

Future trends and driving forces in transport and logistics

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Abstract

In this paper trends and developments in the international transportation and logistics economy are depicted. Key driving forces are discussed, and their mid and long-term impacts on urban environments are sketched. The conclusion is drawn, that the challenges caused by strongly increasing transport volumes can only be met by comprehensive, integrative approaches.

Keywords: transport, logistics, transport policy, future trends.

1 Introduction

What are the most crucial issues in urban transport and the environment, currently and in the future? One obvious answer would be that increasing volumes, quality, and performance of freight transport, for they cause essential impacts. This development is a worldwide one, and there is no indication of decreasing problem pressure.

The dimension of this future challenge can be illustrated by some very basic figures: Concerning Western and Central Europe, future transport volumes are widely known: PROGNOS [1] forecasts 2.756 billion tkm in 17 Western European countries by 2015 (2002: 2.007), and 312 billion tkm in five Eastern European states (CZ, H, PL, SLO, EST) (2002:233 billion tkm). This is an increase of ca. 40% within a decade, including a modal shift towards road transport from 79 to 80% (Western Europe) or 55 to 72% (Eastern Europe) respectively (see Figure 1 and 3).

Several experts in the field are arguing that these forecasts – both volumes and modal split figures – might be somewhat conservative [2], describing rather a slow growth, and optimistic (with regards to rail mode) scenario.



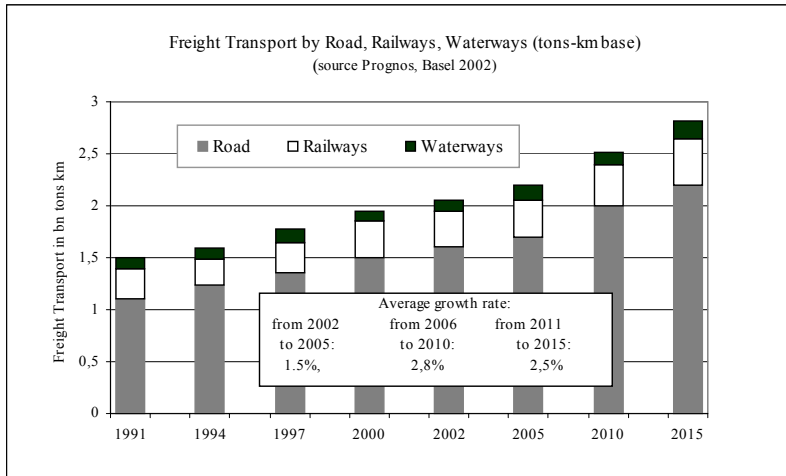


Figure 1: Development and forecast of freight transport in Western Europe [1].

In summary, we are confronted with a rapidly increasing transport demand, being in line with comprehensive requirements on how transport is being realized efficiently. In this paper we want to give the reader an overview or orientation about future developments in a changing scenery.

2 Current situation and future trends in transport and logistics

The European Union with its 15 members (they will be 25 beginning with May 2004) represents a coherent economic zone with economies that are distinctly based on division of labour and are connected by a highly qualitative network of traffic infrastructures. Thanks to the EU there is a conjoint efficient traffic zone covering 87% of the surface of Western Europe. EU Gross Domestic Product has been 9.280 billion US-\$ in 2002 on the basis of the prices and exchange rates of 2002 (for comparison: US' GDP in 2002: 10.446 billion \$). The European Union conducts an active transport policy aimed at creating a harmonized and liberalized freight transport market without frontiers. National rules and regulations about transport will be replaced with the legislation of the EU. A common European economic and transport zone is profitable to economy by extending division of labour on the European level. It has effects on new and modified transport flows between the production and consumption sites in the different countries and regions of the EU. With 10 countries of Central and Eastern Europe being admitted in May 2004, the European Union will be enlarged towards the East. The main stress in the freight transport in Europe is on road transport. The modal split of transport performance (tons km base) is: 80% road transport, 16% transport per rail and 4% inland waterways. Prognoses

for freight transport predict an increase of around 2,5% per annum based on the predictions for the economic growth in the EU (see Figure 2).

