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Bringing intermodal transport to the potential customers: An interactive modal shift website tool

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ABSTRACT

Intermodal transport still has to cope with an important gap between supply and demand. The two most important barriers in this respect are that shippers are not aware that intermodal transport can also be a cost effective solution for them and second, they do not know who to contact. This is due to the more complex structure of intermodal transport compared to unimodal road transport, with more actors and handlings involved. A possible solution to overcome the gap between supply and demand is to set up a web-based tool in which companies can check if intermodal transport might be appropriate for them. In this paper the setup of such a web-based tool is described and connected to the state of the art knowledge on intermodal transport. The web-based tool is based on a GIS-based location analysis model.

1. Introduction

Intermodal transport is the combination of at least two modes of transport in a single transport chain, without a change of container for the goods, with most of the route travelled by rail, inland waterway or ocean-going vessel and with the shortest possible initial and final journeys by road (Macharis & Bontekoning, 2004). Intermodal transport may include various types of transport modes. In this paper we concentrate on the combination of rail/road and waterways/road in maritime chains using containers as loading units. A typical maritime-based intermodal transport chain is shown in Fig. 1. The main haulage is performed by barge or train, while the post-haulage is done by truck.

As intermodal transport is more attractive in terms of energy, efficiency, external costs and may help reduce congestion problems on the road, it receives attention on several policy levels (Kreutzberger, Macharis, & Woxenius, 2006). Specifically for the maritime-based inland flows, intermodal transport is an important tool to decongest the port area which has to deal with an ever increasing flow of containers to be handled and transported to the hinterland. A virtuous circle between this increasing volume of maritime containers and the setup of new container terminals enables the intermodal sector to become an important solution for maritime flows.

The volume of containers that are handled at the ports increased substantially. In Fig. 2, the strong growth in container traffic in major European ports for the last three decades is presented. The growth of container traffic is impressive until the recent decline in 2008 following the global economic crisis. The Belgian ports of Zeebrugge and Antwerp have an average of respectively 10 and 9% annual growth between 1980 and 2011.

In order to support this growth and to open up the ports for the hinterland by inland waterways and railways, several new intermodal terminals were set up in Belgium. Visualized in Fig. 3, there are 19 terminals in Belgium of which there are 7 barge terminals, 6 rail/road terminals and 6 trimodal terminals. The map indicates a concentration of terminals near the Flemish waterways. At the moment, new terminals are also planned for Wallonia.

Still, the full potential of intermodal transport is not yet exploited. Even in this favorable situation with large volumes and many possible terminals in the hinterland, many containers are still transported by road. In the evolution of the modal split of the main ports, for example of the port of Antwerp, we see that most of the containers are being transported by road (see Fig. 4). The share of road transport has decreased slightly in the past 7 years, with 4% (in absolute figures it has increased, however). The container inland navigation has increased its share by 1% and railway/road transport by 3%.

Representing only a small portion of the total freight transport, intermodal transport takes up an important share within specific corridors, particularly in the North–South corridor (Alpine traffic for rail transport) and the modal split in the seaports. Serving mainly international routes (60%), intermodal transport constitutes a market for niches (Savy, 2007). The reasons for this failure to capture more volumes for intermodal transport are diverse. The short distances especially intermodal rail transport have difficulties to compete with road transport (Bärthel & Woxenius, 2004). As will be pointed out in Section 2.3 intermodal transport is only competitive after reaching a critical distance. This distance is shorter for barge/road transport

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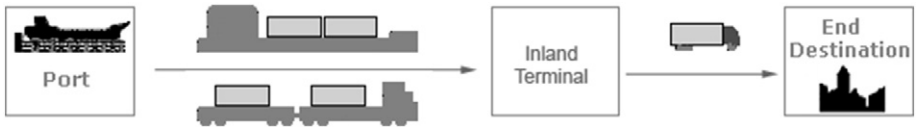

Fig. 1. The intermodal transport chain.

