Integration of Inland Navigation into managed Intermodal Logistics Chains

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ABSTRACT

The EU research project ALSO Danube aimed to promote the use of inland waterway as a key mode of intermodal door-to-door transport chains. Within the project, an open virtual network, with potentials for application on a broad European level, links operative actors and interconnects partly existing systems via common source logistic databases, was interactively integrated into traffic management systems. Web based client applications, advanced EDP-solutions and innovative telematics technologies were demonstrated and evaluated in five supply chains. The technical approach and the operational concept corresponded to SME (small and medium enterprises) and CEEC-(Central East-European countries)operator needs; they created superior logistic services, increasing the competitiveness of the Danube and leading to micro and macro-economic benefits while strengthening the economic integration of the CEEC.

Keywords:

Intermodal Transport Management

Multimodal Logistics Chains

Traffic and Transport Telematics

1. INTRODUCTION

The traditional cargo operated on the Danube in Austria is bulk material (iron ore, coal, oil, fuel, grain). Conventional (traditional) services on vessels do obviously not attract other commodities to be operated by inland navigation. The European Commission and the national administrations, responsible for inland navigation have started investigations to explore new markets and to develop new services on inland waterways. These projects focus on the deployment of intelligent data processing and communication solutions as well as to the introduction of new procedures and logistics services for cargo transport operation on inland waterways. The key project related to develop new technologies and logistics services for the management of door to door logistics chains with inclusion of the Danube navigation is the EU research project ALSO DANUBE.

2. THE EU RESEARCH AND DEMONSTRATION PROJECT ALSO DANUBE

ALSO DANUBE (Advanced Logistic Solutions for Danube Waterway) is a research and demonstration project within the 5th Framework Program of the European Union.

The overall objective of ALSO DANUBE is to increase significantly the use of inland waterway as a key mode within multimodal door-to-door transport chains focusing on the Danube axis. ALSO DANUBE aims to:

- develop and implement an advanced European concept to manage multimodal transport chains with inland navigation as core transport mode
- set up and run highly integrated logistic networks and operational platforms to enlarge the current range of logistic services
- integrate advanced traffic and transport management systems
- introduce new systems and technologies in the area of data exchange and communication
- create independent logistic information and communication services
- stimulate the extension of waterway transport relations to port hinterland and combined cargo
- improve the efficiency of Danube transport which shall contribute to the development of the Danube waterway as a backbone for European transport, promoting the sustainable integration of the accession countries into the European Union

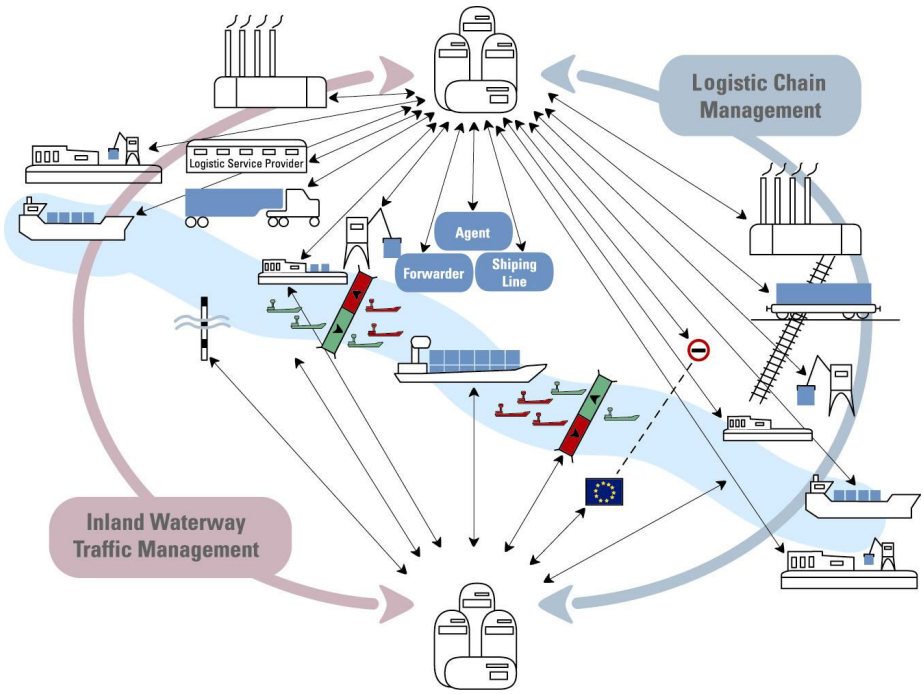


Figure: Integrated Logistic Chain Management

The project ALSO DANUBE is coordinated by the Development Agency for Telematics and Danube Transport, in short via donau, an affiliate of the Austrian Ministry of Transport, Innovation and Technology. The consortium comprises of lead European Research Organizations, information technology system suppliers and strong partners from the logistics industry.