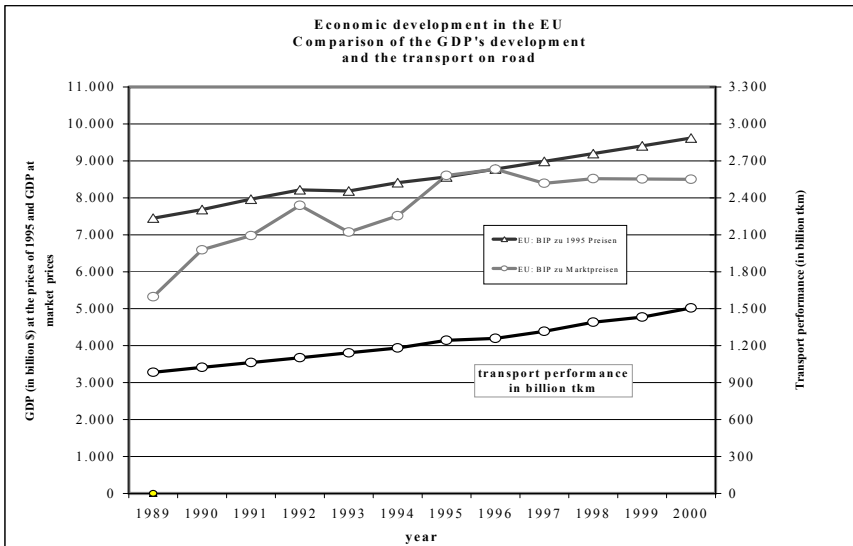


Figure 2: Road freight transport in the EU, development of transport performance (base in tkm) and economic growth [1; 3].

EU transport policy encourages a liberalization, deregulation and harmonization of the transport markets and as a consequence the free access to the transport market. If in the past the different member States had apportioned the capacities of vehicles and established strict conditions for market access, the legalization of the EU gives freedom of entry into the transport market. Due to the ending of the cabotage regulation, carriers of each of the EU countries are considered as residents in all EU countries, there are no limitations for transports in a neighbouring country (2). The application of the European transport policy on the national transport markets is realized in different manner in the countries due to national specific dynamics. Mergers in the transport sector on the European level lead to a concentration so that a smaller number of companies is now able to make a disposition of capacities on European level and thus reduce the number of deadheads. The EU transport policy favours chances of big carriers that are extending their capacities. Small fleets function as subcontractors and support big forwarders in case of peaks of demand. This means that they will be forced to react more flexibly to the market by adapting their capacities.

Liberalization and deregulation has reached the European transport markets with few exceptions. The concentration process on big enterprises (haulage carriers and logistic services) and the outsourcing of performances to small



carriers (carter) lead to oligopolistic market structures. There are no plans for big road infrastructure constructions on the European level except measures tending at connecting or adapting national transport networks. The application of measures within the trans-European network aims generally at adapting capacities in the peripheral area and towards Eastern Europe. The EU Eastern enlargement in 2004 will entail a growth of the common European transport market. The European forwarding business has established yet agencies in the capitals and big agglomerations of the candidate countries. The population of all EU members will increase from 380 to 455 million people after the accession of the ten new members (plus 75 million people), the surface dedicated to transport will augment by 16%. The GDP of the ten new members, on the other hand, is only between this of the smallest existing members Netherlands and Belgium. Although an economic growth of 5% is predicted for the Central and Eastern European countries, the attractiveness of the new transport markets should not be overestimated.

EU legislation being applied in the Eastern European transport sector after a period of transition of five years (free choice of working place) and seven years (cabotage rules in the new members), this one will be considerably reinforced and rush onto the European transport market. Demand for new and used vehicles will rise, the European transport sector will benefit from the lower costs (staff and taxes) on the new markets. Prognoses for the development of the modal split in the new members suppose that the share of road transport will increase from 61% in 2002 to 66% in 2010 (see Figure 3).

