Advances in the competitiveness of pan-European rail freight services: findings from a case study

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The European rail freight market is ostensibly a free market where, from 1 January 2007, both incumbent and new-entrant operators are able to compete on every line and in every European Union country. The main objective of this research paper is to assess the advances in the competitiveness of the pan-European rail freight services operated by a new-entrant (private) operator. Its main focus is to assess and contribute to the understanding of the advances towards competitiveness and the future prospects in the open European rail freight market, including dealing with challenges (e.g. dormant and departure of partners, suspension of the project, indistinct roles and responsibilities of operating partners) at different phases of the research, development and service offerings, that will be an important contribution to the Research and Development (R&D) policy and management arena in the Europe rail freight transport sector. The current research applies a case study research approach. The assessment of the rail freight service is performed by conducting two phases: first, a comparison of the progress between first and second year of the REorganisation of Transport networks by advanced RAil freight Concepts (RETRACK) rail freight service, operated by a new entrant and conducted on the corridor between two hubs – Cologne, Germany, and Győr, Hungary, and secondly a comparison of the opinions of customers on the RETRACK service and its competitors. From the comparative study between the first and second years, the study finds that the new-entrant operator was able to offer an increased number of services by consolidating cargo from satellite connections at both ends of the operational corridor by adopting a pragmatic and flexible approach. The customer satisfaction survey suggests that the new-entrant operator offered better service in terms of price, transit time, reliability and information flow/management compared to its competitors’ services (offered by incumbent rail operators) on the corridor. However, their service was inferior to that of its competitors, in terms of frequency and availability of service. These less-well performed service factors have improved gradually over time. The study suggests that intra-rail competition has improved, but that inter-modal completion is yet to be achieved. The ups and downs of the project provide important lessons for R&D management, academia and policy makers. The study suggests that a pan-European rail freight service can be efficiently and effectively run by new-entrant operators, and this will lead to more intra-modal competition. However, they have yet to achieve competitiveness that will
result in a shift of cargo from road to rail by offering an improved service that at least matches the major attributes of road freight service, e.g. price, transit time, door-to-door service and working in a collaborative way with other actors.

1. Introduction

The competitiveness of European Union (EU) economies depends on many important factors, including an efficient freight transport system. The European rail freight market is ostensibly a free market where, since 1 January 2007, both incumbent and new-entrant operators are able to compete on every line and in every EU country. Competition in a competitive environment is an indisputable need for the building of an efficient freight transport sector (CER, 2008). Asteris and Collins (2010, p. 171) opine that ‘Rail freight competitiveness hinges on length of haul, as well as rail connectivity at origin and destination.’ Brewer (1996, p. 92) opines that: ‘It is possible to get the benefits of competition without the requirement of a large number of competing firms.’ This is true in the case of intra-rail competition, as only a limited number of companies can be allowed to run on a railway; this is due to, among other things, path allocation and time-tabling, which is normally approved long before the actual service operation, although short-term approval is possible. This is particularly crucial in the European rail network, where both passenger and freight trains run, each having different aims and operational characteristics. Johnson and Nash (2012, p. 1) note that: ‘The policy of the European Commission is to introduce competition within the rail sector, and this has already been implemented for freight services.’ The EU Transport White Paper 2001 set a strategy that the competition policy will ‘ensure that opening up of the market, especially in the rail sector, is not held back by dominant companies already operating on the market and does not translate into poorer quality public services’ and that ‘transport research policy will make the various efforts made at Community, national and private level more consistent, along the lines of the European research area’ (European Commission, 2001, p. 15). The mid-term review of the 2001 White Paper set similar transport policy objectives and states that: ‘Efficiency gains supported by EU policies will make notably rail and waterborne transport more competitive, in particular on longer routes’ (European Commission, 2006, p. 7). In line with this EU R&D policy, the European Commission (EC) funded the REorganisation of Transport networks by advanced RAil freight Concepts (RETRACK) project, under its Sixth Frame-
1.2. Structure of the paper

Section 2 of this paper describes the state of the art, including: background information in subsection 2.1; project management in sub-section 2.2; pilot demonstration of the rail freight service in sub-section 2.3; and progress beyond the state of the art in sub-section 2.4. The research approach is discussed in section 3, followed by a discussion on the data collection template, data collection and analysis in section 4, while section 5 conducts a comparison of the RETRACK rail freight service, between the first and second year of operation, using pilot diary data. Section 6 conducts a comparison of RETRACK and competing rail freight services, using a customer satisfaction survey. Section 7 summarises the comparative assessment, with added focus on policy implications, and is followed by the drawing of conclusions and recommendations in section 8.

