

Innovation in European Freight Transportation

Basics, Methodology and Case Studies for the European Markets

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Chapter 1

Introduction

1.1 Problem Statement

Today we experience the possibility to participate in nearly unlimited mobility¹ – spanning the full meaning of this expression. It has become the *savoir-vivre* of the last two decades. Our values and hence, our thinking and acting are shaped by both our claim and our duty to be mobile (Petry 2006). This conclusion is decisive in order to understand the importance of the discussion around this topic.

For our research purposes, mobility means the movement of people, goods and information (Vester 1990; Henning and Schmid 1998). Even within this definition mobility is still one of the most decisive economic factors, and simply a common leisure activity².

Mobility is called the engine of our economy. The increase of the Gross Domestic Product and the growth-data of freight/passenger transport are linked as shown in Fig. 1.1, for the 25 European countries (EU 25). The transport sector is the employer of 10 million people (TREN 2004). Its share in the Gross Domestic Product is 1000 billion³ EUROS which equals 10% of the GDP (White Paper 2001). Freight transportation needs particularly to be considered here.

During the last decades the European economy has benefited from the fact that the costs of *direct* freight transportation carry marginal economic weight⁴. Therefore all national markets have strongly expanded and production and dis-

¹ Originally, the Latin expression “*vulgus mobile*” describes an obnoxious mass of people. This led during the 17th century to the swear-word “Mob” (Padrutt 1991; Novy 1993).

² 35% of all passenger car movements are for recreational reasons (Vester 1990; Novy 1993).

³ 1 billion = 10⁹.

⁴ The economic development and the process of deregulation since the mid eighties allowed a cutting of transportation costs of 25% up to 50% (Aberle 2003).

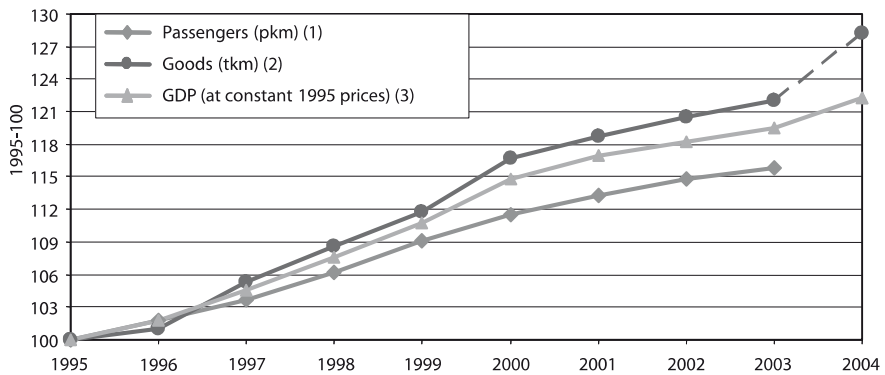


Fig. 1.1. Growth of transport and Gross Domestic Product EU 25 (1995–2004, 1995 = 100) (Directorate-General Energy and Transport 2005) (1) passenger cars, powered two-wheelers, buses & coaches, tram & metro, railways, air, sea; (2) road, sea, rail, inland waterway, pipelines, air; (3) GDP: at constant 1995 prices and exchange rates

tribution processes have fundamentally changed. Our freight transportation system today offers a highly efficient organisation which all European citizens have been experiencing during the last decades when the ways and standards of living have been continuously improving about everywhere in Europe.

There are, however, some serious problems and risks to be observed in such European mobility. According to the European Union the major difficulties are: “the imbalance in the development of the different modes” (Fig. 1.2), “congestion on the main overland routes and in cities”, and furthermore “the major impact which transport is having on the environment and on citizens’ health” (European Commission 2004:9).

Hence, on European and national level, major efforts and investments are performed to optimize and improve the freight transportation system. The main aims are to continue the successful development of mobility across Europe while achieving reduction of its detrimental effects and avoiding damage to the national economies (Savelsberg 2006a).

On this background, the first of four main priorities has been listed by the European Union within the Energy & Transport Report as follows: “Adjusting the balance between the different modes of transport”. It hints specifically at the following issues:

“Breathing new life into the railways, (...), and the development of intermodality are presented as being the keys to the success of a policy aimed at changing the balance, in particular for the transportation of goods. The paper also stresses the need to improve the quality of road transport by modernising its operations, while respecting social legislation. (...).”

