

STRATEGIC ROLE OF TECHNOLOGY FOR SUSTAINABLE TRANSPORT MANAGEMENT

Katarzyna NOWICKA

SGH Warsaw School of Economics, Warsaw, Poland, EU, Katarzyna.Nowicka@sgh.waw.pl

Abstract

Sustainability plays crucial role in today's competitive environment. Having CSR strategy implemented in the area of production seems to be not enough. Currently companies realized that they could also be competitive by improving their logistics processes i.e. in terms of implementing more eco-friendly transport management. Sustainability in the area of transport activities can occur as replacing road to multimodal modes. However, the multimodal transport is still recognized as complex and problematic solution for many logistics managers. Thus, it is rarely chosen by the companies. These challenges can be met through using technology tools for transport planning and management. One of the available solutions is a part of ChemMultimodal project toolbox - Intermodal Links platform. On such a digital platform companies can easily plan different scenarios for multimodal transport routes within Europe. It could also further serve i.e. for synchromodality as a new competitive solution on logistics services market. The goal of the article is to present Intermodal Links platform as an example of the tool supporting strategic decisions for increasing sustainable transport solutions. Presented results are based on ChemMultimodal Project implementation. The Project is carried out under Interreg Central Europe Programme between 2016 and 2019.

Keywords: Sustainable transport management, digital platform for transport management, cloud platform

1. INTRODUCTION

Sustainable development means managing a company with the respect of economic, ecological and social needs and aspects. Except from the strategy, sustainability is driven by regulation and growing customers' awareness on their impact on natural resources by daily customers' choices. This means that having Corporate Social Responsibility (CSR) strategy implemented in the area of production seems to be not enough. Currently companies realized that they could also be competitive by improving their logistics processes i.e. in terms of implementing more eco-friendly transport management. Sustainability in the area of transport activities can occur as replacing road to multimodal modes. However, the multimodal transport is still recognized as complex and problematic solution for many logistics managers. This is due to the fact of the need for involving not only different modes of transport but also finding right intermodal terminals or reliable partners that are able to meet customers' need i.e. in terms of Just-In-Time supplies or timely deliveries. Thus, multimodal solutions are still rarely chosen by the companies.

However, these challenges can be met through using technology tools for transport planning and management. Currently digital technology allows to build tailor-made solutions that are able to meet almost any needs of the customers on the acceptable costs level.

Taking into account complexity of the multimodal transport and rapidly growing needs for supporting logistics with sustainable solutions the idea of ChemMultimodal project arouse. The project concentrates on promotion of multimodal solution within logistics of chemical goods. During the project implementation the toolbox solution was developed to support transport managers with multimodal decisions when fulfilling orders for customers located in Europe or even further - on the global scale. One of the elements of the toolbox is the digital platform helping managers with planning and scheduling transport scenarios with usage of multimodal resources - mainly rail and short-sea transport and intermodal terminals. The platform adopted for supporting systemic approach of the ChemMultimodal toolbox is the Intermodal Links platform. This platform is an example of the solution that can help managers with easily planning and developing new different scenarios for multimodal

transport routes within Europe. It could also further serve i.e. for synchromodality as a new competitive solution on logistics services market. The goal of the article is to present Intermodal Links platform as an example of the tool supporting strategic decisions for increasing sustainable transport solutions. Presented results are based on ChemMultimodal Project implementation. The Project is carried out under Interreg Central Europe Programme between 2016 and 2019 [1].

2. CHALLENGES OF SUSTAINABLE TRANSPORT MANAGEMENT

Sustainable transport development is an important element supporting the implementation of the policy of taking measures to improve the quality of the environment in the European Union [2]. Sustainability in terms of transport management means the ability to analyse available transport modes and choosing these that are characterised by eco-friendly impact on natural environment. Low-emission transport includes those modes of transport (or a combination thereof) that, during the transport of goods, emit the lowest CO₂ coefficient in comparison with other branches. Low-emission modes of transport include: railways, short-sea shipping, inland waterway transport [3]. The characteristics of these modes of transport suggest that in fact there is a need to take in to account multimodal solution since not in all of the cases there is a possibility to use a single mode during the direct transport from point of departure to the point of the final destination. Multimodal transport means carriage of goods by two or more modes of transport [4].

Choosing multimodal transport is challenging for many companies. The main reasons are the insufficient skills for planning the complexity of activities within multimodal transport infrastructure and the need for reacting based on different scenarios during the process of the transport frequently on a real-time basis. The other reason is connected with the characteristics of railway (or short-sea) solutions, namely: longer time and problem with punctuality - and therefore reliability - in comparison with road mode [2].