2. State of the art

Any freight transport system may include modal and multimodal transfer points, consolidation centres and uni-modal, multi-modal and urban freight transport service options. Each transport mode has its pros and cons when considering aspects such as distance, type of cargo, size of consignment, value of cargo, etc. The production and consumption centres in Europe are densely populated, requiring a shorter transport haul that provides an inherent advantage to road freight services. Other factors, such as flexibility, door-to-door service, customer-responsiveness and customer-tailored services, have made the trucking industry attractive, dominant and essential in almost all European countries. Its market share, measured in tonne-kilometre (tkm), by volume or by weight, is increasing, while rail freight’s share has been decreasing or stagnant for over 30 years (Ludvigsen and Osland, 2009, p. 32; European Commission, 2012; CER, 2013, p. 31). One consequence of this is many highly congested road transport corridors, in particular during peak hours, causing unreliable delivery of goods, which is counter-competitive for the European economies (European Commission, 2011).

Comparatively, rail (and waterways) transport is considered to be more environmentally friendly than road. Despite many improvements, such as improved aerodynamic truck design and newer engines (e.g. Euro 5) that emit comparatively less CO2, the road transport industry is responsible for the highest contribution of greenhouse gas (GHG) of all transport modes (European Commission, 2001, 2011, 2012). Competition and sustainability are two major policy objectives outlined in the Transport White Paper 2011 (European Commission, 2011, p. 5). However, rail freight transport is sometimes seen as an unattractive mode that is non-responsive to the demands and needs of modern supply chains (although there are examples, in some Member States, of quality rail logistics services).

In the global competitive market, an integrated logistics system involves getting ‘the right product, in the right direction, in the right quantity and right
quality, in the right place at the right time, for the right customer at the right cost’ (Mangan et al., 2012, p. 9). Morlok and Spasovic (1994) found that an integrated intermodal rail-truck service suffered from serious problems in both cost (price) and service quality. However, most railway undertakings lack the capability to offer such integrated pan-European logistics services. This is probably partly due to history. Gutiérrez et al. (2011, p. 840) noted that ‘Historically, most European countries have given priority to the development of their national transport networks; this favoured the integration of their territories and the consolidation of truly national markets. In contrast, less attention was paid to links with other countries. The result, at the supranational level, was the existence of a set of independently developed national transport networks, weakly interconnected. In the context of progressive European integration, improving connections between Member States constitutes a political priority.’

Rail freight (and passenger) services in Europe were government owned and operated and destined to serve within national boundaries, under strict government policy objectives. National railways in Europe carried one-third of the (road and rail) freight market in 1970, which dropped to one-fifth in 1990 (CER, 2008, pp. 25–26). This drop is partly due to changes in the type of cargo available in the market (decline in heavy industry, resulting in less movement of raw materials; growth in consumer goods) and partly to a lack of response to such changes by the rail freight operators. Rail has remained top choice for low value cargo such as solid mineral fuels, ores and metal waste (CER, 2013, p. 19) but has failed to make exhaustive efforts to capture low-density, high-value (LDHV) and time sensitive cargoes. In an attempt to increase market share through improved competitiveness, rail freight transport ownership and operation have been massively reformed, since 1991, through a series of Directives and through Railway Reform Packages, effecting a change from a command economy to a market-based, open, competitive one. So far it is true that the reform has not been introduced to the same degree in all countries (IBM, 2011, p. 15), with many incumbent operators still government owned and operated in disguise, making it difficult to assess and compare the competitiveness of these operators with new entrants. Also, data for such assessment are difficult to obtain. One of the major objectives of the EC’s institutional and financial support is to explore the potential of alternative, comparatively sustainable transport modes, such as rail. Some major rail freight operators are increasingly showing interest in taking part in such research and innovation projects.

2.1. Background information

The RETRACK project, conducted within the part-funded scheme of the EC under the 6th Framework Programme (FP), aimed at research, development, demonstration and implementation of a pan-European rail freight service along the West-East corridor (discussed in section 1.1) linking the North Sea gateways to the Black Sea gateways, spreading from Rotterdam (the Netherlands) to Constanza (Romania). However, to respond to changed market demand, the RETRACK service had to change the origin/destination in the East from Constanza to Gyor in Hungary. The overall length of the corridor, between the farthest origins and destinations of the freight flows, was circa 1,500 km, of which the main part, between Cologne (Germany) and Gyor (Hungary), was c1220 km. The project ran from May 2007 to August 2012 (RETRACK, 2013). Although originally approved for four years, it was extended several times and thus the project documents (description of works – DoW) was revised several times due to changed circumstances (e.g. new partner, recession, partner leaving), as will be described later on. The RETRACK project involved a consortium of 18 partners from nine countries, including new-entrant, privately owned rail freight operators, experienced IT and training specialists and leading R&D organisations (Table 1).

2.2. Project management

The RETRACK project covered a wide variety of subject areas such as logistics, technical and operational aspects, including interoperability, ICT and border crossing formalities. A chronology of events and activities (in graph and table form) can be found in Appendix A. The management of the project consisted of experts covering these areas. Of the 18 partners, there were 12 partners involved in the R&D activities and the remaining six were assigned to operations. A transparent management structure, with decision-making capability and authority, was vital to the successful implementation of the project. Also essential to the success of a complex project with as many partners as RETRACK, was a contact and communication line from the EC to consortium partners.

