Empowering urban freight and intermodal transport for sustainable mobility

Research Plan

Sönke Behrends, 2008-02-14

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Introduction

Background

The current economic development is not sustainable. The biggest and most challenging threat is the worldwide dramatically increasing greenhouse gas (GHG[1]) emissions. In the absence of an effective climate policy this trend will continue and emissions will double until 2050. In this 'business-as-usual (BAU) scenario' the earth would be committed to a warming far outside the experience of human civilization with unforeseeable consequences for physical and biological systems as well as for society (Stern, 2007). In order to reduce the risk of the worst consequences, GHG-levels in the atmosphere need to be stabilized. Figure illustrates the scale of the challenge for returning to sustainable levels. A reduction of annual GHG emissions by 60-85% below BAU by 2050 is required. Stern (2007) concludes that the costs to achieve this (approximately 1% of the worldwide GDP) are much lower than the costs of climate change caused by non-action.

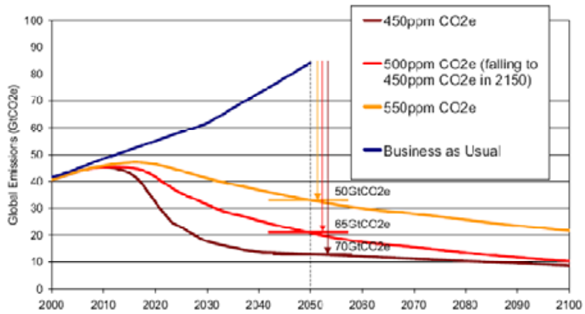

Figure : BAU CO2e emissions and stabilization trajectories. ***Source: Stern (2007)***

Today's transport system considerably contributes to the current unsustainable development. It accounts for approximately one quarter of global CO_2 emissions. Road transport accounts for ca. 65% is the major contributor (Chapman, 2007). Road transport emissions are split two thirds to passenger transport and one third to freight at present in the OECD (European Conference of Ministers of Transport, 2007). It is one of the few industrial sectors where emissions are still growing because the continuously growing demand for freight transport is preferably met by road, the most CO_2-intense land transport mode, while the use of the CO_2-efficient mode rail declines (Figure).

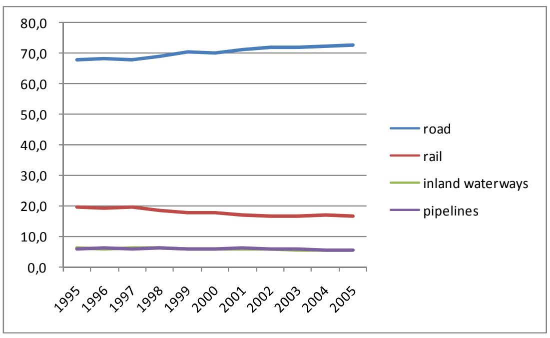

Figure : Freight transport performance for inland modes in 100 mio tonkm (EU-25). ***Source: (European Commission, 2006a)***

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[1] The dominating greenhouse gas is carbon dioxide (CO_2). Many more gases contribute to the greenhouse effect, e.g. methane (CH_4) and nitrous oxide (N_20). Their effect is measured in relation to CO_2 and is quantified in CO_2e (carbon dioxide equivalent).

On a local scale, Road freight negatively affects urban areas where over 60% of the EU population lives in and generate ca. 85% of GDP. Towns and cities are the drivers of the European economy. They attract investment and jobs. They are essential to the smooth functioning of the economy. However, urban mobility is being increasingly challenged by increased traffic and congestion. Increased traffic and congestion go also hand in hand with more air pollution, noise and accidents (European Commission, 2007).

Research projects

The BUSTRIP project

The EU recommends local authorities to develop and implement Sustainable Urban Transport Plans (SUTP) as a cornerstone cope with the challenge of increasing negative transport impacts. The SUTP concept is an integrated approach to manage urban transport by adopting long-term and strategic action plans. It aims at improving qualities of the planning approach in terms of procedures and actor relations as well as designing planning instruments to ensure the efficient implementation of policies and measures and ultimately target achievement (Wolfram, 2004).

BUSTRIP (www.movingsustainably.net) is the 1st project to refine, test and implement SUTPs. Each of the 12 partner cities/regions around the Baltic Sea received a peer review that assists them in understanding their current progress towards sustainable urban transport. This is used to prepare their SUTP and to revise existing plans. From this pilot actions are implemented which aim at achieving targets set out in the SUTP.

The project started in July 2005 and ended December 2007. The results indicate that urban freight transport is not a high policy or action priority for many cities but is one of the biggest threats for local sustainability. Many cities have the ambition to become a "logistics centre" without understanding the implications arising from increasing road freight transport such as congestion, noise and air quality impacts.

The FastRCargo project

The project FastRCargo (www.fastrcargo.eu) aims at developing a new transhipment system for fast loading and unloading of standardized intermodal transport units (ISO containers and swap bodies) between rail and road vehicles and terminals. The goal is to provide more flexible, faster and cheaper transhipments. Intermodal freight liner networks might become reality with the system proposed.