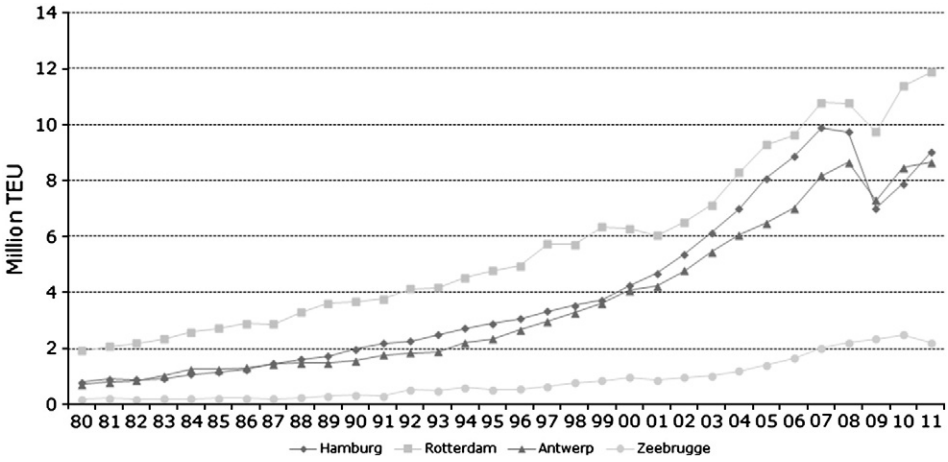

Fig. 2. European container traffic growth.

than for rail/road transport. Many containers have to be distributed in the close vicinity of the port.

However, for the distances for which intermodal transport is more competitive, also here we notice several bottlenecks to match demand and supply (Macharis & Verbeke, 2004; Tsamboulas, 2008). First, just like in passenger transport habits hinder the shift from road to another (combined) modus. Second, the fact that several actors are involved in the intermodal chain creates a bottleneck for potential users. They think it is more complex and do not know who to contact (Eng-Larsson & Kohn, 2012). Additionally, they often think intermodal transport will be more expensive.

In order to overcome this gap between supply and demand, new tools have to be developed to further open up the market for intermodal transport. In this paper we raise the question if and how this gap can be overcome. Therefore, we describe the setup of a web-based tool that enables shippers and other interested parties to check if intermodal transport is a desirable option for them.[1] This web-based tool is built upon the LAMBIT model. This Location Analysis Model for Belgian Intermodal Terminals is a GIS-based tool that shows the market area of intermodal terminals. The model has been used extensively to aid decision makers in the location analysis of new terminals and the analysis of subsidy schemes (see Macharis & Pekin, 2009; Macharis, Pekin, & van Lier, 2010). The web-based tool visualizes the benefits of intermodal transport for the demand side. Within the web-based tool, we provide the user with two main sources of information, namely the transportation cost compared to road transport and the amount of CO_2 emissions that will be emitted in the different options. The goal of the website is then to inform potential users of intermodal transport about the solutions that are currently available. To achieve this goal, the information complexity barrier had to be overcome. Hence, the target audience addressed not only consists of transport planners and heads of logistic departments but also managers of SMEs.

The paper is structured as follows: Section 2 provides a literature review of the information complexity barrier, modal choice variables, the cost structure of intermodal transport and its competitiveness in comparison to unimodal road transport. Here we provide justification for including the comparison of transport prices in our web-based tool. Also existing web-based modal shift tools are discussed and the value added by our web-based tool is stressed. In Section 3 the methodology is described. First the LAMBIT-model is described, then the CO_2 emission variables are explained and third, the modal shift tool itself is explained. In Section 4, the results are covered. Section 5 concludes the article.

2. Literature review

In this literature review, we will, by pointing to the relevant literature, argue the choices we made for designing the web-based tool. In the first section the need for an integrated web-based tool is explained. The second section discusses the choice for transport price, as the modal choice variable that will be displayed on the web-based tool. The third focuses on this specific modal choice variable, elaborating on the cost structure of intermodal transport. The last section compares the characteristics of our web-based tool with other existing ones.

2.1. The information gap

Apart from the often mentioned technical problems such as interconnectivity and interoperability between and within modes (e.g. Stone, 2006), also a complexity barrier may remain for users willing to adapt their logistics chains. It remains difficult for potential users to consider a modal shift when relevant and understandable information are lacking or its communication is not well targeted. In contrast to unimodal road transport, intermodal transport needs additional tools to ease the planning of transport by shippers. The development of new information and communication technologies (ICT), such as the setup of a web-based tool for intermodal planning and promotion, can show interested transport users and promotion agencies some possibilities of intermodality. A web-based tool which is easily accessible and understandable, like the one described here, can help SME's lacking the necessary information to reconsider their current transport chain. This action is also supported by the White Paper 'Roadmap to a Single European Transport Area — Towards a competitive and resource', stating that the information of routing alternatives is necessary to ensure seamless door-to-door transportation (European Commission, 2011).

[1] The website of this web-based tool is http://www.multimodaalvlaamsbrabant.be, the tool can be consulted under 'kaart'.