Special issue

Intermodal transport is the transport of unit loads by the combination of at least two modes of transport in a single transport chain. Goods are transported mainly by rail, inland waterways, or via ocean-going vessels, holding the possible initial and final journeys by road as short as possible. Due to environmental and congestion pressures this mode of transport has received increasing attention over the last few years. Indeed a review on external costs of intermodal transport compared to unimodal road transport (Kreutzberger, Macharis and Woxenius, 2004) showed that intermodal transport is more environmentally friendly than road transport.

Intermodal transport still satisfies only a limited amount of overall freight transport demand even if its modal share can be very large on specific lines or corridors. Intermodal transport is more and more seen as a competing alternative to unimodal road transport. Intermodal transport is also growing to a seamless door-to-door operation capable of working within a just-in-time framework.

Bontekoning, Macharis and Trip (2002), in a literature review of recent researches conducted in the area of intermodal transport showed that intermodal freight transportation research is emerging as a new research field of its own and, even if it still is in a pre-paradigmatic phase at the moment, it seams it is about time to move on to a more mature state.

Characteristics of a pre-paradigmatic phase, defined by the science philosopher Kuhn (Koningsveld, 1987) are: 1) several small research communities working on their own problems; 2) little references to other researchers (or only within the own research group); 3) lack of common problem definitions, hypothesis, definitions and concepts.

The situation will improve for the intermodal research field, intermodal practice and also for transport policy makers, when a distinct research community will materialise, held together by a consensus on definitions, concepts, problems to be investigated, and methodological coherence. Kuhn calls this the period of “normal science” in which research is conducted within the framework of a hypothetical paradigm.

Our nectar cluster on intermodal transport might constitute a small step towards the building up of a larger research community. We bring together several researchers from around Europe. This special issue is the product of one of our meetings. The cluster came to light in Helsinki in 2001 under the guidance of the cluster animators, Yvonne Bontekoning and Cathy Macharis. This cluster is part of the larger NECTAR network which is a scientific European network focused on transport, mobility and communications. In may 2002 the first “real” cluster meeting was held in Delft. A brainstorming workshop was held to define some guidelines, subjects of common interest for the group, such as, for example, the value of time, stated preference/conjoint analysis used in modal choice, cost analysis of intermodal/unimodal road transport, environmental issues and flow estimation modelling. During the second cluster meeting, held in Liège in November 2002, we focused on external costs of intermodal transport compared to road transport ones and invited speakers to share their knowledge on the subject. A joint paper of three of the cluster members was the result of this meeting. The meeting in Lugano, where we were kindly invited by Simona Bolis, was again a great success and this special issue reflects the quality of the papers presented and of the

discussion. Our next plans are of course to partecipate to the next Nectar conference in Las Palmas this summer and to hold a new cluster meeting in Sweden later on.

The papers in this issue can be organised in three different groups.

A first, and most numerous, group deals, under different theoretical, methodological, and practial aspects, with service quality in intermodal freight transport (Danielis-Zotti, Marcucci-Scaccia, Bergantino-Bolis, Wiegmans-Rietveld-Nijkamp and Rudel). A second one is more focused on specific industrial policies for the improvement and development of intermodal trasnportation (Van Ham, Konings, and Kreutzberger) and a third group containing only one paper (Macharis) is aimed at the definition and illustration of a methodological innovation in the evaluation process of transport project implementation.

In more detail, the first group of papers deals with the issue of service quality in intermodal transportation. The methodology used is similar for four of the five papers in this group (Danielis-Zotti, Marcucci-Scaccia, Bergantino-Bolis, Rudel) where a stated preference, discrete choice modelling framework is used and a fifth one (Wiegmans-Rietveld-Nijkamp) adopts a more descriptive approach such as the SERVQUAL model.

