that extra capacity is needed.

We discuss that if transport users did share detailed information on goods volumes and the physical characteristics of the goods with the transport service provider, forecasts and capacity planning would be more accurate. This information could be utilized so that the transport operators could make a better estimation of the capacity needed and by that increase the performance of the freight transport, i.e. increasing the filling rate, reducing empty running and by that increase the overall resource utilisation (Pahlén and Börjesson, 2012). Due to the potency of access of additional information in logistics and transportation, it is important to focus on the factors that may increase the willingness to share information in order to increase the overall transport efficiency.

The research presented in this paper focussed particularly on whether the common societal and business goals of sustainable development might be a driver for increased information exchange. We have problematized around whether the relationship between business policy and goals of sustainable and traditional economical business goals such as increased sales and revenue are compatible. A framework to use as challenge and basis for discussion was developed.

### **Purpose**

The purpose of the paper is to identify how and to what extent companies, acting as users of transport services, are prepared to contribute to make transport and distribution more sustainable and how companies gain competitive advantage from environmentally, socially and economically sustainable freight transport operations.

A part of the problem with inefficiencies in freight transport is that transport users are offered service levels, using express transport services despite the fact that it is often more important that delivery times are reliable and consistent rather than solely fast (Stephenson and Willett 1969). As a consequence, many transport users pay for services, getting short lead times, late pick-up times and high frequency, despite the fact that they above all need cost efficient and reliable transport services.

From a transport operator perspective, short lead times and late pick-up times affects consolidation and the filling rate of load units and trucks. Instead of filling up the load units, transport operators are forced to reduce the filling rate due to time limitations, which eventually means reduced resource utilization. Currently, there is spare capacity in the transport system that could be used if the goods could be consolidated more effectively (Lumsden 2006). Recent research shows that currently the filling rate handling general cargo in Sweden is about 60 to 65 per cent (cube/weight) for general cargo (Pahlén and Börjesson 2012). Even if some of this spare capacity is related to structural problems and transport network characteristics, there is a potential for great improvement.

### **Literature review**

Being the single most environmentally damaging operation within logistics (Wu and Dunn 1995; Martinsen 2011), freight transport has a tremendous potential for being a tool for greening supply chains. It is therefore crucial that transport users are aware of the fact that they have the possibility to influence the environmental and social outcome of the freight transport and that acting responsively can provide a competitive advantage to their customers (Holloos et al. 2012). Carter and Rogers (2008) state that there are activities that organizations can engage in which not only positively affect the natural environment and society, but also result in long-term economic benefits and competitive advantage for the firm. It has also been shown that firms that are selling branded products are inclined to punish suppliers that do not comply with existing sustainability standards (Francés-Gómez and Del Rio 2008). Provided that transport often connects companies to their customers, effective transport operations can enable the delivery of customer value (Sanchez-Rodrigues et al. 2010).

There is a relation between, ICT and freight transport, an *Efficiency paradox*: “*ICT applications that make freight transport more cost efficient immediately will create more freight transport and more energy consumption*” (Hilty et al. 2006). By making transport more cost efficient, ICT creates freight transport demand, with severe environmental effects, unless measures are taken to limit demand of transport. However, from a strict business perspective, efficient use of information will increase the competitive advantage of the firms succeeding in making freight transport more efficient. By sharing information, the freight transport and distribution process can be made more efficient, enabling advanced resource planning and forecasting. The amount of information available increases the opportunities for the transport service provider to allocate resources that correspond to the freight demand. The environmental impact of freight transport can thus be related to the extent to which information is available and how it can be used by the shippers and operators.

In the literature it is well recognised that environmental sustainability and climate change is likely to become a major business driver and that companies will come under intense pressure to lower their emissions of CO<sub>2</sub> over the next few decades (McKinnon 2010). Companies are also rapidly beginning to adopt the term sustainability (Carter and Rogers 2008). Freight transport is also beginning to be sustainability focused, although the process seems to take more time. An increasing number of actors currently willing to reduce the emissions from freight transport which means that the pressure on the transport operators increases. As a consequence, a market for sustainable freight transport services is about to emerge where environmental social and financial aspects are included in both strategic and operational decisions.