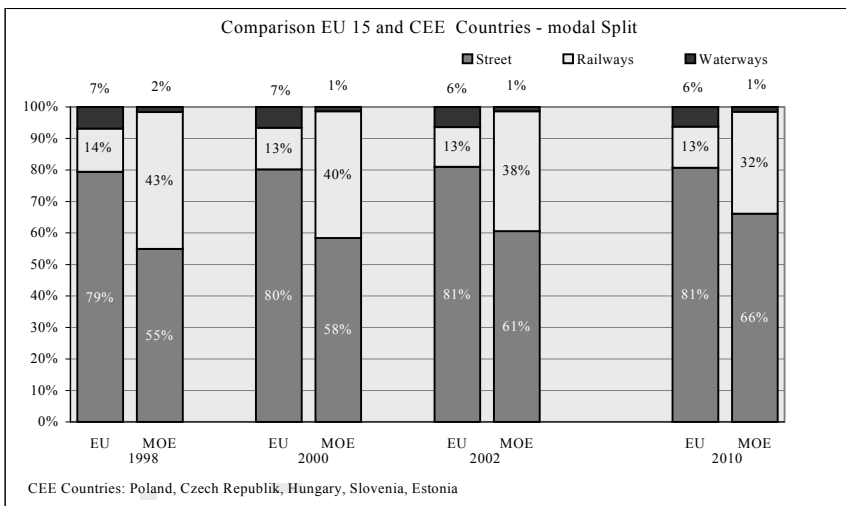


Figure 3: Development of Modal Split in the EU and selected CEE-countries [1].

The positive development of the road freight transport in Europe will be reinforced by the connection of the Western and Eastern European markets entailing both chances and risks for the transport market and the transport sector of the EU. An increase of transport demand between the existing and the new EU member States will be followed by a process of “changing flag” of transport capacities moving towards the acceding countries, the extension of capacities in the EU transport sector will be followed by a displacement into the new markets.

3 Transport and logistics: driving forces

A growth of approx. 50% is predicted for the European freight transport by 2015, both the quantity of goods transported (in tons) and the distances to cover (in km) will considerably increase. The correlation between transport increase and economic growth – the last one being of 2% average per annum – has been similar in the last years. In particular road freight transport benefited from the economic growth. Due to division of labour in Europe connected to a regression of the vertical range of manufacture e.g. in the automotive industry, the value per transport unit has increased and the distances have become larger. Thus each vehicle needs more time for one tour, the dead times decrease in comparison with the transported tons particularly in the long-distance traffic.

Recent prognoses take for granted that the integration of the Central and Eastern European countries into the EU will entail a considerable increase of freight transport within the countries and across borders. This development will be caused by a rising demand of consumer goods and by the extension of supplier industry in Eastern European companies [DE-CONSULT, 4]. The development of the freight transport market in Germany and in Europe over the last years indicates a considerable increase of road transport performance both on long- and on short-distance. Road freight transport is considered to be one of the decisive growth factors of the European economy. The railway and waterways transport modes might succeed in preserving their shares, but will hardly be able to benefit from the transport growth. Besides the better prices, the road offers made-to-measure logistics solutions (just-in-time delivery) to supply production and distribute goods to the final customer. The vertical range of manufacture being reduced in the OEM the valour of vendor parts rises, the transported goods are no longer valuables in reason of their sheer number but are system parts having a high rate of value creation. Stock keeping is limited on very small quantities; delivery is made just in sequence directly on the assembly line [5]. Additionally, these development take place more and more on a global or international scale, which together with international consumption styles led to a considerable increase in international trade and, as a consequence, border-crossing transport (Fig. 4). European carriers had limited themselves for years at the sheer haulage, the creation of value resulted only from freight transport. In Germany, the freight charges were strictly regulated until in the eighties on basis of the RKT (Reichskraftwagentarif – tariff for motor vehicles in Germany).