2.3. Pilot demonstration of the rail freight service

Transpetrol was the co-ordinator of the RETRACK Pilot demonstration and the operational partners of the rail freight service are listed below:
### Table 1. RETRACK consortium with roles and responsibilities

| No | RETRACK partner | Roles and responsibilities |
|----|-----------------|---------------------------|
| 1  | TNO – The Netherlands Organisation for applied scientific research, NL | Co-ordinator and work package leader in Work Package (WP) 1 (Logistics market requirements for new rail freight service); WP10 (Synthesis workshop); and WP12 (RETRACK knowledge base). Also a partner in other WPs. |
| 2  | BB Babcock & Brown, UK | Had a partner role but left the consortium at the beginning of the project. |
| 3  | EUB – European Bulls, NL | Had a partner role in WPs 1, 2 and 3 but subsequently wound down as an organisation and left before the rail freight service operation began. |
| 4  | DR – DeltaRail BV, NL | WP 5 Leader (Training) and partner in other WPs. |
| 5  | NewRail at Newcastle University, UK | Leader for WP2 (State of the art of European rail freight service on the corridor); WP6 (assessment of rail infrastructure and interoperability issues along the corridor); WP8 (Pilot demonstration); and WP11 (Dissemination). Also a partner in WP1, WP3, WP4, WP9, WP10 and WP12. |
| 6  | TOI – Institute of Transport Economics, NO | Leader WP3 (New rail freight service concept development); WP7 (Rail safety and security); and WP9 (Evaluation of RETRACK demonstration case). Also a partner in other WPs. |
| 7  | TCI Rechling – Transport Consulting International, DE | Partner role in multiple WPs. |
| 8  | R4C – Rail4Chem, DE | Had an operating partner role but left after Veolia bought out the company, before the rail freight service started. |
| 9  | TP – Transpetrol, DE | Joined the project, as partner with operating role, before the rail freight service demonstration started. |
| 10 | CER – Central European Railway CO, HU | Operating role as a partner. |
| 11 | SOP – SOPTIM, DE | Leader for WP4 (develop a suitable platform for IT systems). |
| 12 | LTE – Logistik – UND Transport GMBH, Austria | Operating role as a partner. |
| 13 | ST – Servtrans, RO | Had an operating partner role but became dormant before the rail freight service demonstration started. |
| 14 | Excellent SPOL S.R.O. established in Cyklisticka 13, SK-04001 – Kosice (Slovakia) | Excellent became a 3rd party of operating partner TP, who acquired the company. |
| 15 | ERSA European Rail Software Application, FR | Had a partner role but became dormant. |
| 16 | NEA Transport Research and Training, NL | Joined the project at a later stage. Leader of WP 13 (Rail freight service developments in China and Russia and the impact on Europe); and a partner in WP12. |
| 17 | W&H – Wagener & Herbst GMBH, DE | Had a partner role but became dormant. |
| 18 | ARCH Archicom Romania, RO | Had a partner role but became dormant. |

- European Bulls (the Netherlands) – wound down as an organisation and left before the rail freight service operation began;
- Transpetrol GmbH (TP) (Germany) – joined the consortium at a later stage, during the service development; played an important role from the start, in implementation as well as in the successful completion of the pilot demonstration of the rail freight service;
- Rail4Chem (Germany) – left before the rail freight service started, after Veolia bought out the company;
- LTE (Austria); continuous role as an operational partner and traction supplier;
- CER (Hungary); continuous role as an operational partner; and
- Servtrans (Romania) – became dormant at the early stage of the service development.

### 2.4. Progress beyond state of the art

The highlighted changes to the consortium composition show the volatility of small companies, the changing make-up of the rail freight transport sector, as well as typical risk in the formation of a consortium for a pan-European project – less-than-clear roles and responsibilities of the operating partners for the service development and the fact that pilot
demonstration and subsequent implementation constituted unknown territory. Typically core partners previously known to each other form a consortium, some of them with no prior experience of working together. Mostly, the partners work together as previously agreed (and prescribed in the DoW), but there can be problem areas, for example: an incompetent representative of a partner; a partner being bought by another company and thus introducing a new, late-entry representative; facing new challenges, such as bankrupt partner, or a new economic reality, such as the recession started in 2008. After overcoming several such challenges, the RETRACK rail freight service was ultimately run by three operators, with clear roles and responsibilities and a revenue sharing agreement. These were TP (Germany); Logistik und Transport GmbH (LTE) (Austria); and Central European Railways Zrt (CER) (Hungary), with the support of R&D partners. Effectively TP was an integrator, with other extensive roles, including: hiring of crews; train planning; contact with customers; marketing; and train and cargo monitoring. To perform these roles, TP had a small office, staffed by only 3 managers; it is doubtful that incumbent operators can even imagine such low manning levels – a possible key learning point in its own right and a milestone for future such R&D projects. LTE provided traction (locomotive) for the service. Shunting and local traction services were provided by CER in Hungary. This service was provided by different operators in Cologne.