Within the project, an European Concepts for the management of multimodal logistics chains were developed, solutions were also be applied to different real world business scenarios, the so-called demonstration scenarios. This demonstrated that the developed solutions for transport management satisfy the needs of industry. In the following one of the most advanced scenario is briefly described.

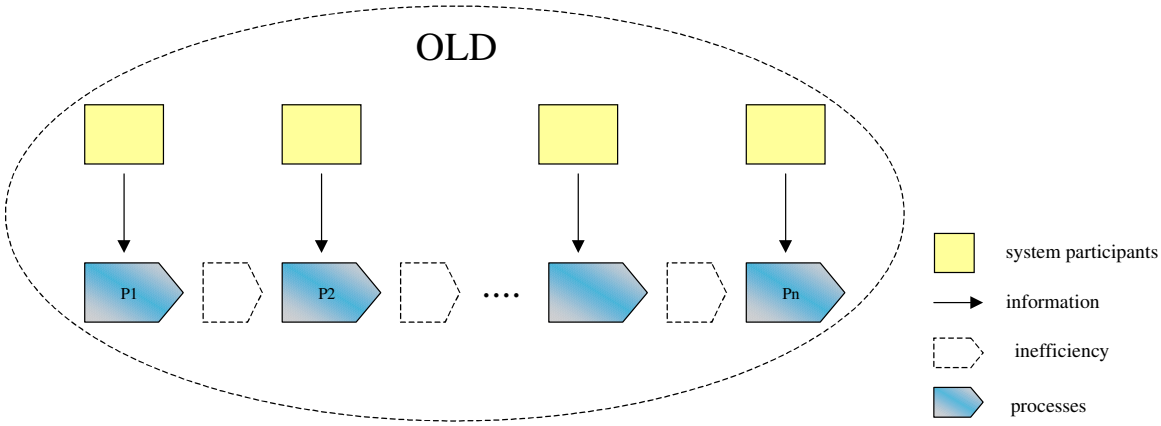
3. DEMONSTRATION SCENARIO ON STEEL LOGISTIC

One of the most advanced scenario is the ILL steel demonstration case in which steel coils are transported just in time (JIT) by means of multimodal transportation (rail – inland vessel – rail) between two different steel factories in Austria over a distance of approximately 130km. Advanced information and communication systems assure a seamless flow of products along this multimodal door-to-door transport chain. The chain was set up with a highly integrated and automated flow of information between all involved partners in the logistic chain creating an efficient logistic network and meeting the high demands of modern just in time delivery.

The involved actors and logistics chain: Industry Logistic Linz (ILL) is the logistics service provider for the consignor voestalpine Stahl GmbH, the most important steel production plant in Austria in charge of managing the multimodal transport process. ILL contracts the Logistic Service GmbH for the transport on rail from the production and storage facilities of the plant to the terminal in Linz (see figure), where the direct transshipment is executed. DDSG Cargo GmbH is the vessel operator in charge of transporting the steel goods from Linz to Krems over a distance of about 130 km. Mierka Port of Krems transships the cargo directly from the vessel to rail wagon. The end haulage (the transport between the port of Krems and the consignee) is operated by the consignee voestalpine Krems GmbH, where the cargo is used for producing high quality steel products.

4. THE INFORMATION TECHNOLOGY AND THE MANAGEMENT OF THE LOGISTICS CHAIN:

During the research project ALSO DANUBE, it was found out that complex multimodal logistics chains with many different transport and transshipment operators is very sensitive to disturbances. Therefore in conventional operations large safety buffers need to be planned. As a result, long waiting times for the inland vessels as well as for loaded and unloaded wagons are characteristic of this situation. This leads to tremendous inefficiencies, which increases the cost of multimodal transportation (see figure).

