Woroniuk C, Marinov M, Zunder T. *Developments for Private Sector Rail Freight Services along an EU Corridor.*


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Date deposited: 9th September 2014

Version of file: Published

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DEVELOPMENTS FOR PRIVATE SECTOR RAIL FREIGHT SERVICES ALONG AN EU CORRIDOR

Summary. This research aims to present a number of developments for private sector services along an EU freight corridor. To achieve this, information technology developments for operating processes and market tested freight services are examined. The anticipated benefits of implementing IT developments for operating processes are presented along with a case study and pilot demonstration of innovative freight services. Analysis of pilot demonstration results suggest that there is potential for these types of services operated by the private sector along a European corridor.

1. INTRODUCTION

A number of developments, for private sector rail freight operations are presented in this study. These include information technology developments for operations management namely a train control centre, customer information centre and a code of language. It is anticipated that these developments will contribute towards good practice and standardisation within the sector through the provision of corridor wide information technology platforms. In addition an innovative, market tested rail freight service which has been successfully demonstrated is analysed. A backbone corridor initially between the Netherlands and Romania has been used to examine developments in private
sector services. This route allowed the pilot to address a number of key issues which have constrained
the performance of rail freight in multilateral operations including border crossing, technical,
operational and language interoperability.

The motivation for this study is twofold; firstly current trends within the sector and secondly EU
rail policy changes during the last decade. EU statistics demonstrate that, rail freight as a whole has
fallen over the past five years. In 2009, statistics indicated that the total performance of rail freight
transport to be 366 billion tonne kilometres, this represents a reduction of more than 17% in
comparison with 2008. (Eurostat,2004). Negative trends are not apparent within the private rail freight
and statistics suggest that the sector is growing. Data from Netzwerk Europäischer Eisenbahnen (NEE)
an organisation which supports private rail freight in Germany and surrounding countries suggests that
the market share of private freight operators is growing and continues to grow. In 2000 private
operators held only 2.6% of the market, by 2011 they held 25.1% market share. This trend is forecast
to continue into 2012, with private operators expected to obtain more than 27% market share. (Source
NEE 2011).

It can be argued that changes in EU rail freight policy have influenced the current trends in the
private sector, as through market deregulation and reform there have been opportunities for private
operators to increase their market share. Market developments have occurred as a result of a series of
directives which were employed by the EC beginning in 1991 with the aim to separate rail
management from the state, encourage rail to be operated commercially as a business and provide
standard licensing and fair access to infrastructure. Following this, in 2001 three infrastructure
packages were proposed by the EC, these were supported by a series of goals and actions to encourage
implementation. Goals included; ensuring high quality rail services and improving the environmental
performance of freight services, while lines of action consisted of removing entry barriers into the
market and developing a dedicated rail freight network.

The objective of this research is to present developments for operating processes within the
European private rail freight sector. This will be achieved through the examination of IT developments
to be piloted using simulation software and through the analysis of pilot testing of innovative freight
services along an EU corridor. It is anticipated that the outcome will determine the level of efficiency
and the associated benefits of adopting each innovation.

2. CASE STUDY

For the purpose of this study, innovative freight services were market tested along a corridor in the
EU from West-East, linking the North and Black sea gateways. Illustrated in figure 1, the
demonstration axis links Rotterdam and Constanza, this route serves major port and industrial
complexes in The Netherlands along with options into Belgium and North German Ports. It also
supplies major industrial areas in Germany and Austria and links to major cities in Hungary and
Romania with new port potential in the latter as a source of traffic. The route includes 4 multimodal
terminals; Rotterdam Rail Service Centre (NL), Ludwigshafen KTL (DE), Budapest Bilk (HU) and
Constanza Port (RO).

The adoption of these types of services is expected to provide a number of advantages to
organisations and entities within freight and logistics operations. These include multimodal door to
door transport, including new rail freight services with a high level of reliability, frequency and
competitive prices. In addition, it is anticipated that innovative operations will lead to benefits for
European society and citizens, as there is the potential for annual savings in transport kilometres of
around 12 million.

During the planning of the pilot it was the intention of the operator to use block trains for the
service, as unlike multi stopping and feeder trains within the hub and spoke model they would be
subject to less frequent delays and as a result would provide a more efficient and reliable service.
However a review of EU railway undertakings has shown that above 60% of existing business
participates in Single Wagon Loads or multiple block train services, this indicates a high market
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...demand for feeder and multi stopping trains along the pilot corridor. As a consequence pilot operations adhered to market constraints and shunting tracks were made available at both ends of the main route, alongside branch services between the hub and final destination sources.

Fig. 1. Trans European Freight Corridor source: retrack.eu

3. INFORMATION TECHNOLOGY DEVELOPMENTS

The train control centre, customer information centre and code of language will be analysed in further detail in this section. The train control centre (TCC) aims to contribute towards more efficient rail freight services through its ability to deliver active monitoring of the train status, congestions, track availability and other events which could inhibit non-stop train movement. The TCC is an innovative support system for use in monitoring the movement of freight, through the provision of operations monitoring and operations data acquisition which links customer delivery requirements and the ability to deliver. The TCC operates through combining information and generating the appropriate actions to correct any deviation from the train schedules, with the objective to minimise any possible delay. The TCC will be realised through the following measures: risk analysis of the corridor as a productive system, formulating measures to enhance the corridor-wide transfer propulsion, facilitating control of the corridor production system and the implementation of monitoring and control of the corridor. It is envisaged that, through a combination of information from the traction provider and information regarding the availability of infrastructure, the movement of freight may be conducted with greater efficiency.