The original schedule of the pilot demonstration was to run a service between January 2008 and December 2010, but this was delayed until February 2010, where after it continued until July 2012. Between January 2008 and February 2010 the RETRACK service was adapted to changes such as shortening of the corridor, changes to hubs and the addition of single wagon load service to feeder lines. Such changes were required both to reflect the changed circumstances, and also to attract and satisfy the needs of customers. To accommodate them, the DoW was revised and approved seven times by the EC – an unusual extent for projects implemented under the funding scheme, in particular in the rail freight sector. Even post such changes, the partners worked together as previously agreed (and prescribed in the DoW), but there can be problem areas, for example: an incompetent representative of a partner; a partner being bought by another company and thus introducing a new, late-entry representative; facing new challenges, such as bankrupt partner, or a new economic reality, such as the recession started in 2008. After overcoming several such challenges, the RETRACK rail freight service was ultimately run by three operators, with clear roles and responsibilities and a revenue sharing agreement. These were TP (Germany); Logistik und Transport GmbH (LTE) (Austria); and Central European Railways Zrt (CER) (Hungary), with the support of R&D partners. Effectively TP was an integrator, with other extensive roles, including: hiring of crews; train planning; contact with customers; marketing; and train and cargo monitoring. To perform these roles, TP had a small office, staffed by only 3 managers; it is doubtful that incumbent operators can even imagine such low manning levels – a possible key learning point in its own right and a milestone for future such R&D projects. LTE provided traction (locomotive) for the service. Shunting and local traction services were provided by CER in Hungary. This service was provided by different operators in Cologne.

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The first phase is the definition and design of the research, where the theoretical background is set to some extent, today. In other sectors, many of these barriers have been resolved in Europe; for example, a truck driver can drive end to end without border-crossing formalities. In the rail transport sector in Europe, by contrast, this is still a burning issue; overcoming such barriers is indeed progress beyond the state of the art – some may even call it contextual novelty or innovation. From the experience of the RETRACK project it can be clearly seen that EU policy makers, funding authorities and indeed the major project partners all need to be aware of and take account of such challenges and be prepared to be flexible and to take a proactive- and pragmatic-approach to achieving objectives and goals.

3. Research approach

The current research conducted a case study on the advances in the competitiveness of pan-European rail freight services run by new-entrant (private) operators. For the current research, a case study method was chosen to study and highlight the commercial experiences, implications and achievement of competitiveness of the rail freight service.

A case study can be defined as an empirical inquiry that investigates a contemporary phenomenon, in depth, and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2009). Gerring (2007, p. 20) has a similar view. A case study is: ‘The intensive study of a single case where the purpose of that study is – at least in part – to shed light on a larger class of cases’ (Gerring, 2007). The aim of case studies is also partly, through in depth studies of a case, to make generalisations to a larger set of cases and to develop hypotheses which can then be tested empirically. Eckstein (1975) emphasised that the selection of case studies could provide for maximum analytical leverage. A ‘least likely’ and ‘most likely’ approach can thereby make it possible to find robust support for theories and hypotheses. One advantage of employing case studies is that the method can handle a large set of complex relations that are context dependent (George and Bennett, 2005) and explain intricate and stable patterns, which demands comprehensive, exact and systematic accounts. Moreover, case studies can be used to explain a phenomenon and to analyse the results in a larger context.

Three phases can be identified within a case study research process.

- The first phase is the definition and design of the research, where the theoretical background is set
out, including selection of cases and the design of data collection protocols. For this paper the background information on rail freight services is discussed in section 3.

- The second phase covers preparation of a data collection template or questionnaire, and the collection of data. The second phase for this paper is performed in sections 4 to 6.
- In the third and final phase, an analysis is conducted with the collected data, a summary of the findings from the analysis is made and conclusions are drawn, including the development of the (policy) implications of the results (Andersen et al., 2012). Here, section 7 summarises the findings of the comparative study and section 8 includes some conclusions and recommendations.

4. Data collection and analysis

Data on the RETRACK rail freight service were collected from two sources. The first data source is the data on rail freight service operations, collected from the pilot diary (in Excel spreadsheet format). For the current research, the data on the RETRACK rail freight service were for two years (February 2010 to February 2012) although the service ran until July 2012 on the Cologne-Györ corridor (see again Figure 1). The second data source for the RETRACK rail freight service is the customer satisfaction survey. Using a questionnaire, data were collected from RETRACK customers to gather their opinion on the rail freight services on the corridor.

4.1. Data on RETRACK rail freight service operations

During the operational period, a diary was kept containing details of all train runs. Also TP sent data, every month, to the relevant research partners (i.e. TNO, NewRail). The pilot diary contained the following types of train data:

- Direction of trains on the main track;
- Train number (e.g. RETRACK 0001);
- Date, day and time of planned and actual departure and arrival at terminals and hubs;
- Remarks connected to disruptions;
- Customer size (in terms of number of wagon loads);
- Consignment in (net and gross) tonnes;
- Number of wagons; and
- Number of customers per train.

No details on costs and revenues were released.