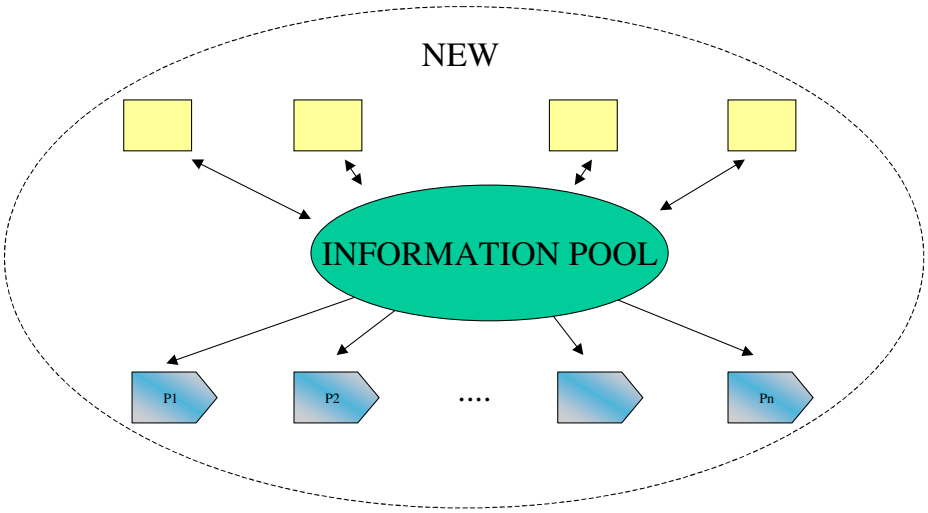


5. IMPROVED OPERATION:

Planning and managing logistics chain enables to overcome the shortcoming. What makes the chain planable and therefore more efficient is information about the overall status of logistics processes.

In the case of the ILL demonstration scenario, an exact time schedule can then be derived, from product retrieval from storage in Linz, to the exact departure schedule and arrival time in Krems, to preparation of the coils in production in Krems. However, the exact production program in Krems is also necessary for efficient resource management.

Furthermore integration of the IT systems of all actors must be done by a large data pool for the purpose of accelerate the overall information flows, which are only executed electronically. The transparent chain makes the sending of information and coordination between partners via telephone unnecessary. In addition to the resulting cost savings (relieves personnel), this also enables automatic, central, and system wide optimal resource allocation. At a single centralized location, the information pool), all information is collected, all processes are planned, and results are made available to all system participants. Within the project ALSO DANUBE, this is executed fully automatic.



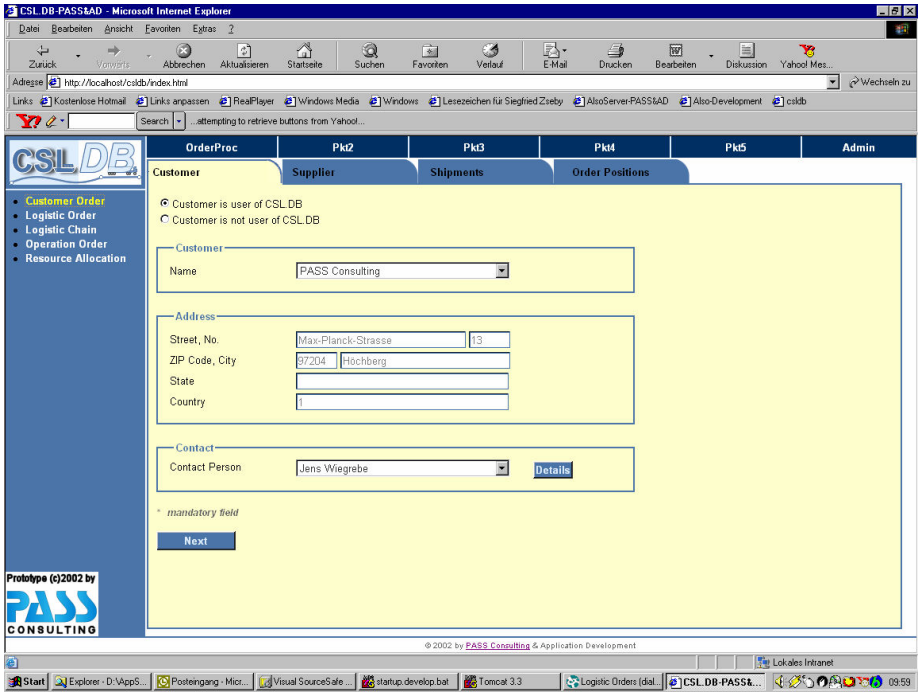
During the project ALSO DANUBE, such an information pool was developed. The so-called Common Source Logistics Database, in short the CSL.DB, was developed as an integrating information management system for the integration of IT systems along the logistics chain.