(European Union 2004:9)

For these far-reaching goals, a decisive contribution is expected to be offered by innovation in technologies and logistic services. The corresponding fields of

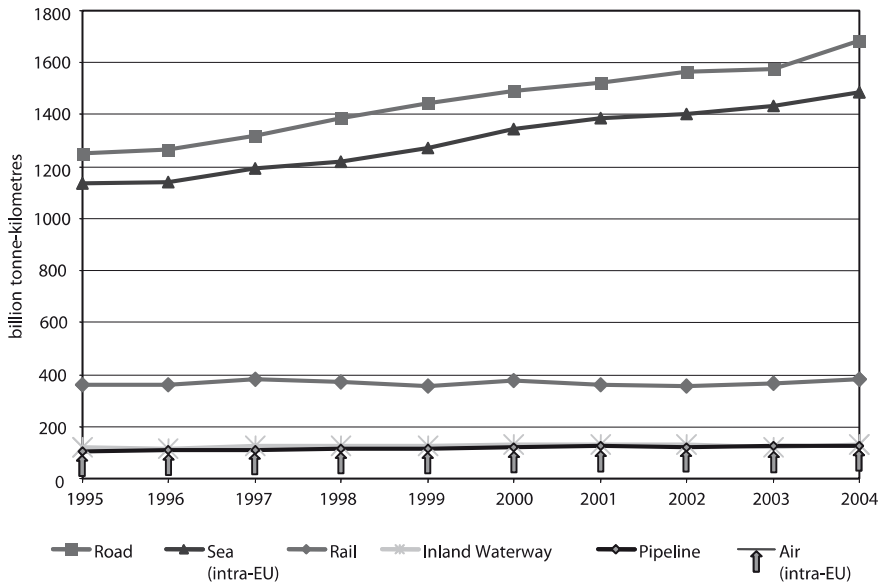


Fig. 1.2. EU 25 performance by mode of freight transport (1995-2004 in billion tonne-kilometres) (European Union 2003)

research concern metropolitan areas (*city logistics*) and national/transnational transport networks or corridors (*long-distance freight transport*).

The topic *city logistics* has to be solved mainly by regional and local authorities. Today it is well taken care of by several national support programmes⁵. The *land-based long-distance freight transport*, however, may be considered a serious national and international challenge. Particularly Germany is affected by these challenges since it is already today and will be even more so in the future, one of the most important European freight transportation hubs. Hence, this sector of European freight transportation is the focus of the research described here.

During the 6th Framework Programme of the European Union, 680 million EUROS were invested in the sub-programme *Sustainable Transport*. Furthermore the German Federal Government has supported several different improvement projects of the freight transportation system. But so far it has obviously not been possible to realize decisive changes on the land-based long-distance freight transportation market.

Therefore it may be considered a major task to implement innovative technologies and logistic service innovations into the freight market. One main obstacle against such innovation has been emphasized by the “Bundesministerium für

⁵ <http://www.mobiball.de>.

Bildung und Forschung”⁶ (BMBF) of the German Federal Government. It is the lack of tradition in utilising systematic *innovation management* within the transport and logistic sector as it is stated by the subsequent German quotation:

„Die Branche hat aber keine ‚Tradition‘ und wenig Erfahrungen systematischen Innovationsmanagements.“

(BMBF 2004:3)

The transport and logistic sector is, therefore, called *a turnover giant but innovation dwarf* (BMBF 2004). As a result innovative concepts may exist but they repeatedly seem to fail to get implemented.

One specific reason for the failure of implementing innovative technologies and logistic service innovations is the fact that the processes of technology design do not take sufficiently into account the complexity of the logistic and transportation system as a whole (Dellmann 2004; Lemmer 2004).

“A good freight transport policy starts by understanding logistics. (...). Logistic problems (are): Difficult to understand complex, conflicting and overlapping supply chain trends. There are excellent supply chain management practises in Europe – but the average standard is low (...). Environmentally un-sustainable logistics is a problem for society at large. Competition rather than co-operation tradition (...).”

(TREN 2004:59, 60)

1.2 Objectives and Strategic Questions

Due to this complexity of the freight market, *cooperative development of technological innovations* seems to be required in order to gain very early the support of all stakeholders for successful migration of such innovations. Therefore this research focuses on innovation processes and products which are based on *cooperation*. This cooperation integrates the different professional groups involved in developing, organising, managing and innovating freight transportation, e.g., vehicle/technology engineering companies, transportation product suppliers, customers of transportation products, and research scientists.

This research does not take into consideration large-scale innovations which are dependent on European political efforts (e.g. Galileo⁷, ETCS⁸). Furthermore the research here deals mainly with improving land-based transportation across Europe, i.e., transport by road and rail. It does not take into account warehousing.

This research aims at suggesting a *Systemic, Migration-Oriented Innovation Management Method* and the supporting tools related to *innovative technologies*

⁶ Federal Ministry of Education and Research (BMBF). Up to 2006 the transport sector was part of this ministry. Today it is part of the “Bundesministerium für Wirtschaft und Technologie” (BMWi) – Federal Ministry of Economics and Technology.

⁷ European satellite navigation system.

⁸ European Train Control System.

and *logistic service innovations*. The innovations discussed deal with the *land-based long-distance freight transport*. Those innovations are described by several case studies which visualise the outcome of different innovation processes. Thus the case studies demonstrate how implementations of innovations may be successful by using the *Systemic, Migration-Oriented Innovation Management Method* suggested. Additionally this research may contribute to making certain recent *research on land-based long-distance freight transport more visible* for interested European researchers and practitioners.