4.2. Survey questionnaire and RETRACK customer satisfaction survey

The following types of questions were asked of the RETRACK service users:

- General questions (respondent’s profile);
- Shipment and quality of RETRACK rail freight services; and
- Service attributes of rail freight service providers in the RETRACK corridor.

There are many factors or attributes that attract shippers to select freight transport services. There are variations in the attribute choice generally due to, among others, the type of goods or products to be transported. Generally, voluminous and lower value cargo can accept a longer transit time. In contrast, high value products (e.g. automobile parts) and time sensitive products (e.g. perishable goods – flowers) need to be transported comparatively quickly. Also, shippers may use the transport chain as a moving warehouse, in which case a longer transit time can represent added value to the shipper. The size and frequency of the consignment may also influence the choice of transport mode(s). To identify such attributes, different research has employed different methods, including literature survey; interviews; focus group discussion; unscientific syntheses of previous studies; and so on (Cullinane and Toy, 2000, p. 41). There is no consensus about which factor(s) are most important in determining transport service choice. Using top down (secondary data analysis) and bottom up (interviews) approaches, Islam et al. (2010, pp. 24–25) identified the following requirement for competitiveness of rail freight service: price; transit time; (transit time) reliability; safety and security of cargo (against loss and damage); and availability of tracking and tracing. To attract cargo from road, they suggested that an intermodal, door-to-door rail freight service should be 10%–15% cheaper than the road freight transport price. Applying a content analysis of 75 papers, Cullinane and Toy (2000, p. 49) ranked the following top five attributes: cost/price/rate; speed; transit time (reliability); characteristics of the goods; and service level (unspecified). Using Delphi study, Zunder and Islam (2011, p. 59) found that a cargo tracking and tracing system is an important attribute for freight service operation. Using multiple analysis methods, Cullinane and Toy (2000, pp. 48–52) found that flexibility, frequency, capacity and controllability/traceability are further very important attributes.

CER (2013, p. 12) reports that sustainability is not a top priority for freight customers, who favour price and reliability as primary requirements.
Giannopoulos (2004, p. 312) discussed the importance of access to information systems (e.g. via the Internet) as well as the flow of information such as transport timetables, route guidance, real-time transport alerts and stops/terminals near to origin or destination. Cullinane and Toy (2000) studied the following attributes: cost/price/rate; service (unspecified); transit time reliability; frequency; distance; speed; flexibility; infrastructure availability; capability; inventory; loss/damage; characteristics of the goods; sales per year; controllability/traceability; and previous experience. To determine attribute cut-offs in freight service selection, Danielis and Marcucci (2007, p. 510) noted the following seven attributes: freight cost; door-to-door transit time; late arrivals (reliability); loss and damage; flexibility; frequency; and transport mode options. In analysing qualitative attributes of freight transport, from a Stated Orders of Preference Experiment, Beuthe and Bouffioux (2008, p. 109) noted six transport attributes: frequency; transit time; reliability; flexibility; loss; and cost. In determining the logistics managers’ stated preferences for freight service, Danielis et al. (2005, p. 205) explored only four service level attributes: cost; transit time; risk of delay (reliability); and risk of loss and damage.

From the above discussion it can be argued that there are many attributes involved in selecting transport mode/service option/choice. Cullinane and Toy (2000, p. 41) opine that ‘While there is a need to limit the number of attributes and attribute levels in order that the number of combinations (decision alternatives) presented to respondents is at a manageable level, it is also important that these variables are accurately identified and specified’. Considering the evaluation attempts by other R&Ds consulted above (summarised in Table 2) and the context of current R&D in rail freight service, the following nine attributes are included in the survey questionnaire to assess the competitiveness of RETRACK and its competing service:

- Price level;
- Transhipment time;
- Handling time;
- Reliability;
- Information flow;
- Flexibility;
- Accessibility of information;
- Frequency; and
- Available capacity.

In May to June 2011, after one year of RETRACK service operation, a satisfaction survey was conducted among RETRACK customers. Due to their confidential nature, the data relating to cost and revenue/income of the rail freight service operation are not presented in this research. With interim data, Zunder et al. (2012, p. 1352) reported that: ‘As at mid-2011 revenue is recovering circa 70% of total operating costs, plus overhead, and has been improving since early 2011’.

| Studies                                    | Attributes                                                                 |
|--------------------------------------------|---------------------------------------------------------------------------|
| Beuthe and Bouffioux (2008, p. 109)        | Frequency; transit time; reliability; flexibility; loss; and cost.         |
| CER (2013, p. 12)                          | Price; reliability; and sustainability.                                    |
| Cullinane and Toy (2000)                   | Studied the following: cost/price/rate; service (unspecified); transit time |
|                                            | reliability; frequency; distance; speed; flexibility; infrastructure availability; capability; inventory; loss/damage; characteristics of the goods; sales per year; controllability/traceability; and previous experience. |
|                                            | Of these, the top five are: cost/price/rate; speed; transit time (reliability); characteristics of the goods; and service level (unspecified). |
| Danielis and Marcucci (2007, p. 510)       | Freight cost; door-to-door transit time; late arrivals (reliability); loss and damage; flexibility; frequency; and transport mode options. |
| Danielis et al. (2005, p. 205)             | Cost; transit time; risk of delay (reliability); and risk of loss and damage. |
| Giannopoulos (2004, p. 312)               | Access to information systems; flow of information; route guidance; real-time transport alerts; and stops/terminals near to origin or destination. |
| Islam et al. (2013)                        | Transport cost; transport time; flexibility; reliability; quality; and sustainability |
| Islam et al. (2010, pp. 24–25)             | Price; transit time; (transit time) reliability; safety and security of cargo (against loss and damage); and tracking and tracing. |
| Zunder and Islam (2011, p. 59)             | Cargo tracking and tracing |
5. Assessment of the RETRACK operation