However, if the main objective of logistics activates is to coordinate freight transport, storage, inventory management, materials handling in the integrated manner, therefore logistics or transport managers should be familiar with multimodal challenges and able to gain in value in terms of low-emission transport scenarios implementation in their companies. In any case, to meet this objective the proper information sharing and management should be in places. The information can be collected and processed by and within the company, by the logistics service providers and the company or can be obtained by the open source systems available on-line on digital platforms.

3. TOOLBOX SUPPORTING SUSTAINABLE TRANSPORT MANAGEMENT DEVELOPED DURING THE CHEMMULTIMODAL PROJECT

ChemMultimodal project is implemented for promotion of multimodal transport of chemical goods. The Project aims to achieve this by coordinating and facilitating cooperation between chemical companies, specialized LSP, terminal operators and public authorities in chemical regions in Central Europe. The Project is carried out under the Interreg Central Europe Program between June 2016 and May 2019.

The first part of the Project concentrated on diagnose on how physical flows of chemical goods are managed and what kind of tools are used in supply chain to support smooth and continues flows. This information is a base for a tool development that aims to promote increasing in multimodal transport usage. Project is conducted in seven countries or regions in Central Europe by fourteen Partners. All the Project's activities are performed simultaneously in all Partners' countries. The ChemMultimodal Project presents a systemic approach to manage sustainable transport activities on a global scale. This is because it consists of four elements which complement each other to provide comprehensive solution - the toolbox - based on cooperation in the outsourcing model. The toolbox consists of four elements (consulting services, planning guidelines, Intermodal Links platform and CO₂ calculator) and has been tested by each of the project's



partners with chemical companies in the partner countries to facilitate real modal shift. The toolbox elements are presented on **Figure 1**.

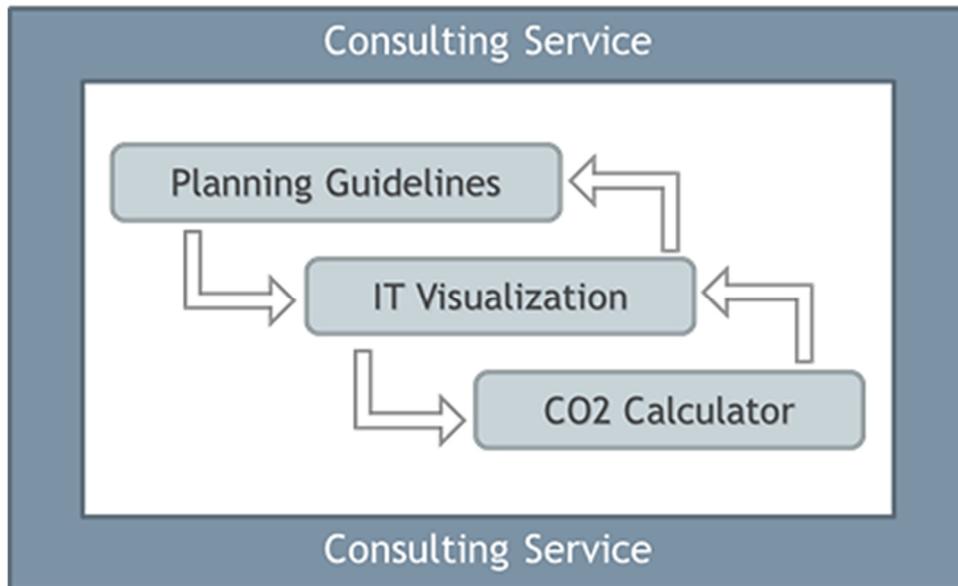


Figure 1 ChemMultimodal Toolbox

The main elements of the toolbox are:

- **Consulting Service** for chemical companies to improve multimodal transport serves as a moderating framework for hosting workshops, bilateral meetings while discussing the potential to shift unimodal transport to multimodal. The aim is to establish bilateral cooperation and to develop a database of contacts generated throughout the project. The main role of the project partners is providing information, engaging in discussion, facilitation of cooperation and networking between companies and logistics service providers.
- **Planning Guidelines** for increasing multimodal transport are established to capture necessary transport facts. The planning guidelines serve as an output sheet whereby most important indicators related to multimodal transport are gathered. Such indicators are:
 - product type to receive information about the products characteristics,
 - volume to estimate if intermodal transport poses a suitable alternative way of transport,
 - countries crossed along the route with respective driving and loading regulations,
 - bundling options to achieve a more efficient use of capacities and
 - the number of transport units. This number is based on the volumes (tons or litres) foreseen for the transport
- **The CO2 calculator** was developed based on activity-based method. It is useful for both, chemical companies and logistics operators, and provides the one-click calculation of CO2 emissions of intermodal connections from the place of origin to the cargo destination with possibility to define freight characteristics. The value of CO2 emissions is based on average emission factors [5].
- **The Intermodal Links Planner** allows the visualisation of existing intermodal transport routes and provides information about frequency of departure, availability of Logistics Service Providers and terminal operators, arranged feed, delivery of transports to/from different terminals. It fulfils the core requirements like European wide availability, high topicality of the routes and connections and integration of different transport modes [6].

4. IMPACT OF TECHNOLOGY ON TRANSPORT MANAGEMENT - THE CASE OF INTERMODAL LINKS PLATFORM FOR SUSTAINABLE TRANSPORT MANAGEMENT

Currently digital technology plays crucial role in gaining competitive advantage by the companies. Technologies impact on innovativeness and innovations in the area of products (goods and services), processes and business models [7]. They are also one of the main resources supporting companies that are not classified as innovative companies. Therefore, any company can gain value by using technology in the area of multimodal transport management. The solution for the complex transport activities' planning is using a digital platform that enables access to the information shared by logistics and transport service providers. The example of such a platform is presented on **Figure 2**.

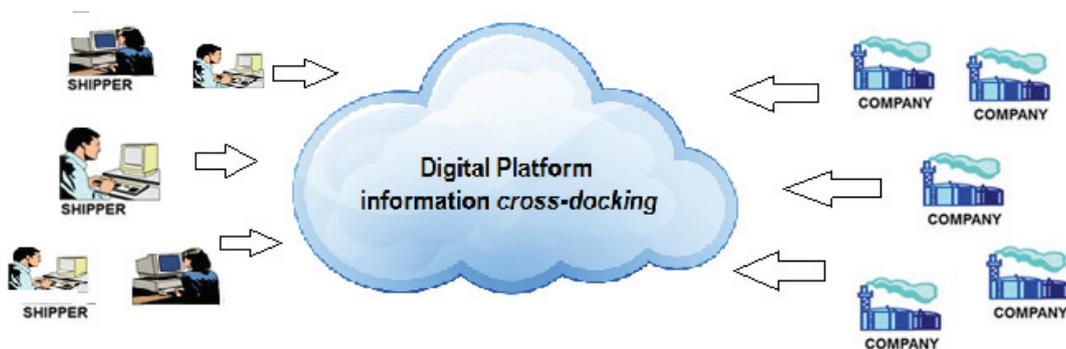


Figure 2 The transport planning platform on cloud computing model

In case of digital platforms, the information is centralized - mainly in the cloud computing model - and available to the users in form of the data base where all the connected transport suppliers share their resources of services. That kind of platforms are the base of the sharing economy offering the possibilities to meet the demand and the supply on-line [7].

The example of independent on-line search platform that enables to find the best and fastest multimodal transport for containers throughout Europe is the Intermodal Links solution. The platform on intermodal within Europe routes is available since 2013. It combines schedules of 159 barge, rail, short-sea and ferry operators. And it is continuously updated by them - 71 % of the information is updated on 3-monthly basis, 18 % - 3-6 months, 10 % - 6-12 months and 1 % - more than one year. To support users with such a complex data, the standardization is needed to collect and present schedules. The schedules are based on Transport Service Description (TSD) that consist of:

- city of departure and arrival,
- terminal of departure and arrival,
- days of departure,
- frequency (departures per week),
- transport time (in number of days),
- name of transport operator,
- name (and date) of transport service.

The screenshot of the platform for sustainable transport planning is shown on **Figure 3**.