Starting out from the transhipment technology and the function of terminals developed by other partners, Chalmers' part aims at expanding the knowledge of how to integrate the fast transhipment system into a context of intermodal transport services. The project started in October 2006 and will end in March 2009. The objectives are:

- Development of new intermodal rail transport service characteristics on the basis of the new fast transhipment equipment developed in the project
- Defining options for division of roles between actor categories
- Development of a generic business model for several type of rail services
- Identification of barriers for implementation of the service

The work aims at developing the characteristics of transport services based on the fast transhipment technology and its impact on the actors involved. The perspectives will be defined of:

- The rail operator as transport service provider operating the trains

- The road operator as transport service provider operating pre- and post haulage by trucks
- The system integrator as operating and implementing of terminal-to-terminal or door-to-door services
- The freight forwarder as transport service provider to transport buyers and as customer to the terminal-to-terminal rail services.
- The transport buyer of the output of the system, regarding quality, costs and environment.

Intermodal transport from a haulier perspective

This project intends to compensate for the fact that the road haulage part of intermodal transport chains has been neglected in research as well as the public debate, keeping in mind that the activity accounts for a large part of the time and costs consumed. It is also practically challenging to organise road haulage efficiently and a common reason for not combining traffic modes.

The project is divided into three areas:

1. The road haulage activity as part of the dominating production paradigm, that is full trains between relatively large terminals where the trains remain during the day.
2. The road haulage company's role in the current industry structure where they perform road haulage but also play the role of actually deciding whether to outsource long-distance haulage to rail as an alternative to producing road haulage itself.
3. Looking ahead in time, the third area includes both the activity road haulage and the actor role hauler in future production paradigms developed in FastRCargo and other Sir-C projects. It particularly focuses line train systems with intermediate terminals.

Frame of reference

The growth of road freight traffic is the result of complex interactions derived from the economic activities that it serves (McKinnon, 2007). Supply chain structures, improved logistics, alternative fuels and other technological measures can contribute to reduce the emission intensity of road freight. Nonetheless, freight transport volumes are expected to continue to grow significantly (European Commission, 2006b) and outweigh these potential reductions of the emission intensity in the road freight sector. Consequently, it is this expansion that needs to be targeted. If a return to sustainable levels is to be achieved, shifting transport volumes from road to more CO_2-efficient modes like rail is inevitable.

Woxenius (1998) states that the suitability of rail transport for substantial transport market shares is limited by, among other things, the limited extension of the railway network and the high costs of shunting wagons into private sidings. Road transport, on the other hand, offers accessibility with maintained economy for smaller shipments over short distances. Hence, intermodal transport, the combination of pre- and post haulage (PPH) on road and the long haul on rail, has the potential to offer the required accessibility and flexibility of road yet maintaining CO_2 efficiency of rail transport.

Woxenius (1998) continues that using more than one transport mode in the transport of goods between origin and destination requires a transhipment of part-loads between two modes which is time-consuming, costly and also involves a risk of damage. To limit these problems the goods are loaded into standardized units which can be transhipped automatically and be handled by all modes of transport. This method is called the principle of unit loads and the transport arrangement is commonly referred to as intermodal transport. Basically, intermodal transport is a combination of at least two modes, where road transport is used for pick-up and delivery of the standardized load unit in order to secure broad accessibility and flexibility. The by far biggest distance is performed by large-scale transport modes like rail, inland waterways, short sea shipping or ocean shipping where the units are consolidated with other shipments and economies of scale are being achieved.

(Macharis and Bontekoning (2004) define intermodal transport by the following characteristics:

- Task division between transport modes with respect to the short-haul and long-haul of the transport chain. Road transport is assigned to the short-haul while rail is assigned to the long-haul.
- Transhipment to enable the division of task between short and long-haul.
- The use of standardized load units, which increase the efficiency in the transport chain.
- Multi-actor chain management with many organizations which each of them control a part of the transport chain.
- Synchronized and seamless schedules between different modes without storing and handling of freight during its journey from origin to destination.

In order to run the intermodal transport chain smoothly, a lot of actors need to work in collaboration. These actors are (a) PPH operators, who take care about the pick-up and delivery, (b) terminal operators, who take care of the transhipment operations, (c) network operators, who take care of the infrastructure planning and organization of the long-haul transport (rail, barge, ocean vessel), and (d) forwarders, who can be considered as users of the inter modal infrastructure and services, and take care of the route selection for a shipment through the whole intermodal network (Macharis and Bontekoning, 2004). Figure provides a simple depiction of intermodal freight transport where the long-haul is represented by rail.

PPH operations accessing consignors and consignees to and from terminals often take place in urban areas, where they are likely to increase the local external effects compared to all-road transport (Woxenius, 2001). At the same time, urban congestion makes haulage operations more costly and less reliable, which reduces the competitiveness of the whole intermodal transport chain.