As environmental sustainability and social awareness is one of the most important incentives to increase financial sustainability, it is also likely that it might be a driver for sharing information. Previous research has been shown that companies that act in a responsible way, should explore the possibilities to find even more arguments and areas that could be incorporated in their actions (Campbell 2007; Hollos et al. 2012). However, there is a general lack of knowledge on how sustainability and CSR drive the development for more efficient freight transport services. It is also unclear how sustainability can influence the performance of freight transport operations. It is therefore of great interest to find out in what way companies can be motivated to contribute to better transport efficiency using sustainability and corporate social responsibility as a means to increase their competitive advantage. It has been suggested that environmentally adapted supply chains can only be realized through cooperation between environmentally aware suppliers and a focal company (Seuring and Müller 2008; Wolf and Seuring 2010). The transport service providers thus have to be aware of the power of environmental sustainability and social responsibility.

### **Case study**

A case study methodology was chosen for the study (Eisenhardt, 1989; Yin, 2003; Eisenhardt and Graebner, 2007). Two companies were contacted for the case study, representing two very different types of organisations. In this paper the two companies are anonymous and therefore just referred to as "*Case Company A*" (the clothing and leisure vendor) and "*Case Company B*" (the apparel and hardware vendor). Before the companies were selected and the interviews were made, an interview guide was developed in a structured way. Of different reasons, Case Company A chose to answer the interview questions by using e-mail. Detailed answers to all questions were received from the focal company including follow-up questions. Case company B was interviewed on site using a similar questionnaire compared to the one sent by e-mail to case company one. Two interviews were made using open-ended questions. The interviews with Case Company B were recorded and transcribed.

### **Sustainable development**

Sustainable development, often referred to as 'Sustainability', is an increasingly potential dimension for competitive advantage for transport service providers due to the increased focus on environmental and social impacts from freight transport. CSR, environmental, and economic sustainability are becoming important criteria for how products and services are perceived by the customers. In this way, sustainable freight transport may provide an additional value to transport users, both in terms of efficient and effective freight transport processes but also the goodwill effect of being environmentally and socially responsible. The increased focus on sustainability also provides an opportunity for the transport operators to develop services where increased operational efficiency not only means increased resource utilisation and better total economy but also leads to reduced environmental impact. Sustainability as a core business value in organisations purchasing transport and logistics services thus provides opportunities for the transport service providers to develop services that increase the environmental performance and increase transport efficiency.

To conceptualize the focus of the study, a framework was developed. The framework incorporates the three separate concepts of the research, that is information and ICT, transportation of goods and sustainable development. The concept of sustainable development is constituted of the three dimensions of Triple Bottom Line, People (social performance), Planet (environmental performance) and Profit (Financial performance)

(Elkington, 2004; Kleindorfer et al., 2005; Hollos et al., 2012). In the framework those are translated into, the financial performance - *Business*, the social performance – *Man*. and the environmental performance - *Resource(s)* used (Table 1).

**Table 1 Sustainability**

<b>Sustainability dimension</b>	<b>Attribute</b>
Financial performance	Business
Social performance	Man
Environmental performance	Resource(s)

The long-term financial performance (business) relies on the environmental performance (material and resources in use) and the social performance. Too low costs of a good or service will for certain mean a product cannot be sustainable. However, if the financial performance is poor, environmental and social performance cannot be sustained and therefore the long-term sustainability is threatened. The bottom line is that a violation of any of the three sustainability dimensions means that the product or process in focus is not sustainable.

### **Information and ICT**

Developments in information communication technology (ICT) are creating a new operational landscape for collaborative logistics systems (Lalwani and Mason, 2005). It is also well recognised that freight transport in terms of load planning, routing and scheduling can be made more efficient by using ICT (Stank and Goldsby, 2000). A main objective in this research is therefore the sharing of information and the potential of using ICT for effective and efficient transport operations, e.g. in what way transport users share information with their suppliers; why information sharing occur and under what premises; and finally what kind of information can be shared. For the design of the interview questions, the use of ICT was categorised into three main categories: (1) *Identification and traceability*, (2) *Information sharing and communication*, and (3) *Goods specific information* (Table 2). For each category, an indicative definition was provided.