Danielis and Zotti analyse, via a stated preference exercise, the likely effects of the introduction of transport policies aimed at stimulating the growth of intermodal transport. The studies scrutinise the situation of the mechanical sector in the Friuli – Venezia- Giulia region in Italy. After describing the sampling, data gathering and data base construction process the results of the estimation process are put forward. The service attributes that are studied in order to characterise service quality are, mode, cost, trip duration, frequency, flexibility and loss and damages. The models estimated are the multinomial logit, latent class model and random parameter logit. Thanks to the good quality of the data and of the interviews some interesting and significant results can be stated. As to the singular attributes of the transport service, cost and damages are the most important ones. Time reliability and trip duration are also important eventhough to a lesser extent and, maybe due to an unsatisfactory definition of frequency and flexibility these variables have not proven statistically significant.

Marcucci and Scaccia conducted a parallel research to that of Danielis and Zotti in the Marche region in Italy and concentrated on two industrial sectors: mechanics and furniture. The decision was taken in order to verify if there was a spatial influence in the two different regions (in both cases the mechanical sector has been examined) and also to test if there are substantially diverse preferences in different production sectors characterised by distinct logistic structures. The paper, using an extension of the traditional compensatory utility maximisation framework, studies the relevance of service quality in the process of mode choice in freight transport. The use of cutoff analysis can be traced back to the contribution of Swait (2001) even if it has never been applied to freight transport. The paper is innovative not only methodologically but also for the research field chosen. Starting with the description of the problem studied the paper accounts for the method of analysis employed as well as for the interviews and the data base collected and final comments on the results obtained. The most interesting results have to do with the specific reference to the sectorial analysis proposed. In fact, it is important to underline that there is a substantial difference between the furniture and mechanical sector testified by a lower attention paid to the attributes composing service quality in the mechanical sector with respect to the furniture one. A further

characteristc differentiating these two sectors has to do with the different attitude towards cutoff compensability. Whereas freight transport demand is more flexible and compensation is possible even in presence of ex ante cutoffs (soft ones) in the mechanical sector the same is not true for the furniture one. The paper concludes that a rethinking of the present Italian freight transport policy, substantially based on train, ship and intermodality subsidisation, is needed.

Bergantino and Bolis try to empirically identify the factors which might exert a significant influence on the choice of operators given the growing interest towards a re-balancing of freight traffic over the different modes. The paper is characterised by three elements: a) it opts for an interactive approach which allows operators' preferences to be elicited on hypothetical alternatives; b) it restricts the modal choice to a maritime ro-ro service; c) focuses on freight-forwarders instead of producers. After describing the methodology used to assemble the dataset, the criteria followed in identifying the sample and the design of both the revealed preference survey and the adaptive stated preference experiment, a detailed description of the database and an illustration of the estimation procedure and main outcomes is presented along with a brief comparison of the main results with other EU studies. The main objective of the paper is the presentation of the preliminary evidence from a pilot study carried out with the primary objective of testing the validity of adaptive conjoint data collecting methods in analysing operators' preferences when redirecting current on-land transport services to a hypothetical maritime ro-ro alternative. Furthermore the paper has provided a preliminary rating of the transport attributes included in the stated preference experiment and a first on-the-field test of the soundness of the selection carried out with respect to the analysis of the maritime ro-ro context. Finally it has also tested the appropriateness of selecting freight forwarders as respondents in their vest of transport service users. The preliminary estimates suggest that in order to improve the use of the maritime ro/ro, maritime transport operators and institutional authorities should focus on actions improving the reliability and the frequency of service.