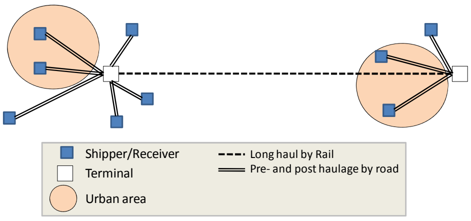

Figure : A typical road-rail intermodal transport

Different consolidation networks for intermodal transport services exist, i.e. point-to-point, line, hub-and-spoke and collection-distribution network (Figure). In these networks, different production models for operating the trains can be applied, including frequency of services and train lengths. For obvious reasons, the choice of consolidation network and production model has a significant impact on costs and quality of the intermodal transport service.

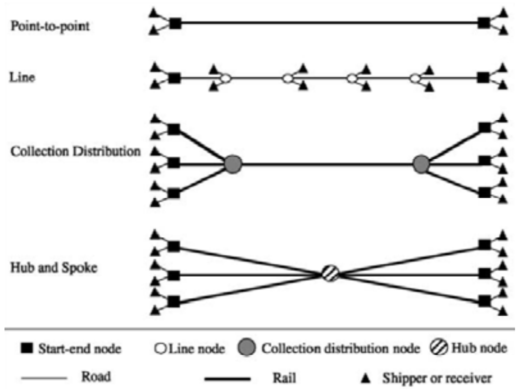

Figure : Four basic consolidation networks. ***Source Macharis and Bontekoning (2004)***

Furthermore, the design and organization of intermodal transport services requires decisions from more than one actor and more time horizons. Taylor and Jackson (2000) argue that a chain leader, the actor with most power in the intermodal chain, can generate overall chain steering. However, no single-actor fulfils this role. Currently, each actor is striving for optimizing its own operation, but what is best for each single actor is not necessarily for the chain (Bontekoning et al., 2004).

As a consequence of the high costs of rail and terminal equipment, the actors aim at economies of scale and minimizing the costs of intermediate transhipments. This has lead to a high concentrated intermodal network with a relatively small number of nodes and a strong focus on a limited number of high-volume corridors (Trip and Bontekoning, 2002). The trains stay at the terminal throughout daytime and are operated overnight as full trains between terminals. High volumes of load units are required in order to distribute the costs of the terminal between a large number of transhipments.

The break-even distance of intermodal transport compared with all road transport is most sensitive to PPH for accessing consigners and consignees. Despite its relatively short distance compared to the rail line haul, it accounts for a large fraction (between 25% and 40%) of total expenses for the transport chain (Macharis and Bontekoning, 2004). Generally, traditional intermodal transport is competitive only at distances in excess of 300 to 500 km on high volume corridors (van Klink and van den Berg, 1998); (Trip and Bontekoning, 2002); (Bärthel and Woxenius, 2004). To compete successfully with all-road transport for dispersed goods flows over medium distances, an alternative design and organization of intermodal transport services are required, addressing rail, terminal and PPH operations. One possibility is a line train design with high transport frequencies and additional small scale stops between the large scale origin and destination terminals. By combining less dense flows over long distances and dense flows over short distances, this service can attract the amount of freight needed for high frequencies and utilizing economies of scale (Woxenius, 2001).

The stops at the small-scale terminals need to be short in order not to prolong the total transit time which requires a fast transhipment technology with a low costs per move. Hence, innovative systems do not only require an operational shift of consolidation network and production model; they also have to cope with a technical challenge since a cheap, flexible and scalable transhipment technology is required that does not rely on economies of scales. Bärthel and Woxenius (2004) state that a wide range of transhipment technologies have been proposed by inventors and evaluated by researchers, but with very view exceptions, they have not been explored commercially.

The operational design of line trains can also improve the preconditions for PPH in the intermodal transport chain. PPH usually takes place in urban areas where congestion and most environmental impacts are most critical. A larger number of terminals allow a greater chance of shorter local road haulage which allows restricting operational costs. Kreutzberger et al. (2003) therefore conclude that both spatial and network policies are crucial for the efficiency of intermodal transport.

Hence, besides the actors that actively run the intermodal transport chain, there are a lot of other actors and stakeholders which influence its competitiveness. As WOXENIUS' model illustrates (Figure), these actors are those which influence a) infrastructure, b) demand for transport services, c) competition from single-mode transportation, e) laws and regulations and e) political and economic decisions. Thus, also the actors representing these factors need to be considered when strategies for improving the competitiveness of intermodal transport are to be developed. However, research and studies focus usually on single actor categories with operational problems in a certain time horizon. There is a lack of studies that address decisions from more than one operator and/or time horizon (Macharis and Bontekoning, 2004).