The Common Source Logistic Data Base (CSL.DB) ensures the availability of all relevant data, which are necessary for

- planning
- managing
- monitoring and
- achieving integrated intermodal logistics and transport chains.

Furthermore, the CSL.DB is used by the operators as a common source for all requested data and information in the adjusted scope and Java, HTML and XML based formats and for actual status information. Besides, the CSL.DB provides an interactive link to the traffic management (TM) systems which allowed an exact tracking of vessel movements on the inland waterway. A monitoring of supply activities can be realised at the level of transport orders with given interactive relational links between supply order data and transport operation data from the CSL.DB. The CSL.DB has the following general technical components:

- the database (Oracle 9i), where the respective data was collected, linked, assigned, and maintained;
- advanced access solutions (remote access as well as interactive web based access) and clients applications which are directly related to the CSL.DB in order to collect and to provide data and information;
- interactive links to the traffic management (exchange of data and
- information upon request or event-based)
- interactive links to external information databases (e.g. schedules of transport service providers, dangerous goods databases, transport networks, port information, etc.);
- direct interfaces to logistics service providers (such as ILL) and to shipping companies (such as DDSG) in order to administrate their master data and specific logistics chain needs. In short, the CSL.DB can be defined as advanced interconnectivity management in terms of a web-based application.



The CSL.DB was developed step by step in accordance with the ALSO DANUBE work packages (concept, specification, implementation, demonstration, and validation of the system) by the consortium members PASS Consulting & Application Development GmbH, PASS Consulting Services GmbH, BLSG, KIOS and PASS LogiConsult GmbH.

6. FURTHER DEMONSTRATION SCENARIOS:

The designated demonstrator DDSG Cargo Line provided intermodal transport services from Hungary to ARA Ports. As a part of this scenario, the CSL.DB used traffic data from the telematics system River Information Services (RIS) and from the company's fleet management system for the purpose of deviation management.

Combined Container Services (CCS) provided multimodal door-to-seaport transport on the Rhine and its branches. The CSL.DB functions were used within this project for tactical and operational route planning. Tactical route planning allowed the generation of possible multi-modal transport chains for transport requested in a strategic (mid-term) planning horizon, whereas operational route planning shall support daily operations.

In 2001, a new container liner service was set up between Bavaria, Upper Austria and Central Hungary. The container line operator Danube Combined Services (DCS) provided regular door-to-door intermodal transports of 45'' containers on the Danube from Budapest (Hungary) via Enns (Austria) to Deggendorf (Germany).During the engagement of DCS in ALSO DANUBE, IT systems for the management of container liner services have been developed. The use of these IT systems proved to be a crucial factor to guarantee high quality service for industrial clients. Despite its commercial failing, DCS has proved that Danube container liner services are technically and organisationally feasible and can meet the customer requirements. Summing up we can state a high importance of the demonstration phases of the project. They are the initial test for innovative solutions which have been developed in the research project ALSO DANUBE.

The Mierka Port of Krems not only participated in the ILL Demonstration Scenario, but also used data from the governmentally operated waterborne traffic management system - DoRIS (Donau River Information Services) - for accessing the position of the vessels which are registered for transshipment by means of the CSL.DB. This demonstrated the technical feasibility of the integration of Port Management Systems with Traffic Management Systems. It demonstrated also that by means of reliable information, which is provided automatically, the processes in the ports can be strengthened.

Industrie Logistik Linz executed a second demonstration besides the steel demonstration scenario to Krems. In the Linz – Antwerp steel case this company transported steel coils to

the ARA seaport at a regular basis. By means of telematics technologies on board of the vessels, the sailing was constantly monitored and the progress was compared to the transport schedule. The Common Source Logistics Database also created alert messages in case of a deviation relative to the transport schedule.

8. CONCLUDING REMARKS

The demonstration scenarios of ALSO DANUBE were excellent examples that multimodal chains (rail, inland navigation, rail) can compete or are even superior to rail or road transportation in terms of logistics performance as well as costs. However, due to increased complexity, multimodal chains do prove to be slower, more sensitive to disturbances, and so less planable. Improved information and communication systems for planning and managing the multimodal logistics chain are therefore required to ameliorate these drawbacks.

The demonstration cases are certainly to be viewed as a benchmark in the view of modern transport management. They showed that inland navigation is a competitive transport mode under the precondition that it is integrated into managed logistics chains.

9. REFERENCES