This section presents four assessments of the RETRACK rail freight service, using pilot diary data. These are: general assessment; transit time; consolidation of RETRACK traffic and train departure schedules; and progress in the RETRACK rail freight service operation.

5.1. General assessment

The data from the diary suggest that most of the trains (63%) ran the entire route between Cologne and Györ; that 32% ran on a shorter route, between Hegyeshalom and Cologne; and that Passau was the start or end point for the 5% shortest train runs. The number of eastbound services on the Györ-Cologne-Györ corridor is higher than westbound. This is due to lack of goods for the westbound direction in some periods of the year. The number of (one-way) train departures per month increased from November 2010 (see Figure 2), but the number of wagons also increased substantially from the same date (see Figure 3). There is a correlation between Figures 2 and 3. The monthly train data displayed in Figure 2 consist of wagons displayed in Figure 3. Both figures show a similar pattern.

The composition of the train runs differed considerably, from one wagon load per train (to maintain customer confidence), to 46 wagon loads per train. The load ranged from empty (no cargo) to 1,756 net tonnes per train. It can be noted that all wagons/shipments/volumes are not necessarily carried for the entire route, meaning that some of them were transported for shorter distances, for example between Cologne and Passau or between Passau and Hegyeshalom. Others were for longer distances, for example between Cologne and Györ.

Figure 2. Number of RETRACK freight service train departures, both directions combined.

Figure 3. Breakdown of number of monthly wagons; loaded, unloaded and total.
Understanding the capability of the competitors is an important starting point for any business. This is particularly crucial when a new-entrant operator, like RETRACK, looks to offer a service on a corridor where incumbent and bigger rail freight operators, such as DB, have been operating. The incumbent operators have developed customer relationships over the years of offering them service. Recognising their service quality (in terms of, for example, price, transit time, flexibility, and reliability), as well as their strengths and weaknesses, is vital to the new entrant; the challenge then being to develop a suitably competitive service offering that will attract the attention of customers. This challenge is even greater when competing with road freight transport service providers, who are able to offer customer-oriented, door-to-door, flexible service, on the same corridor. It seems from the pilot demonstration that the RETRACK operators could not yet overcome this last point.

5.2. RETRACK transit time

The complexity and variability of the demand served by the RETRACK rail freight service were important factors that contributed to variations in the transit time. On the Györ-Cologne-Györ route, the eastbound (Cologne to Györ) transports were performed somewhat faster than the westbound (Györ to Cologne). However, the average transit time in both directions is lower than the average two days per trip transit time predicted in an interim analysis of the project, reported in Woroniuk et al. (2013, p. 90). Figure 4 displays the average speed of the RETRACK train, on different sections of the route. It can be expected that the future operation will be even faster, with lessons learned in overcoming the initial operational difficulties, as reported in Zunder et al. (2012, pp. 1349–1350). The service will be able to attract more customers who need a faster (as well as a reliable) transit time.

On the Cologne-Hegyeshalom-Cologne route, the eastbound services had a slightly higher transit time than the westbound service. On the Passau-Cologne-Passau route, the westbound transports were the faster, although it had relatively fewer consignments.

The fastest transit time on the eastbound Cologne-Györ-Cologne Györ-Cologne-Györ route was slightly more than 17 hr, while 20 hr was the fastest transit time for the westbound Györ-Cologne-Györ route. The reasons for the variations in transit time are multiple. In the services with shorter transit times, the train carried little load and several empty wagons, and may effectively be regarded as operating empty. Also, the longest transit time was approximately 142 hr on the westbound Györ-Cologne-Györ route and 173 hr on the eastbound Cologne-Györ-Cologne route. On services with the longer transit time, the train faced a number of issues (for details, please see Zunder et al., 2012, pp. 1349–1350), including track disruptions, technical problems with the locomotive; late arrival of single wagon loads, or group wagon loads, at the hubs (see dwell time in terminals in Figure 5); bureaucratic border crossing formalities, such as container/wagon inspection; and driver change, which is an important barrier in pan-European rail freight service operations. Without certification issued by the national regulator in the (foreign) European Member State, driver change is mandatory. To eliminate the bureaucratic barrier, it is proposed, in the Fourth Railway Package (European Commission, 2013), that this certification be issued by ERA. This will contribute to faster transit time, as well as to a lower cost of operation.