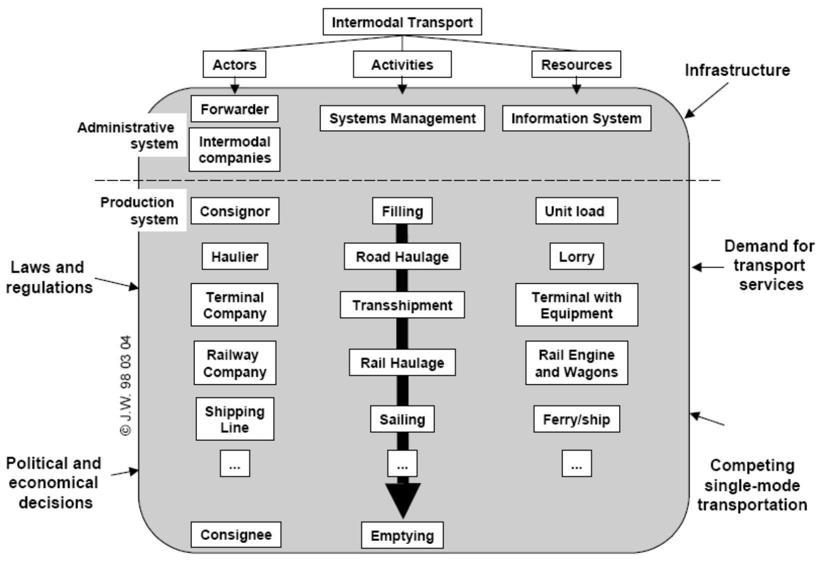

Figure : A reference model of intermodal transport. ***Source: Woxenius (1998)***

Problem analysis, purpose and research question

Road freight transport is a major contributor to the unsustainable impacts of the freight transport sector. If a return to sustainable levels is to be achieved, shifting transport volumes from road to more CO_2-efficient modes like rail is inevitable. A modal shift from road to rail requires more competitive intermodal transport for dispersed transport flows over short and medium distances. An innovative approach to rail services, terminal design and PPH that acknowledges the demands of the transport market is called for.

The vast majority of research in the area of intermodal transport focuses on rail operations between the terminals. The system boundaries of the technical system are normally set at the gates of the terminal and PPH is often regarded as something that is handled by the customers of the intermodal transport operator.

PPH accessing terminals and consignor and consignee often takes place in urban areas and is increasingly threatened by congestion. At the same time, freight vehicles are increasingly contributing to congestion, noise, air pollution and accidents. Thus, citizens and local authorities recognize urban freight transport as disturbing factor and there is a tendency for measures which restrict the access of freight transport to urban areas.

With respect to the influence PPH has on the overall intermodal transport costs and with respect to its local impacts, much more research on how to make PPH for accessing consignors and consignees more efficiently is necessary. A holistic approach addressing two dimensions needs to be taken:

1. Sustainable urban freight transport, which is negatively affected by PPH. At the same time urban freight transport conditions determine the accessibility of the intermodal terminals for PPH.
2. The design of consolidation network and production model of rail and terminal operations, which define the preconditions for the additional PPH.

Thus, the purpose of the thesis is the following:

The purpose of this thesis is to analyze how rail and terminal operations on the one hand and urban freight transport strategies on the other hand, can complement one another for the sake of more efficient pre- and post haulage operations in order to improve the competitiveness of intermodal freight transport without threatening the sustainability of urban areas.

The purpose has been broken down into five research questions:

Research question 1

Although there is a clear and accepted definition of sustainability, it is a concept with many subjective interpretations. This is especially valid for urban freight transport with its many different actors. Hence, there is a definite need for a comprehensive definition of "sustainable urban freight transport". A key problem for implementing an achievable strategy towards "sustainable urban freight transport" is determining the parameters of measurements. Actors involved in urban freight transport need an understandable and applicable set of indicators to monitor and evaluate the interdependencies of their economic activities and urban freight transport. Existing indicator sets either fail to reduce the complexities and grapple the interdependencies in urban transport or are not applicable by the actors involved. Applicable indicator sets need to take into consideration that freight transport, at least in the short term, is a derived demand and that the impacts are the final element in a causal chain which is influenced by many actors. Therefore, research question 1 is:

What are the actors of urban freight transport and how are the interdependencies between their economic activities, urban freight transport and unsustainable impacts?

Research question 2

After the interdependencies of economic activities, transport operations that serve these activities and their unsustainable impacts have been identified and parameters of measurement defined, the current state and future development of these parameters need to be analysed. Knowing the key drivers of the unsustainable development and their scale is a prerequisite for defining successful strategies and implementing effective actions. These key drivers may follow different trends among cities in Europe, since cities differ in size, economic and historical background as well as political and cultural framework. Therefore, research question 2 is:

What are the key parameters for the unsustainable development, what is their current trend and what is the potential for the urban freight actors for modifying this trend?

Research question 3

Today's intermodal rail-road transport network is highly concentrated with a relatively small number of large-scale terminals and a strong focus on a limited number of high-volume corridors. A technology which allows fast transhipment technology and low cost per move can break the reliance on economies of scale in terminal operations. More competitive consolidation networks which also enable better conditions for PPH would become a reality. Therefore, research question 3 is:

What are suitable rail and terminal operation designs for more effective pre- and post haulage?