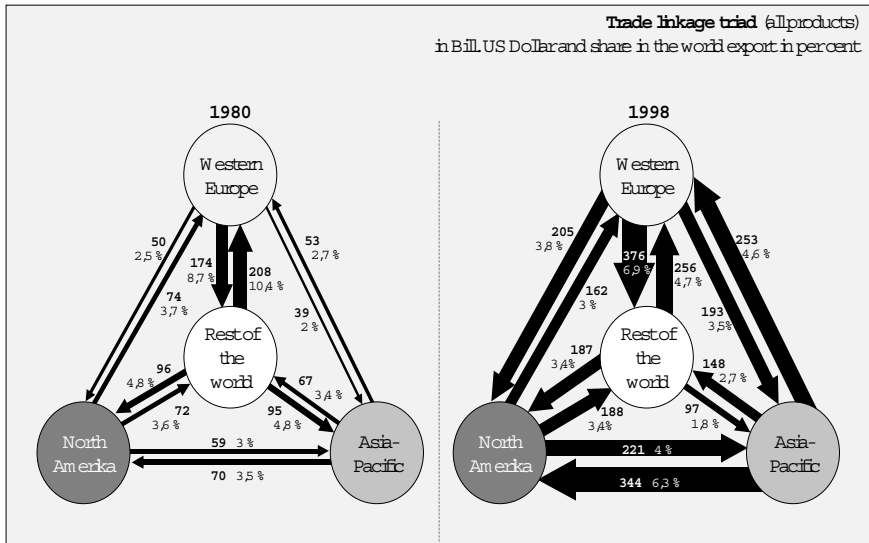


Figure 4: Commercial integration and trade flows in the Triade [6].

In consequence of the “Europeanization of the goods transport markets” with its liberalization and deregulation of the general legal conditions, the free competition exists now also with the tariffs, the freight charges being now freely negotiated between shippers and carriers. In order to preserve their creation of value, the haulage companies were looking for new tasks, they have extended their performance portfolio to services “around the transport”, the creation of value has shifted from physical transport to services “near to transport” and “far from transport”, focusing mainly on logistics (see Figure 5).

To the same extent to which the global production networks of the major shippers assume increasingly complex structures, the transport operators will transform into service providers, controlling the entire logistical process between producers, suppliers and final consumers. Formerly state-owned companies, such as the postal and railways operators, will play a special role. They were positioning themselves as centres of crystallization for international cooperations and alliances and were acquiring know-how and capacity worldwide.

Accordingly, a scenario of only a handful of global players determining the lion’s share of the European market for transport and logistics by the end of the decade, might emerge. Middle-sized freight forwarders related to the major shippers and often structured as sub-contractors carry out the transports. In many cases the major shippers have reduced their own fleet and transmitted the risk to their sub-contractors [5].

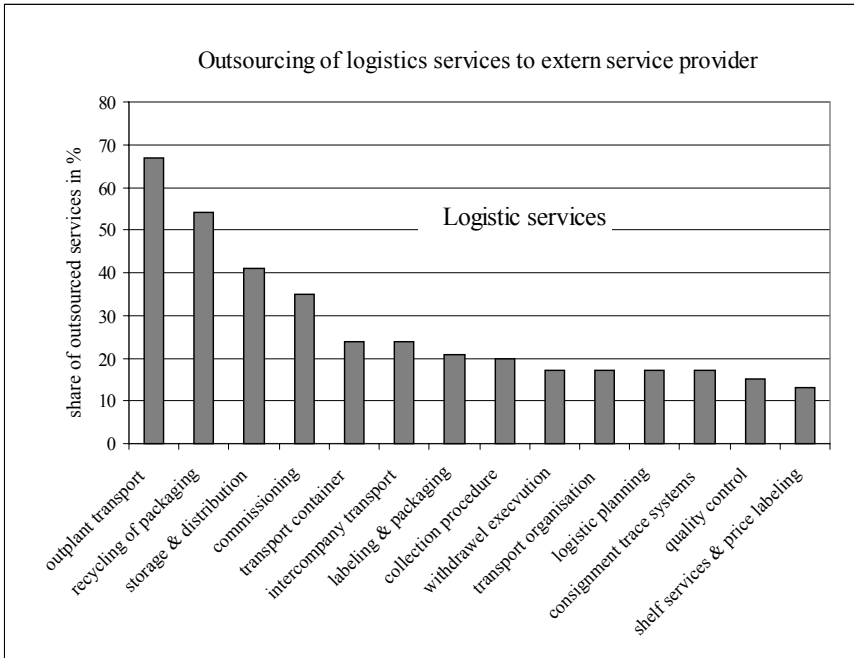


Figure 5: Outsourcing of logistics services [DEG, 7].

4 Long-term urban and environmental impacts

It might be perceived as trivial that arguing on transportation issues inevitably requires long-term thinking, especially concerning its manifold, complex impacts. So decisions about products might have effects up to 20 years, about infrastructure up to 50 years, while environmental impacts such as climate change show even wider effects. Experience teaches that far too often these issues are treated in an oversimplified, short-term, and deterministic manner. Policy-makers, transport planners, and researchers therefore have to cope with the growing complexity and uncertainty associated with policy issues. This implies the need for improved decision making processes - in areas such as problem solving, communication and co-operation in multidisciplinary, multicultural teams who often meet only “virtually”.