The longest transit time was also due to the fact that some long journeys can be run intentionally at a slower speed, because the train was actually able to depart earlier than planned schedule. In some cases, trains were postponed, due to non-urgent customer demand. Of the total transit time on the core corridor Györ-Cologne-Györ, the study finds that the dwell
time spent at Hegyeshalom (Hungary–Austria border) was relatively longer on the westbound Győr to Cologne route. The transit time spent at this border crossing constitutes 30% of the average transit time for the westbound service and 21% for the eastbound, which explains the previously noted variations in the transit time between westbound and eastbound trains. In general, stoppages at hubs and multiple border crossings account for most of the variations in total transit time and are also the primary reasons for longer transit times.

5.3. Consolidation of traffic and train departure schedules

The rail yards in Cologne and Győr are used as hubs, with coupling and decoupling of trains and single wagons and the shunting of single wagons being very time-consuming and costly. It is estimated that shunting one single wagon takes 0.5 hr. Reviewing Figure 5, it can be noted that the turnaround time at each of the rail yards, Győr is shorter than other yards (e.g. Cologne and Hegyeshalom). This is achieved by conducting efficient coupling and decoupling of single wagon loads and group wagon loads. The longer time at hubs as well as border crossing delays are important barriers to rail freight operation, constraining the value of the service.

In the Győr rail yard, westbound trains with grain and single wagon loads from Hungary, Romania and Slovenia are gathered for customers located in the Netherlands, Belgium and Germany. In Cologne, eastbound trains, and wagons from customers located in the Netherlands, Belgium and Germany are coupled and decoupled to new trains, with destinations in Austria, Hungary, Romania and Slovenia.

After an initial eight months with fewer than 10 train departures (i.e. fewer than 5 in each direction) an abrupt increase in the frequency of departures began in November 2010 (see Figure 2). During the second year, the number of one-way departures was between 15 and 25 and included longer periods where departures took place every day.

The direction of freight flows was quite uneven, with westward volumes more than 3 times those transported eastwards due to commodity types transported (grains from the Eastern origins and intermodal containerised cargo from the Western origins). This uneven flow had implications for the activities carried out at the hubs and sidings. In addition, an incompatibility of rail wagons was created between eastward and westward transport, since rail wagons used to transport corn and soya pellets westwards could not be used to transport many of the eastbound high-value intermodal commodities.

A normal scheduled train was planned, with a consolidation time of 12–24 hr and 2 hr in the rail yards in Cologne and Győr. An example of the effect upon rail yard operation and dwell time was the delayed arrival of trains. Delay might occur due to technical problems (such as locomotive failure, or other problems with the engine or wagons) or track unavailability (due to accident, extreme weather conditions or infrastructure problem).

On the Cologne-Győr-Cologne route (traffic consolidated up to the previous day), Wednesday was the highest (36%) train departure day from Cologne (see Figure 6). On the Győr-Cologne-Győr route, the departure from Győr was mostly on Thursdays and Fridays (jointly accounting for 55%). On the Hegyeshalom-Cologne-Hegyeshalom route, Saturdays (westbound, 41%) and Wednesdays (eastbound, 43%) were the most frequently used departure days (see Figure 6).

5.4. Progress in the RETRACK rail freight service operation

Over the two years of the RETRACK rail freight service operation, some positive developments were observed. The number of regular customers increased in the second year, from one (from Győr)
to several regular customers with one and/or several shipments, plus several one-time customers. Also, the market coverage was expanded geographically. While the number of origins for freight departures was slightly reduced from 15 to 14, the number of destinations grew from 13 to 17. This expansion was most noticeable at the eastern end of the corridor.

Comparing the performance of the rail freight service between the first year (February 2010 to February 2011) and second year (March 2011 to February 2012), the RETRACK (2012) final report suggests advances/growth (see Table 3) in all transport indicators:

During the operating period of two years, a total of 369 trains were run (181 westbound and 188 eastbound). Starting with only one weekly departure, the frequency of the RETRACK service had increased substantially by November 2010, growing to three train departures per week in the second year. At the same time, the travel distance for a train in the core corridor was gradually reduced, by an increased use of the second hub point Hegyeshalom (Hungary) as the eastern hub, instead of Győr (Hungary).

Train departures were not subject to a fixed schedule of days and/or hours, although departure times for eastbound trains appear more consistent than westbound. This is also the case for trains using Hegyeshalom as the hub, versus those running to/from Győr. The Cologne-Győr-Cologne transit time of over 24 hr proved a disadvantage to the operation of a fixed timetable, especially a daily departure schedule. A high degree of variation in transit time – mostly related to the dwell times at hubs and border crossing points – added to the scheduling challenges, as well as affecting the reliability of customer service.

6. Assessment of RETRACK and competing services

This section contains two types of assessment: opinions on the performance of the RETRACK rail freight service during the period February 2010 to February 2011 and RETRACK customers’ opinions on competing freight services (using the customer satisfaction survey).