Research question 4

PPH in urban areas are increasingly threatened by congestion. At the same time, freight vehicles are increasingly contributing to congestion, noise, air pollution and accidents. Thus, citizens and local authorities recognize urban freight transport as disturbing factor and there is a tendency for measures which restrict the access of freight transport to urban areas. Efficient PPH requires strategies that acknowledge both, the accessibility needs of freight transport and urban sustainability. Therefore, research question 4 is:

What are suitable urban freight transport measures for more effective and sustainable pre- and post haulage?

Research question 5

Implementing innovative urban freight and intermodal transport services require new chain-coordination strategies. Many pilot actions and other small scale projects of more advanced approaches aiming at more efficient urban freight transport have been conducted in cities, but the general trend seems to be that nothing happens when the project ends (Zunder and Ibáñez, 2004); (Lindholm and Blinge, 2006); (Lindholm and Thalenius, 2006). Individual actors have to give up some autonomy or accept higher costs for the sake of better chain performance. Structures are required that redistribute costs and benefits of changes for single actors when this does not take place automatically via market mechanisms. With respect to the big impact of urban freight policies urban and regional authorities and other actors influenced or influencing urban freight need to be acknowledged as actors in intermodal freight transport. The final research question therefore is:

What actor coordinating structures are necessary for implementing innovative rail, terminal and pre- and post haulage operation designs?

Theoretical Framework

This chapter introduces the theories being used in the licentiate thesis.

Sustainable development

The term “sustainable development” first gained major prominence in the report ”Our Common Future”, published by the World Commission on Environment and Development, which is also commonly known as the Brundtland Report. Its definition of sustainable development is still widely used today (Brundtland (1987), p.54):

“Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of ‘needs’, in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. […]”

This definition highlights three fundamental components to sustainable development: 1) economic growth and 2) social equity for meeting the needs of today’s generation, as well as 3) environmental protection for the ability to meet today’s and future generation’s needs. It also disproves the widely spread perception that some impacts on environment and society are trade-offs for economic prosperity.

Figure 6 presents the three dimensions of sustainable development applied on logistics.

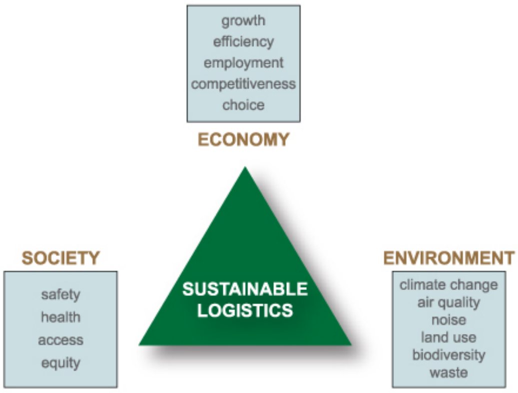

Figure : The three dimensions of sustainable logistics. *Source: www.greenlogistcs.org*

The Natural Step

A sustainable future cannot be described in detail, but its basic principles can be defined (Holmberg and Robért, 2000). The Natural Step[2] refers to these principles as the four system conditions covering the three dimensions of sustainable development. The general dimension “Environmental Protection” is further specified by the system conditions describing the causes for environmental non-sustainability, i.e. 1) increasing concentrations in the atmosphere of substances extracted from the earth’s crust, 2) of substances produced by society and 3) the physical degradation of nature. System condition four covers the social and economic dimension by requiring that human needs are met worldwide.

[2] The Natural Step (TNS) is an international NGO that helps organizations move strategically toward sustainability

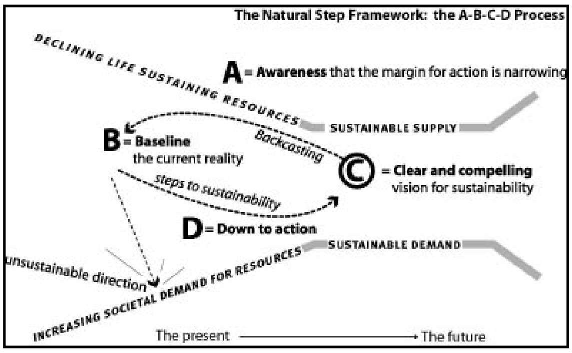

Figure : The Natural Step A-B-C-D process[3]

The Natural Step presents a framework for strategic planning which includes four steps (Figure). The first step is to develop the knowledge and awareness of sustainability based on the four system conditions. Secondly, the current situation of the unsustainable development is assessed. After this, a list of solutions and visions is created – short term as well as long term listing the possibilities for providing the same services but without violating the system conditions. Finally, a program for transition is designed how to reach the sustainable future (back-casting). Solutions from the list are selected and priority is given to those solutions which combine the technological potential for further progress later on ("flexible platforms") with economic realism ("low hanging fruit").