Rudel in his paper studies the evaluation of quality attributes in freight transport in Switzerland using a stated preference approach. The substantial increase of freight transport demand has recently been accompanied by structural changes demanding particular attention for lighter and more voluminous goods, generally shipped at higher frequency. New production concepts and spatial production networks have provoked a renewed interest for logistic services that have more and more been outsourced to specialized companies. At the same time new patterns in productive and distributive processes have generated a demand for high quality transport and logistic services. Empirical research on transport demand has mainly been focused on mode choice and travel time savings. However, no representative national analysis of travel time savings is available for Switzerland. Furthermore no other quality attributes, such as punctuality and avoidance of damages, has been researched. The filling of this gap tries to analyse and monetize the significance of quality attributes in the Swiss freight transport market. The research focuses on a specific freight market segment and, in spite of this limitation, produces a first important input for the building up of a cost-benefit analysis framework necessary for the evaluation of new infrastructure investments. The paper estimates the monetary values of the different quality attributes of transport services.

Wiegmans et al. investigate the role of service quality in the container terminal handling process. Service quality is scrutinised in order to understand how container carriers, having various options among different container ports in Europe, make their

choice. A set of fourteen interviews is used to present an operational view on the judgment of service quality of container terminals by terminal operators. Interesting results, reported in the paper, are that, for maritime terminals, average delivery time is considered extremely important even if reliability is confirmed the number one quality aspect and, given the low demand elasticity, container handling price reductions will not stimulate container handling demand. As it is for continental terminals, single-mode transport is the reference point on which the terminal operators base their price. A critical performance condition for this terminal operators is a 'total service assortment' including pre- and end-haulage (logistics solution). Secondary services (container repair, cleaning, etc.) further increase sales. The competitive position of continental (mainly barge) terminals is stronger than that of maritime and rail terminals. In fact a large customer base and a broad service package offers good business opportunities. Short distance between the operating personnel and the management is also a crucial competitive issue.

The three papers dedicated more specifically to commercial and industrial policies to stimulate intermodal transport tackle, respecitively, the role of foldable container leasing, the feasibility of mega container vessels and the relevance that distance and time have from the shipper's point of view. The first two papers are strictly linked to maritime transport whereas the third one deals more specifically with road-rail intermodal transport.

Konings examine the role of conataniner lessors in boosting the introduction of foldable containers. Given that the shipping company fulfils a central role in the logistic chain of maritime container transport, it also has a substantial interest in limiting the costs of empty return transport. Various potential benefits of foldable containers under this respect are identified.

Leasing companies have always played an important role in the container industry, providing spot availability of containers throughout the world. Konings affirms that this role is confirmed by the balance of ownership of the world container fleet between shipping lines and leasing companies. The reluctance of carriers to invest in foldable containers is understandable, considering the financial burden of purchasing containers which can be three to four times the price of a standard box and a substantial number of boxes is required to reveal the system benefits of foldable containers. The foldable container has also to fit in the logistic process of the carriers in order to provide a real added value to them (see Konings & Thijs, 2001a). In addition to such logistic conditions, the technical and economic conditions are just as much of importance for their acceptance. The question of whether there are sufficient incentives for the container leasing industry to lead the way with foldable containers is open for discussion. The dramatic decline of new container prices in combination with low interest rates and the sharp decrease in utilisation rates, worsened by severe trade imbalances on the major trade routes, caused serious problems for the performance of the industry, both in terms of revenues and profitability. The trend towards consolidation in the container industry, the availability of more sophisticated and efficient financing techniques and better management of container imbalances world-wide by shipping lines suggest that ownership of containers by shipping lines will increase in the future at the cost of container leasing business (Stribley, 2000). A possible answer to this problem could be the broadening of lessors services beyond the traditional leasing functions of supplying standard equipment and finance.