*Information sharing and communication* is related to supply chain integration and the amount of information being shared between the transport users and the transport operators in order to improve logistics performance. In order to reduce uncertainty, supply chain integration, at all levels, is essential to improve supply chain performance (Sanchez-Rodrigues, Potter et al. 2010).

*Goods specific information* is the use data on the characteristics of the goods to enhance the goods handling process, e.g. weight, volume, etc.. A major issue is therefore what type of information that will contribute to sustainable freight transport and goods handling.

*Identification and traceability* refers to the track and trace services offered by the transport operators and the potential of using automatic identification for localisation of products and goods. A major benefit of traceability is the increased visibility and fact that the shipper is able to take the control over the physical handling in the supply chain.

**Table 2 Information and ICT**

<b>Aspect of information</b>	<b>Indicative definition – “To always receive information on...”</b>
Information sharing and communication	Availability of information, receiving the same information as today, three days in advance instead of 1 hour before pick-up,
Goods specific information	Information on geometrical and physical dimensions, including weight. Specific characteristics, e.g. fragility, tolerance, security and goods value.
Identification and traceability	Information on geographical location, identity of the goods is being handled and who is handling the goods for sent, expected or in-, for-, or after transport handling.

### Freight transport indicators

Seven indicators were chosen to reflect the potential change or benefit: Filling rate, lead-time, delivery precision, profit, cost, risk and optimisation (Table 3).

**Table 3 Freight transport Indicators**

Indicator	Definition
Resource utilisation	Physical resource utilisation, e.g. weight, cube or volume capacity.
Lead time	Time required for transport between the goods is ready for pick-up and delivery
Delivery precision	Deviation between actual and expected time for pick-up and delivery.
Cost	Cost related to the transport assignment
Profit	Profit related to the transport assignment
Risk	Perceived risk
Optimisation	Optimising the system on behalf of a specific actor, i.e. sub optimisation or indeed a new optimum where all or some actors are sharing the investment cost to reach the goal

### The interview set-up

The interview questions were formulated based on a structured methodology where first the three dimensions of sustainability according to TBL (Table 1) were combined with information and ICT (Table 2) and the proposed indicators in Table 3. For each aspect of sustainability, an information aspect was assigned followed by an indicator. In total 63 questions were generated, covering one qualitative aspect and one quantitative aspect respectively.

A large number of questions were later found to be redundant as they covered similar aspects whereas others were grouped together. The number of questions was reduced successively in four rounds down to 11 unique questions that provided the foundation for the interview questionnaire. Due to the chosen methodology, a thorough analysis of the area was made which meant that all aspects of the studied area were covered. Interviews were then made with the two case companies based on the questionnaire, either on site at the head office or via e-mail. In both cases full answers were received on most of the questions which made a cross case analyses possible.

*Case Company A* is a global fashion retailer, acting online and via an international network of physical stores. The major part of their production is based in the Far East and the products are shipped mainly by boat to their main warehouses in the Eastern part of Europe and Scandinavia. Some fashion products are also delivered by air transport due to restrictions in time. The company is selling under its own brand, which means that the company has an incentive to act in a way that their returning customers find attractive. Being a part of the fashion industry, their customers expect certain lead-time, customer service and cost for transportation.

*Case Company B* is a Nordic vendor of hardware and home appliances, selling to both companies and private people. The company started with mail order service, which later was transferred to the Internet as a sales channel. However, as a consequence of a strategic decision the internet and mail order service was terminated a couple of years ago as they decided to focus solely on the stores, followed by an expansion of physical network of stores. Currently, the company involves a sales network of over 50 stores in Scandinavia and Eastern Europe. A large part of the products in their assortment are private labels but they also sell other well-known brands. A majority of the private label products are made in the Far East and arrive by boat in ISO containers. The company recently announced that a DryPort solution (Roso et al. 2009), combining intermodal rail and road transport, will be used for the transport of containers from the port to the main warehouse.