Transportation systems

Realization of transportation systems and movements results from decisions by many actors who show strong interdependencies. (Sjöstedt, 1994) presents a simple model that highlights basic interactions (Figure). The model is system oriented and it is organized around three basic elements: These are *goods* that demand transport, *vehicles* being used and *infrastructure.* These elements interact in pairs in three different subsystems. The *activity system* comprises all activities that require movements of goods. In the *transport system* the demand for transport services is matched by vehicle operators. In the *traffic system*, finally, actual physical movement of vehicles is realized in physical networks in which traffic units absorb infrastructure capacity. It is at the traffic system level that vehicles consume energy and produce emissions where most of the negative impacts of freight transport take place. As the model shows, the traffic system is, however, only the final element of the causal chain Activities – Transport – Traffic.

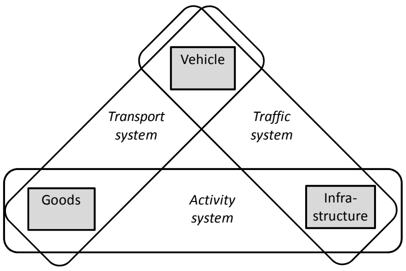

Figure : Conceptual reference model of activity, transport and traffic system. ***Source: Sjöstedt (1994)***

(Sjöstedt, 1996)) concludes that a planning is required that integrates activities, transport and traffic in order to fulfill the accessibility needs in time and space of a prosperous society, while simultaneously looking at the consequences of the location, transport and traffic processes that materialize the required mobility.

[3] Source: The Natural Step Canada (http://www.naturalstep.ca/index.html)

Transport networks

Transport networks are characterized by a) goods supply and demand points, b) points where activities such as consolidation of goods and transhipment between vehicles are performed and c) transport activities between these points. Goods supply and demand points as well as points of activities are defined as nodes; transport activities connecting the nodes are defined as links. In a given pattern of supply and demand points different transport system designs are possible which have different impacts on performance requirements of nodes and links (Figure). What system the most suitable is, depends on supply and demand patterns as well as required transport quality and is up to the operator to decide.

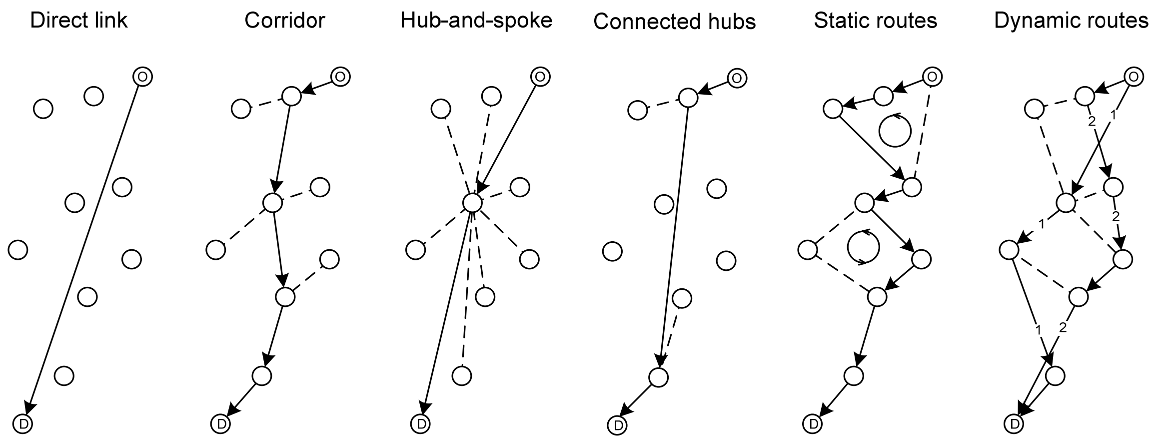

Figure : Six options for transport from an origin (O) to a destination (D) in a network of ten nodes. Dotted lines show operationally related links in the network designs. In 'Dynamic routes', two alternative routes are shown; in all other designs, the routing is predefined. ***Source: (Woxenius, 2007)***

Stakeholder theory

The stakeholder theory can form the theoretical foundation for developing new actor coordinating structures, but since actor relations are outside the scope of this thesis it is not introduced here.

Research design

In the previous sections the purpose, research questions and theories which will be applied have been introduced. This section provides an overview of the research framework of this thesis connecting purpose, research questions and theories. After this, research papers and methods used are presented.

Research framework

As mentioned above today's freight transport system is unsustainable because of the continuously increasing road freight transport. The aim of this research is to improve the competitiveness of intermodal freight transport by making pre- and post-haulage operations more efficient without threatening the sustainability of urban areas. Figure provides the framework of this research by applying the TNS model on the purpose of the thesis.