The following research questions are discussed in this report:

1. Which political objectives and innovation-related requirements have to be considered concerning the land-based long-distance freight market, separately for each carrier?
2. Which Fields of Action should be focused on in order to contribute towards continuous development and improvement of the European freight sector?
3. Which are the basic principles of the *Systemic Migration-Oriented Innovation Management Method* and which steps have to be conducted within this *Method*?
4. Which tools can be used to support the steps of this *Method*?

1.3 Structure of the Volume

This report deals, firstly, with deriving the *Systemic Migration-Oriented Innovation Management Method* to be applied to *innovative technologies* and *logistic service innovations* in the *land-based long-distance freight transport*. For this task it starts by analysing in some more detail the present state of the freight sector in Europe. Thus Chap. 2 illustrates selected aspects of land-based long-distance freight transportation. Political objectives and innovation-related requirements are pointed out regarding the land-based long-distance freight market.

Secondly, the *Systemic Migration-Oriented Innovation Management Method* is to be based on certain theoretical concepts. Hence Chap. 3 presents selected aspects of the System Theory and Innovation Management as the basis of this Method. Thus the structure of the suggested Method is constituted as being systemic and migration-oriented. It consists of eight steps. A series of tools are suggested in Chap. 4 which may be required to accomplish those steps.

The subsequent chapters of the volume deal with the different case studies in order to demonstrate how implementations of innovations may be successful through the method suggested here. Seven case studies are described in Chaps. 5, 6 and 7 (Fig. 1.3). The case studies are grouped according to the following topics:

- innovative technologies in European freight transportation,
- innovative technologies to improve the intermodal transport chain⁹, and
- logistic service innovations.

⁹ In the following chapters named: innovations to improve the intermodal transport chain.

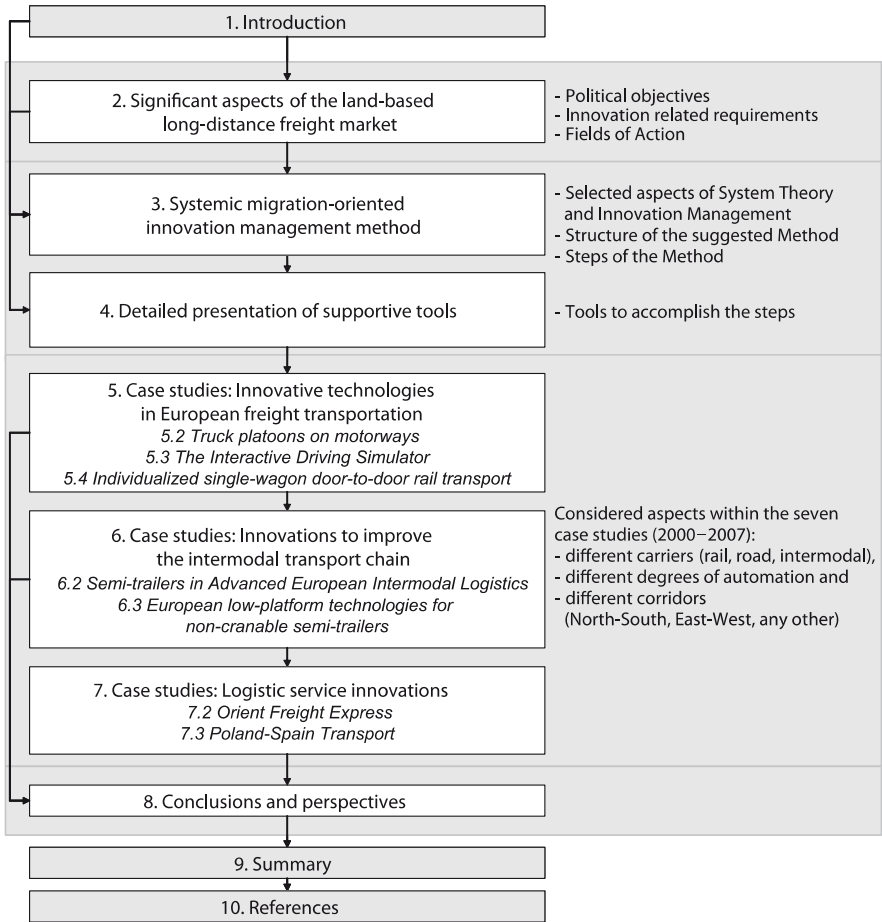


Fig. 1.3. Structure of the volume

The author of this research has been involved – mostly in a leading position – in all of these case studies and the corresponding research, development and implementation projects. These case studies offer a broad and comprehensive up-to-date view concerning the following themes:

- different carriers (rail, road, intermodal),
- different degrees of automation, and
- different corridors across Europe (North-South, East-West, any other).

The overall experiences of the different research projects are reflected and discussed in Chap. 8 where some future developments and recommendations are also suggested. The Summary is finally presented as Chap. 9.