SYNCHROMODAL TRANSPORT CHAINS: TOWARDS A DEFINITION AND THE IDENTIFICATION OF KEY ENABLERS

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To shift freight transport from road to other eco-friendly transport modes is one prior goal of the European Union. Synchromodality as promising approach combines elements from different transport concepts and aims to create a flexible transport network, to sustainably use available transport resources and optimize transport processes. Since the transport sector is highly responsible for emission problems and other negative externalities, the need for promoting modal shift is evident. Synchromodality is a logistics concept, which strives to increase the share of rail and inland waterway transport. Switching between rail, inland waterway and road transport is carried out in near real-time. This is possible since shippers book their transport service “mode free”, i.e. the transport mode is not specified in advance. The transporter is therefore able to bundle the flows of goods from different customers and optimize their carriage. Close cooperation between all actors along the transport chain allows transporting goods in a flexible and resource-efficient way.
The port of Rotterdam and the European Container Terminals (ECT) started some pilot projects. The most famous one is the implementation of the synchromodality network between Rotterdam, Moerdijk and Tilburg. Even though synchromodality is a promising new concept, the applicability of this concept starting from landlocked Europe to the sea has not been investigated successfully yet. In order to prove the applicability of synchromodality in the hinterland in Central Europe, key enablers (similar to key success factors) of existing pilots of synchromodality have to be identified.

The aim of this paper is to define the term ‘synchromodality’ and to identify the key enablers for a successful development of synchromodal transport chains in the hinterland. Moreover, to identify the current situation and projects about synchromodality in Europe and the level of integration of inland waterways in the hinterland . The main element of synchromodality is to plan transport processes based on current capacities of the different transport modes in real-time. The shipper gives the logistic service provider the possibility to choose the appropriate combination between available modes of transport. Thus a real time switch is possible and sustainable transport processes can be efficiently integrated in the transport chain. A core criterion for a working synchromodal chain is to generate a cooperation network between all stakeholders. To foster the successful implementation of synchromodal transport chains the status quo of synchromodal transport as well as potential key enablers such as the standardised exchange of data and the efficient use of ITS must be defined.

In order to define key enablers for a synchromodal transport network, the first step was to determine the term of synchromodality and to differentiate it from related transport concepts such as intermodal or co-modal transport. Thus, based on a systematic literature, using international scholarly databases, review existing definitions and explanations about these transport systems are discussed and distinguished. As a second step, we reviewed the literature to identify potential key enablers for a successful implementation based on the literature. As a third step, we conducted interviews and a focus group with companies which have been identified as best practice examples. To increase the involvement of relevant stakeholders (i.e. politicians, logistics provider, shippers, researchers, special interest groups and IT providers), they will be invited to a discussion group. The main topic of this group is to discuss and reflect on the results of the overall project. Moreover, a desktop research is included to identify ongoing implementation projects about synchromodality and how inland waterway transport is included.

The concept of Physical Internet, which is anchored in the long-term strategy of the European Union should be achieved by 2050. Synchromodality is a major requirement to achieve this vision. Thus, project referring to transport and the physical internet are included in the results.
To communicate its benefits to the stakeholders a clear definition of synchromodality is essential. Results suggest, that key enablers will give an overview which factors must be considered (e.g. minimum amount, standardized data) based on the literature and the pioneers of synchromodality. Best practice examples and the status quo observation of the market, will help to examine existing framework conditions and to define additional required circumstances for the hinterland. By integrating potential stakeholders for the implementation of a synchromodal transport network, awareness on the topic will be raised to foster a long-term shift from unimodal to intelligent, flexible and sustainable synchromodal transport.

The transport system synchromodality will help to overcome this weakness and establish more sustainable transport chains by using the eco-friendly transport modes railway and inland waterway. In addition, bottlenecks in transport chains (e.g. low water levels or congestions) can be more easily compensated. Synchromodality allows saving costs since the best and most efficient transport mode is selected. Nevertheless, before establishing such a system the main barriers and key enablers must be identified and awareness needs to be created. The implementation of synchromodality may support a modal shift towards eco-friendly railway and inland waterway.

Based on a literature review and a discussion in a team of researchers, seven main categories of potential key enablers have been determined. Those seven categories are ranked due to the number of times they have been mentioned in the papers of the literature review: Network/ Cooperation/ Trust, Sophisticated Planning/ Simulation, Information/ Data/, ICT/IT, Physical Infrastructure, Legal/Political Issues, Awareness/ Mental Shift and Cost/ Service/ Quality.

A best practice example has been identified from the port of Rotterdam, which are the founders of synchromodality. The use of inland navigation for 50% of all cargo at the new Maasvlaakte II terminal in the hinterland transport is a requirement which has to be fulfilled by 2020. An Austrian best practice example is the project ATROPINE, which simulates the effects on inland navigation of transport bundling activities of different companies.

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