The fact that the world is rapidly changing and the perceived need for more changes to solve global problems can be attributed to a complex set of different issues. However, amongst the main drivers of change are undoubtedly science and technology. Successful and acceptable exploitation of technology has become crucial to achieve economic competitiveness as well as sustainable consumption and production patterns. The care for environment and sustainable development demands a forward-looking approach and a vision on what future developments are desirable.



Without any doubt, it has become increasingly difficult to predict trends, based on which these visions can be developed, with traditional instruments and in the traditional sense. Therefore, it has become central for policy and strategy makers in the public and private domain to use more reliable systems detecting relevant signals early, evaluating risks and opportunities of science and technology developments comprehensively, and putting the different findings in the systems perspective of overall policy development, in all fields and at all governance levels. Globalisation and localisation, technological and organisational changes, as well as the ever-increasing importance of learning capabilities and application of knowledge have significantly altered the ‘rules of the game’. This means that policy-makers will have to take on long-term responsibilities, while industry will find new strategies to remain, or become, competitive in this constantly changing environment [EC; ROLLWAGEN, 8].

To sum up, the application of future-oriented methodologies like those under the “Foresight”-label should become some kind of standard for major transportation projects, complementing and enhancing classical instruments as forecasts and simulation by participatory, multi-actor approaches.

Concerning the urban environment, the transport and logistics story contains both good and bad news: above all essentially rising transport volumes as described earlier could be understood as a potential threat for environmental qualities especially within agglomerations. And for those still dreaming of major shifts in modal split away from road transport the message is very clear: these kind of expectations are not realistic, and therefore should be kept out of consideration. But what is now the good news? Here some indicators:

- Advanced logistics systems with increased transport efficiency, i e. more transport volume at constant distances driven, show reduced environmental impacts.
- Ongoing developments such as logistics knots or freight distribution centres, tend to distract essential parts of the transport business away from inner urban districts, this way exonerating sensible areas from environmental burdens [MATTRISCH, 9;10].
- Most of all technological progress within the rolling stock is contributing to sustainability. *Figure 6* demonstrates the massive reduction of EU emission standards from 1990 to 2008, allowing to conclude that these regulated transportation-based emissions are on their way out of the agenda of environmental problems [WBCSD; HÖPFNER, 11].

Can these developments in sum be seen as an all-clear signal for the urban environment? Probably not, despite considerable progress. Furthermore, it should be mentioned that these developments are valid for the EU (and for other industrialized countries), while the present situation and future developments in emerging regions might be much more serious. In these cases, co-operative and future-oriented approaches, combining the efforts, resources, and competences of multiple actors, are even more necessary.



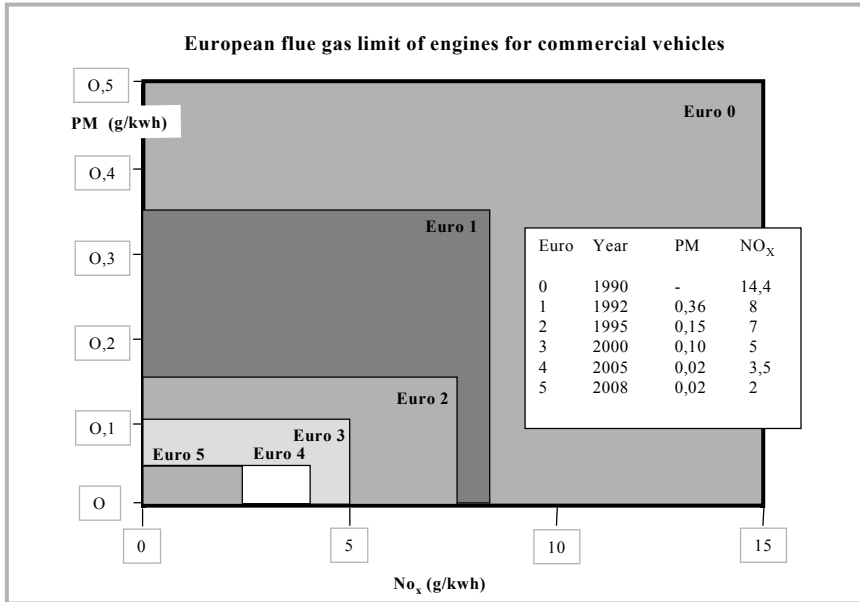


Figure 6: European Emission Standards for Commercial Vehicles [VDA, 12].