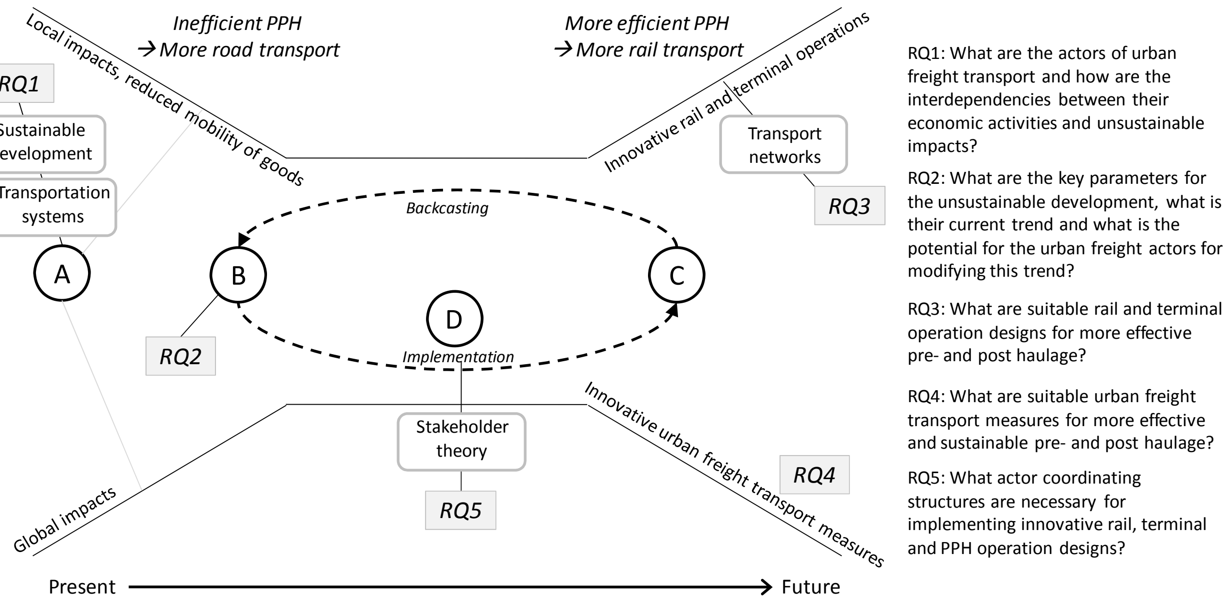

Figure : Research approach in the TNS-framework

A: Understanding unsustainable freight transport

The starting point for developing solutions is to be aware of and to understand the **nature of the problem**. The problem is that today's growing demand for road freight is unsustainable with impacts both on a local and a global level. This is symbolized by the walls of the funnel. Rail freight is not able to fulfil the demand of the transport market because of, among other things, inefficient PPH accessing terminals and consigner/consignee in urban areas caused by unsustainable urban freight transport. Understanding the sources of unsustainable urban freight transport and the role of the actors' economic activities is addressed by Research question 1 using the theory of sustainable development and the theory of transport systems.

B: Baseline review – understanding the current reality

The second step is to understand the **structure and the scale of the problem of today's system**. Based on the knowledge of what sustainable urban freight transport is, the current reality is analyzed in terms of the relations between actors, activities and freight transport impacts. This issue is targeted by Research question 2 applying the analysis framework of transportation systems.

C: Vision for sustainable freight transport

Thirdly, **solutions to the problem** are developed. Since one source of the continuous growth of road freight transport is the inefficient PPH, solutions need to target this inefficiency in order to achieve a sustainable freight transport system. In the long term, innovative rail and terminal operations as well as urban freight transport measures can contribute to more efficient PPH. This is symbolized by an opening of the funnel, which is addressed by research question 3 and 4. Research question 3 uses the theory of transport networks.

D: Implementation of sustainable freight transport

The final step includes the **implementation of the solution**. A program for transition from today's unsustainable system towards the vision of sustainable freight transport is designed. Research question 5 targets the actor coordinating structures which are necessary to implement innovative services. The stakeholder theory is applied.

Research papers

In this section the research papers and the methods used are presented. Figure presents the relationship between papers and research questions. Research question 4 and 5 are outside the scope of this thesis and will be addressed in the PhD Thesis.