The customer information centre (CIC) aims to benefit rail freight operators, through its ability to analyse the quality of services delivered and the profitability of orders. The CIC is able to provide the known location of a train, identify the status of a customer order, identify wagons and freight type on a service and locate information relating to wagons and freight type for example wagon lists and freight...
information. The CIC is linked to the TCC, as it has the ability to receive information from the TCC and relay it to customers in relation to their logistical query. It is anticipated that the CIC will link supply chain management service requirements with integrated services offered by local rail operators. In addition, the CIC can also be used to optimise sales and operational activities through the provision of e-booking, e-planning and functionalities for yield management.

The code of language (COL) aims to address the current language interoperability barriers through the provision of a numerical and alphanumerical set of codes which are correlated to information expressed in different languages. Through integration with European rail traffic management system (ERTMS) and European train control system (ETCS) it is envisaged that in the future the current technical, operational and language interoperability barriers will be overcome. The COL will be implemented by TCC and CIC staff and train drivers. It is anticipated that it will remove the current language barriers of; the ability to understand the operational rules and the ability to communicate in the language of the nation state and that the COL will allow safe communication of short messages.

4. PILOT SERVICE DEMONSTRATION

Images Innovative private freight services implementing a hub and spoke production pattern and operating single wagon load traffic, have been market tested along a corridor from Cologne to Gyor from February 2010 until January 2012. In February 2010 services ran on a single rotation per week between Cologne- Eifeltor in Germany and Gyor in Hungary. Train operations included a mix of wagon sets and commodities ranging from agricultural products and powdery bulk cargo to semi finished products from the coal and steel industry and chemical products, together with single wagon load traffic which was concentrated and distributed at Koln and Gyor.

The train traction providers leased eight locomotives and nine sets of wagons. This was necessary, as every locomotive can only run in one or two countries. The nine sets of wagons consisted of fourteen 6-axle wagons (for 4,5 TEU) and six 4-axle wagons (for 3 TEU) this ensured that a maximum of 81 TEU per trip was transported. The total gross maximum weight of the train was 1,850 tonnes. In April 2010, Chemical single wagons were first added to the route, following this car parts were added in June 2010 and from October 2010 three rotations per week were carried out.

4.1. Results

The results of the pilot demonstration are indicated in figure 2. The graph illustrates a positive trend in the number of total wagons per train, from forty six in February 2010 to over four hundred and eighty one in January 2012, with a maximum of five hundred and eighty six in November 2011. Between November 2010 and December 2011 the total number of wagons loaded exceeds the total number of wagons empty. This suggests that the service reached a higher level of operation cost coverage during this period. In addition, these data suggest positive trends for the number of train operations per month, from four services per month in February 2010 increasing to twenty services per month in January 2012 with a maximum of twenty seven services per month in October 2011. This indicates an increasing demand for this type of service.
5. FURTHER DEVELOPMENTS

As it is not practical to pilot the IT developments along the corridor while operations are ongoing, the IT developments will be piloted using simulation software with data provided from the pilot demonstrations. A railway management suite developed by SOPTIM will be used to pilot the train control centre and customer information centre. This is a new, innovative software which allows the planning, optimisation and control of railroad traffic to be simulated. In addition, it is possible to create schedules and dispatch locomotives for different cases, both the developments will be piloted using different scenarios at a number of locations along the route. It is anticipated that the simulation results will indicate benefits both to the customer and the operator through customer information centre and train control centre implementation.

The code of language will be piloted using simulation software supported by ERSA. The operational simulator will contain a simulated GSM-R network, timetable, automatic route setting, ETCS components, legacy ATP and signalling. The traffic simulator allows for traffic control by the dispatcher and the management. The code of language will be tested using a number of scenarios incorporating a number of different locations, train positions and types of event. In line with the Directive 2007/59/EC, the code of language will be tested for its ability to cope with practical situations involving an unforeseen element and its capability to continue a simple conversation. Potential code of language users, including train drivers, customer information centre and train command centre staff will be trained in the use of the code of language, a training handbook is currently under development. It is anticipated that on completion of the training code of language users will have the capability to manage operations which include code of language and are able to undertake the appropriate actions. At the end of the pilot, comparative analysis will be undertaken based on the implementation of ERTMS, ETCS and a code of language to improve cross border interoperability. The analysis will compare the situation today based on the bottlenecks experienced to date with the future situation wherein ERTMS, ETCS and a code of language have been implemented.
6. CONCLUSION

Information technology developments for operations management and a market tested private rail freight service have been presented in this paper. As the information technology developments; train control centre, customer information centre and code of language are in the process of being piloted, currently there is no suggestion as to whether they will be implemented by the industry. Benefits as a result of IT development implementation are anticipated for both rail operators and customers, it is envisaged that the issues of interoperability, communication and efficient delivery will be addressed. The results from the pilot demonstration of innovative freight services for the private sector have indicated positive trends in the demand for the service, represented by an increase in the number of trains throughout the pilot. These data also demonstrate an increase in cost coverage, which is supported by the service carrying a greater number of loaded wagons than empty wagons. These factors along with others suggest that there is potential for these types of services operated by the private sector along a trans-European corridor.

6.1 ACKNOWLEDGEMENTS

We wish to acknowledge the Retrack project for the provision of data, Retrack is an FP6 project funded by the European Commission, for more information about the project please consult the webpage: http://www.retrack.eu/

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