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Developing environmentally sustainable logistics Exploring themes and challenges from a logistics service providers' perspective



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ABSTRACT

The purpose of this paper is to explore themes and challenges in developing environmentally sustainable logistical activities.

The approach is explorative with a cross sectional design that takes advantage of ten case studies out of selected logistics service providers (LSPs) operating primarily in the Scandinavian countries.

The findings illustrate the major themes by analyzing current and future activities in developing environmentally sustainable logistical activities. In addition, four categories of challenges are identified: customer priorities, managerial complexity, network imbalance, and technological and legislative uncertainties. It is concluded that there is a great need for a holistic perspective where LSPs and product owners together analyze and design future logistical setups.

The suggested holistic and integrative model, building on a three-dimensional concurrent engineering framework, provides new opportunities for research. Further research is needed to improve the interrelationship between LSPs and their customers in the development of sustainable logistical solutions.

This paper puts forward recommendations for the sustainable development of logistics by combining the results from the case studies with a review of related literature. This will be beneficial for managers and policy makers when they approach sustainable logistical challenges. The emergence and synthesis of themes and challenges are critical for a sustainable society.

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Introduction

Logistical activities have several positive socio-economic effects while demand for mobility and accessibility are fulfilled; infrastructures are constructed; new jobs are created; poverty, hunger and crimes are lowered; and humans and nations become wealthy. On the other hand, logistical activities may have several negative effects on their surrounding (natural) environment and societies that should be minimized. For example, they are still dependent on fossil fuels and nonrenewable

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natural resources; have negative effects on residents' health and safety; give rise to atmospheric, land, water, noise, and visual pollution, congestion, intimidation, vibration, injuries, and accidents.

Sustainable development of logistics calls for activities that lead to the highest economic and social gains while reducing the negative environmental losses. However, in the long term these activities are complex and tied to great challenges, dilemmas, difficulties, and barriers. [European Union \(2011\)](#) highlights some of the current and future trends, such as migration and internal mobility, aging, urbanization, and globalization, all of which may challenge social and economic developments. The increasing scarcity of fossil fuels and global warming are examples of environmental challenges. [McCauley \(2008\)](#) sheds light on challenges in governing sustainable development. [Abbasi and Nilsson \(2012\)](#) elaborate on environmental challenges from a supply chain perspective and classify these into costs, complexity, operationalization, mindset and cultural changes, and uncertainties. [Rodrigue et al. \(2001\)](#) shed light on paradoxes of green logistics due to costs, time/speed, reliability, warehousing, and e-commerce.

The purpose of this paper is to explore themes and challenges in developing environmentally sustainable logistical activities from a logistics service providers' (LSPs) perspective. The two main reasons for choosing an LSP perspective are: (1) their dominant role in handling freight due to the increased outsourcing of logistical services to LSPs ([Wolf and Seuring, 2010](#)) and, (2) the limited research available with an LSP perspective on sustainable development ([Lieb and Lieb, 2010](#)).

The next section provides the frame of reference, and reviews previous research on connecting logistics to sustainable development and to LSPs. This is followed by a description of the methodology used. The research is based on case studies of selected LSPs operating in the Scandinavian countries. In the results section, emergent themes of environmentally sustainable logistical activities are presented, along with the challenges identified and discussed. The paper ends with the discussion and conclusions sections, of which the latter presents opportunities for future research.

Sustainable development and freight transportation

Popularized after the Brundtland Report, *Our Common Future* ([World Commission on Environment and Development, 1987](#)), and followed by the [United Nations 2005 World Summit](#), sustainable development (SD) encompasses the interdependent and mutually reinforcing pillars of economic development (Profit), social development (People) and environmental protection (Planet). The three 'P's of SD are sometimes called the 'three bottom lines (TBL or 3BL)' ([Elkington, 1997](#)).

The literature of the logistics and supply chain disciplines demonstrates the increasing appearance of SD. [Carter and Rogers \(2008\)](#) elaborate on its three pillars together with four supporting facets: risk management, transparency, strategy, and culture. Much of the remaining literature focuses on some of the pillars, such as corporate social responsibility ([Keating et al., 2008](#); [Dyllick and Hockerts, 2002](#)); environmental logistics ([Wu and Dunn, 1995](#)); and green logistics ([McKinnon et al., 2010](#); [Abukhader and Jönson, 2004](#); [Aronsson and Hüge Brodin, 2006](#)).

Although outsourcing of logistical activities to LSPs and their role in the creation of trust and value in supply chains are considered to be imperative ([Selviaridis and Spring, 2007](#); [Marasco, 2008](#)), little attention has been given to sustainability goals and aspects ([Lieb and Lieb, 2010](#); [Wolf and Seuring, 2010](#)). [Huemer \(2012\)](#) puts forward the limitation of most SCM research and practice in focusing on the manufacturer or the retailer perspective. He suggests further investigation of the LSP perspective as an alternative to the dominant product and/or value chain perspective, especially in the cooperation among manufacturers and/or retailers in making logistics more environmentally friendly. The prevailing manufacturer and/or retailer perspective (the demand side) is evident when it comes to research on logistical services in general (procurement or outsourcing of logistical services) ([Selviaridis and Spring, 2007](#)), but also when it comes to sustainability issues ([Philipp and Militaru, 2011](#)). [Wolf and Seuring's article \(2010\)](#) was the only one found that includes both buyers and LSPs in the same study.

In two literature reviews on third-party logistics ([Selviaridis and Spring, 2007](#); [Marasco, 2008](#)) a number of themes and challenges are raised. However, as also noted by [Wolf and Seuring \(2010\)](#), the discussion of sustainability and environmental issues are neither highlighted as central themes nor as areas for further research. The low level of interest is confirmed when examining the empirical literature on environmentally related activities of LSPs. For example, [Maas et al. \(2012\)](#) conclude in their study on third-party logistics actors that environmental differentiation is only a minor part in differentiating their practices. [Lieb and Lieb \(2010\)](#) report that 13% of LSPs receive substantial attention and 50% moderate attention from their customers on environmental initiatives. [Lin and Ho \(2008\)](#) argue that despite the great environmental impact of logistical activities, the logistics industry is still in its infancy when it comes to environmental issues. They go on to investigate the intentions of LSPs to adopt green innovation in Taiwan and find a number of significant factors needed in these organizations: explicitness and accumulation of green technology, organizational encouragement, quality of human resources, environmental uncertainty, and governmental support.

In order to gain insights into the role and perspectives of LSPs in relevant domains of logistics research, a manual systematic review of title, keywords and abstract was carried out in this study of all articles published in top-ranking supply chain, logistics, and operations management journals² up to the end of 2012 ([Table 1](#)). It resulted in 115 articles that focused on LSPs and LSP activities. Of these, only 5 dealt with the environmental aspects of sustainability and none dealt with all three pillars.

² The journals were selected based on Journal Citation Reports available on the ISI Web of Knowledge.

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