5 Conclusion

Whatever scenario is elaborated on future freight transportation, it will always be road transport playing the major role. Growing transport volumes, but at the same time constant or sometimes marginally enlarged road infrastructure constitute a continuous conflict line. With worsening traffic conditions, much of the environmental gains sketched above are jeopardized, for commercial vehicle emissions tend to increase essentially under stop-and-go circumstances. In other words, providing adequate conditions for growing freight transport demand seems to be a necessary pre-requisite for environmentally sound transport policies.

Another important impact is traffic safety. Although each commercial vehicles manufacturer is focusing on safety enhancements via assistance and emergency systems, these efforts might not be realized at an optimum due to inadequate infrastructure and traffic flow conditions. In this context the EU Commission's "Road Safety Action Plan" [EC, 2] provides a future-oriented framework, but the policy requires a lot of co-operative, multi-actor measures.

Freight transport is not only a decisive cornerstone for regional and transnational economic development, but is also contributing essentially to quality-of-life. In this sense, improving operating conditions for freight transport in different and especially co-operative ways can bring together relevant stakeholders to the benefit of everybody depending on freight transport.

References

- [1] PROGLOS (2002): European Transport Report 2002, 22 West and East European Countries: 2000-2002-2010-2015, Analyse and Forecasts; Basel 2002
- [2] EUROPEAN COMMISSION (2001): Time to decide – White Paper on European Transport Policy, Brussels 2001
- [3] Statistisches Bundesamt (Hrsg.): Statistisches Jahrbuch 2003 für das Ausland; Wiesbaden (2003)
- [4] DE-Consult Berlin: Die deutsche Verkehrswirtschaft und die Anforderungen an die EU-Osterweiterung; in Deutsches Verkehrsforum, Berlin (2002)
- [5] LANGER, D.: The Fleets of Tomorrow in: MB-Transport Magazine, 1/2003
- [6] UNCTAD 2002 in Deutscher Bundestag 2002, Drucksache 14/9200
- [7] Hrsg: Andersen, DEG, F.A:Z:-Institut, manager magazin: Logistik, Chancen in Emerging Markets, Fokus Mittel- und Osteuropa/Asien; Frankfurt/M. (2001)
- [8] EUROPEAN COMMISSION (2002): Vorausdenken, Optionen abwägen, Die Zukunft gestalten – Zukunftsforschung für Europa, Brussels 2002; ROLLWAGEN, I.: Foresight at DaimlerChrysler, Presentation for the Finnish Parliamentary Commission for the Future, 2002
- [9] MATTRISCH, G.: Global Focus, In: Transport Magazine, 02/2003; WITTEMANN, N.: Managing Virtual Supply Chains – How Leading Companies Operate, Schott Logistics Symposium, Mainz 2002
- [10] See VAN DUIN, J. H. R.: Urban freight transport – learning from the practices in two countries, in: Wessex Institute of Technology, Urban Transport and the Environment in the 21st century V, Southampton 1999, p. 299-310; MATTRISCH, G.: Ten societal trends and their potential impact on the movement of goods in European Urban Agglomerations, in: Wessex Institute of Technology, Urban Transport and the Environment in the 21st century II, Southampton 1996, p. 305-314; DJABARIAN, E.; MATTRISCH, G.: The Logic of Future Logistics, in: Wessex Institute of Technology, Urban Transport and the Environment in the 21st century V, Southampton 2001, p. 3 - 11
- [11] World Business Council for Sustainable Development (WBCSD): The Sustainable Mobility Project – Progress Report 2002; HÖPFNER, U.: A holistic approach towards reducing road traffic CO2 Emissions, Third Environmental Forum, United Nations Environment Programme & DaimlerChrysler, Magdeburg 2003
- [12] VDA Frankfurt, Verband der Automobilindustrie, Auto-Jahresbericht 2003