The Intermodal Links platform offers point-to-point intermodal solutions across Europe and adjacent regions. There are around 18 000 direct connections offered, 90 % of them are the services supported by 50 largest operators (30 largest operators represent 75 % of the direct connections and 10 largest operators - 44 %). The connections by transport modes are shared between short-sea or ferry (48 % of connections), railway (32 %) and barge (20 %). It covers the connections with 1100 intermodal terminals and includes information on logistics infrastructure from 56 countries. This tool is insightful and is based on tailor-made analytics strongly

supporting modal shift strategies. It must be also underlined that this solution is free of charge and can be used both - for checking available solutions within European transport infrastructure and for building alternative scenarios of road transport and planning sustainable solutions. According to the platform users the reason for using Intermodal Links was “to find better intermodal transport connections” (58 % of responses) and “to compare intermodal transport with road transport” (26 %). When analyzing impact of the platform to the daily-basis users work, they admitted that “I have found

alternative intermodal routes in Intermodal Links which I can offer to my clients” (25 % of responses), “I save time by using Intermodal Links” (22 %), “I make my work more efficient” (17 %) and “I have contacted intermodal operators which I have found in Intermodal Links” (17 %) [9]. These replies prove that the solution is also helpful for logistics service providers which can offer their services on the platform, but also serve their customers by the other offers available on the Intermodal Links. Further they can use it for supporting more innovative solutions e.g. for synchromodality purposes [10].

The Intermodal Links platform usage has been recognized already by three international European ports - Port of Amsterdam [11], Port of Zeeland [12] and Port of Zeebrugge [13] and also by East-West Corridor [14] and KTL Ludwigshafen [15]. The platform is constantly developed and includes new partners.

5. CONCLUSION

The main objective of logistics activates is to coordinate freight transport, storage, inventory management, materials handling in the integrated manner. Having in mind the fulfillment of customers’ satisfaction and at the same time meeting the goals of CSR strategy makes logistics’ objectives even more challenging and problematic. To simplify at least part of the complexity and to solve the problems of low level of multimodal transport usage the ChemMultimodal project was introduced. One of the toolbox elements that was developed within the project was an IT Visualization solution. The Intermodal Links platform was chosen to be further developed and serve as a base for transport and logistics managers during transportation activities planning and managing. The platform integrates information from different transport services providers - mainly within European Union - to visualize possible routes scenarios when revising multimodal transport solutions on long distances. Except for broader information on available models, managers can gain the solutions that meet companies’ CSR strategy in practical, not only partial or theoretical, manner. Of course, this platform will not solve all multimodal problems and complexity as these strongly depend on the scale and diversity of the products’ portfolio and geographical dispersity of the customers within particular supply chain. However, such a solution might be a first step to diagnose multimodal potential that - according to the study - is still uncovered or perceived as too complicated by many managers from chemical companies. The next step for developing

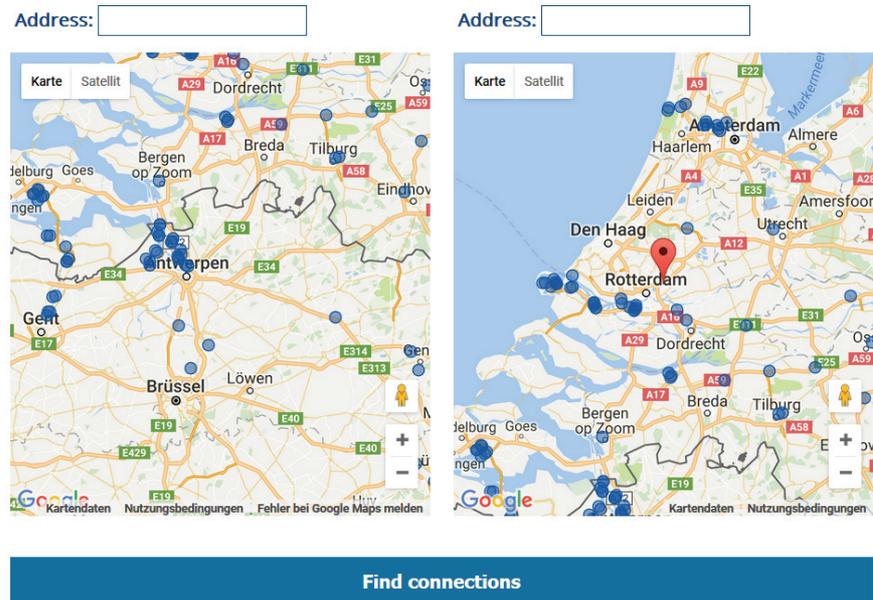


Figure 3 Intermodal Links platform visualisation

competitiveness by sustainable transport management - also for Logistics Service Providers - might be a synchromodality implementation into the practice based on digital platform like Intermodal Links.

ACKNOWLEDGEMENTS

The article is a result of ChemMultimodal Project implementation and is co-financed by Interreg Central Europe Programme.



Scientific work financed from funding for science in the years 2016-2019 granted for the implementation of the co-financed international project.

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