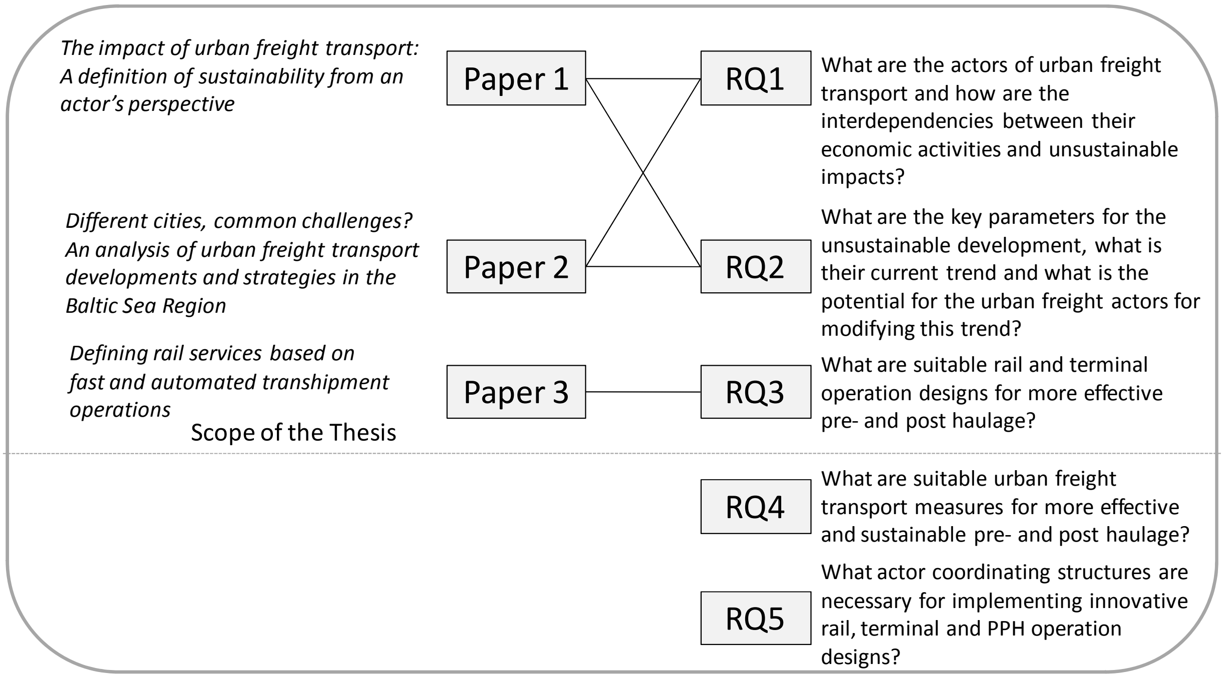

Figure : Scope of the thesis

Paper 1

The impact of urban freight transport: A definition of sustainability from an actor's perspective

Authors: Sönke Behrends, Maria Lindholm, Johan Woxenius
Publication strategy: Submitted to Transportation Planning and Technology, May 2007

Abstract

Purpose: The purpose of the article is to review definitions of sustainability, freight transport and other relevant conceptions and consolidate them into a definition of sustainable urban freight transport. In order to make the definition more accessible for policy makers as well as other stakeholders, a matrix with a suitable set of indicators is presented.

Method/approach: A literature study is being made in the area of sustainable urban freight transport. Definitions and previous work in the areas of *sustainability*, *sustainable urban transport*, *urban freight transport* and *sustainable urban freight transport* are studied and discussed.

Findings: The article concludes with the development of a definition of "sustainable urban freight transport" and with a matrix to develop an indicator that connects actors and impacts.

Paper 2

Different cities, common challenges? An analysis of urban freight transport developments and strategies in the Baltic Sea Region

Authors: Maria Lindholm, Sönke Behrends
Publication strategy: Logistics Research Network Annual Conference 2008, Liverpool, UK

Abstract

Purpose: To reach sustainability new organizational models for the management of freight movements within the city limits are called for. Since freight transport is mainly business-to-business, models cannot be worked out without a public-private understanding and cooperation. The purpose of this article is firstly, to analyse the current state and ongoing development of freight transport in urban areas, and secondly, to analyse the awareness and actions of involved actors and stakeholders. By this the article contributes to laying the ground for designing strategies and solutions to overcome the challenge of securing the mobility of goods and at the same time reducing unsustainable impacts from freight transport.

Method/approach: Interviews with stakeholders were conducted in five cities in the Baltic Sea Region. A common characteristic of these cities is the strong role of port and logistics activities. A large quantity of local actors and stakeholders has contributed to this analysis. Current impacts, measures, planning procedures and awareness are identified and structured. The cities studied are categorized by problems, barriers and solutions and are compared to find similarities and possible strategies to overcome the problems identified.

Expected findings: The study shows, that interaction and cooperation of all involved actors are necessary but lacking, including both actors from the public and private sector. Furthermore, taking into account freight transport's growing contribution to the negative impacts, compared to passenger transport, cities need more capacity and competence within this area.

Paper 3

Defining rail services based on fast and automated transhipment operations

Authors: Sönke Behrends, Johan Woxenius
Publication strategy: NOFOMA 2008 (WIP)

Abstract

Purpose: The Purpose of the paper is to define and analyse conceivable intermodal road-rail transport services using fast and automated horizontal transhipment operations.

Method/approach: In a deductive approach new intermodal road-rail transport services are developed. In addition, interviews with actors of the consortium of the FastRCargo project (www.fastrcargo.eu) are used. The project aims at developing automated transhipment equipment that allows parallel loading and unloading of standardized intermodal transport units below active power lines. The project consortium includes technology developers, rail transport and terminal operators, rail infrastructure providers as well as transport and logistics research institutes. The interviews are complemented with literature research.

Expected findings: Fast and automated transhipment operations enable a variety of innovative road-rail intermodal transport services which can increase the mobility of goods on rail significantly. Hence, the innovative technology allows transport actors to shift transport modes from road to rail with reduced disadvantages compared to all-road transport, and by this it can contribute to the removal of congestion on roads and to the sustainability of freight transport.

Implications: This paper establishes the basis for future research on the implications of the identified innovative intermodal road-rail transport services, e.g. on the design of transport networks and train operation principles. Furthermore it includes the division of roles between actor categories and the development of business models for the rail services.

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