An important reason for choosing companies was that both companies are actively working with environmental sustainability and CSR.



### **The result of the interviews - Sustainability management**

Through the interviews, we learned that sustainability is a core business value for both companies and that the companies take all three dimensions seriously. Through the interviews, it was found that both companies were aware of the potential of sustainability performance and use sustainability dimensions as guidelines in their daily operations, following a well-defined code of conduct. They also share a willingness to involve CSR and Sustainability in strategic and operative planning and development of the companies and aim to integrate them in the business strategy. For *Case Company A*, which is acting on a global market where branding and goodwill is of great importance, reporting on sustainability was more formalised compared to *Case Company B*.

The interviews show that sustainability management control systems for transports and logistics are in place. *Case Company A*, acting on a global market has formalized the requirements on the suppliers. Transport operators and logistics service providers are required to present a minimum score of 112 points on the ERRT WayAhead self assessment tool for carriers ([www.way-ahead.org](http://www.way-ahead.org)). The company also arranges workshops on CSR and environmental sustainability where they together with their transport suppliers learn about and from each other.

*Case Company B*, the selection of carriers is made based on long-term relationships and trust. The company is working close with their suppliers and expects them to be proactive in terms of sustainability and social responsibility. The study shows that systems to set environmental requirements on transporters are in place, and are at different levels of development. One does not recognize the responsibility for suppliers, e.g. truck drivers, and does not expect that to be taken care of by contracting big haulers rather than individual small ones.

Both interviews show that it is doubtless and clear that sustainability is high on the agenda of business policy, strategy and everyday business life. It is also clear that the full level of implementation and utilization of this strong concept is still on-going in an explorative manner. There is a strong willingness to develop this much more, but both companies also express a carefulness to implement sustainability management in a good way, to avoid any form of backlash or risks to oversimplify the questions.

### **Information and ICT**

The two companies have to a large part established their traditional business logistics processes and economy on ICT. They do rely on advanced information and communication systems for their daily operations. ICT is identified as a facilitator for work situation, e.g. since it helps with planning and knowing when and where trucks and transports are. However, there is not much follow-up or quality requirements on environmental data. Both companies state that they currently do not have the possibility to record and to follow-up on this type of information. This is partly because of lacking information infrastructure but also due to the lack of tools for decision support. The study proves that there is a need for reporting and evaluation tools for environmental and social performance to increase environmental sustainability and social responsibility. It was stated by one of the case companies that the implementation of a transport management system (TMS) would facilitate the evaluation and selection of carriers. The decision support delivered by a state-of-the-art TMS would mean that decisions could be made based on sustainability factors.

### **Conclusion and further research**

Sustainability as a core business value in organisations purchasing transport and logistics services provides opportunities for the transport service providers to develop services that increase the environmental performance for transport services and to increase the overall transport efficiency.

Being a part of the supply chain, the demand for sustainability and social responsibility includes transport services. The literature review and the presented case study indicates that environmental sustainability and social responsibility constitute an important future competitive advantage for many companies including transport operators. However, in order to become truly sustainable information decision support is needed. Many of the identified

future possibilities for sustainability as a driver for efficient freight transport and logistics are limited by the fact that a proper information systems infrastructure is not in place. This study shows that information systems support for environmental and social reporting is lagging behind. This is also the case for technologies for real-time tracking and tracing information systems such as Radio Frequency Identification (RFID). Currently, implementing such technology provides limited additional value and does not motivate the investment cost, at least not from a sustainability perspective.

Based on the positive outcome of the presented study and the response from the case companies, there are reasons to believe that there is a growing potential for environmental sustainability and social responsibility as a driver for information sharing. The fact that the empirical study involves just two companies and that these two companies clearly represents best practice, further research should include a broader base of companies. Depending on the focus of the new study, either by expanding the study involving more companies focusing on communication and information sharing or by making a survey focusing on the business opportunities.

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