Van Ham studies the role that the internationalisation and globalisation of economies has had on shipping due to the relevant quotas of international trade moving across the world by ship. In fact, most of the general cargo is transported in containers and the increase in volume of containerised cargo has been increasing in the last decades. On most major routes a doubling of volume occurred in less than ten years and the current fleet of container ships with a total capacity of 7 million Twenty foot Equivalent Units (TEU) has also doubled since 1997 (Europoort Magazine, 2004). Moreover, ship size is still increasing and van Ham scrutinise the future development of containerships in this perspective. From a historical perspective a trend is described towards vessels of 10.000 TEU. Already on the drawing board are Ultra-Large Container Ships (ULCS) up to 12,500 TEU such as Suez-max and even Malacca-max container carriers (18,000 TEU). However, it seems that for these mega container ships new technical and logistical concepts are needed. Via desk research the pros and cons of such vessels are identified. Executives of major container shipping lines in Asia and Europe have been interviewed in order to draw some conclusions on the feasibility of the mega carriers. The trend of increasing ship size has not yet come to an end; growing (Asian) markets require container capacity and shipping lines will provide it. Technically speaking mega carriers are feasible but from an economic point of view the benefits are small. Momentarily traditional concepts are stretched to their limits but the advent of a new generation of container ships will be based on twin screw with two engines. If this technical innovation proves a success the next frontier is the Suez-max vessel up to approx. 12,500 TEU while the ultimate container vessel, the Mallaca-max, probably has too many limitations to become a new standard.

Kreutzberger in his paper discusses the relevance that distance and time have from the shipper's point of view and analyses operator's response. Usually, in fact, freight transport evaluations suggest that (direct) transport costs are the most important aspect followed by (time) reliability and transport duration. The relevance of transport time is a matter of dispute and one can observe that customers of road transport attribute to time a relatively high priority whereas those of intermodal (rail) transport – according to numerous studies – a relatively low one. The relevance of transport time also seems to depend on its definition and that of frequency and flexibility. Under this respect the paper shows that: all cost performances deserve a thorough evaluation; intermodal rail transport time ought to be taken into serious consideration, as long as customers of road transport highly value transport time; and the design of transport services should explicitly consider indirect transport costs for the shipper in such a way that an increase in indirect costs is covered by a decrease of direct ones.

Furthermore the paper discusses the issue of the increase in transport speed, distance and time in complex bundling networks characterized by intermediate nodes for load units exchange. In this case the choice of roundtrip speed versus bundling influence distance, time, and hence vehicle costs.

Finally Macharis in her paper scrutinies the issue of the evaluation process for transport projects. The increasing complexity of transport projects' evaluation implies that different aspects have to be taken into account since the consequences of the projects are usually far reaching and the different policy alternatives are numerous and difficult to predict. Macharis points out that several pressure or action groups have also emerged causing an even more complex decision making framework to emerge. The use of multi criteria analysis for the evaluation of transport projects has increased due to the

growing complexity of the problem situation and stakeholders should be incorporated explicitly in the evaluation process.

The paper, after introducing the concept of stakeholders in the existing evaluation tools for transport projects, discusses a multi stakeholder, multi-criteria analysis methodology that has been developed for decisions in the transport sector. Finally the methodology is illustrated by applying it to some case studies. The paper proposes some interesting conclusions. In fact, the evaluation of transport projects involves several stakeholders and several criteria have to be included to take care of them. The methodology proposed allows to incorporate these points of view and several criteria in the analysis. The methodology has been applied in a variety of projects, ranging from the evaluation of infrastructure projects up to the evaluation of new technologies. Including stakeholders into the analysis takes more time at the beginning, but the acceptance of the proposed solution will be higher in the end.

For this special issue we would like to thank all the people who were in Lugano: Romeo Danielis, Luca Gambardella, Bart Jourquin, Rob Konings, Ekki Kreutzberger, Sabine Limbourg, Andrea Rizzoli, Roman Rudel, Hans van Ham and Bart Wiegmans, Simona Bolis and Yvonne Bontekoning. In Lugano very fruitful comments and suggestions were given on the papers presented. Our cluster members were also willing afterwards to act as referees in order to contribute to the improvement of the papers now appearing in this special issue. Special thanks goes to Simona Bolis who was our host in Switzerland, together with Rico Maggi who lead us to a typical local restaurant and also showed us the night life in Lugano.

Cathy Macharis and Edoardo Marcucci