As the customer satisfaction survey was conducted in May to June 2011, it should be noted that the assessment might reflect some opinions formed over a longer period than the one-year period stated, while others will reflect a shorter-term experience. The survey did not collect opinion from non-RETRACK customers, thus it has not been possible to report their opinions. At the time of the survey there were 13 RETRACK customers; of these, nine completed and returned responses for analysis. Some parts of the questionnaire yielded higher response rates, while others were sparsely filled in. The small sample size means it is difficult to reach concrete conclusions, since a change to one respondent’s opinion will cause a significant difference to the findings.

6.1. Customer satisfaction survey respondent profile

All nine respondents were reported as regular and frequent users of the RETRACK service. Of these, five customers were weekly, while the others were either monthly (two) or less frequent RETRACK rail freight users. Four customers began using the service in 2010, while the remaining five customers entered in 2011, meaning that, for these respondents, the survey covers a relatively short period of experience. The survey respondents were considered experienced rail customers, as eight out of nine possess rail sidings and most of the RETRACK shipments used these sidings as origins and/or destinations. One shipper did not have a siding and accessed the rail terminal by truck.

Overall, the typical RETRACK shipment in the survey seems to be long distance, relatively large volume, with origins/destinations in Germany and Hungary. Some origins/destinations of consignments were located in the Netherlands, Austria and Romania, which were served by feeder services.

Five out of nine respondents had shipments containing chemicals, petroleum, automotive, aluminium slabs or aluminium oxide, some of which

Table 3. Advances of RETRACK rail freight service

| Indicators/characteristics                                      | Growth between first and second year |
|---------------------------------------------------------------|--------------------------------------|
| Increase in train departures                                  | 115%                                 |
| Increase in freight volumes                                   | 81%                                  |
| Increase in transport (tkm) on feeder lines                   | 60%                                  |
| Increase in transport (tkm) on main line                      | 111%                                 |
| Total increase in feeder and main line distribution transport (tkm) | 80%                                  |
| Increase in transport (tkm), feeder and main line distribution, based on Western hub Cologne | 71%                                  |
| Increase in transport (tkm), feeder and main line distribution, based on eastern hubs | 85%                                  |
products are characterised as dangerous goods. The other four respondents were shippers of different products and materials, such as corn and soya pellets. The shipment volumes ranged from one wagon load (around 50–55 tonnes) upwards.

The survey reports pre-booking information to be somewhat scarce – unsurprising since the operators were new-entrant, small- to medium-size enterprises (SMEs) significantly smaller than incumbent operators and were not yet fully equipped or manned. The customers were asked to estimate the number of requests accommodated by the RETRACK service at short notice (1–2 days), but only one customer required this. The others either reported zero or left the question unanswered, which may indicate that the information is less available or that short notice bookings were less relevant, either for these customers or for typical rail freight customers in general. The apparent slow response by the rail freight sector needs further in-depth research.

6.2. Customer opinion on the RETRACK rail freight service

One out of nine respondents expressed the opinion that they were motivated to use the RETRACK service as an alternative to the existing incumbent rail freight service. Also the general term ‘service’ appeared as a motivation for choosing RETRACK. Among the service related factors, the most frequently occurring were cost and price. Answering the open question ‘What factors motivate you to transport these commodities using the RETRACK transport service?’, the following were the motivation factors, ranked highest to lowest by the number of statements made by the respondents:

- Price (cost effectiveness) (6);
- Transit time (3); and
- Reliability (2).

These suggestions are in line with the recent findings of a report (CER, 2013, p. 12). Based on their experience, the respondents were asked to rate nine service attributes, on a five-point Likert scale, where the ratings were expressed as 1 (very poor), 2 (poor), 3 (average), 4 (good) or 5 (excellent).

The top three RETRACK service factors were (see Figure 7): price level, transit time (both transhipment and handling) and reliability, where the mean scores approach 4 (i.e. ‘good’). The remaining service factors scored close to 3 (i.e. ‘average’), with frequency and availability of capacity gaining the lowest scores.

An indicator of success is the increase in the number of customers. From the start of the service, the number of customers increased from 1 (February 2010) to 14 (June 2011). The strongest growth in the customer base was during the autumn and winter of 2010/2011, with an expansion from 5 to 14 customers.

Responding to market needs (e.g. adding single wagon load service, changing the hubs that were not included in the original plan) is probably the key factor in achieving the improved performance level. Understanding and responding to customer needs was also behind the success.

6.3. Customer opinion on the competing services on the RETRACK corridor

Seven out of nine customers used rail-only for transports on the RETRACK corridor. The other two had
used rail, road or intermodal transports prior to using the RETRACK service. Furthermore, seven out of nine customers consider rail as the only alternative mode to RETRACK. The remaining two customers consider road, short sea and intermodal transports as alternatives. From this, it can once more be observed that most of the RETRACK customers interviewed were experienced and stable users of rail freight services. This finding also indicates that the RETRACK service was less successful in attracting non-rail (e.g. road) customers. When asked to name their competitor service providers, all respondents mentioned other incumbent rail freight operators, either by name, or just as rail carriers in general (names protected here by confidentiality agreement). This may suggest that the intra-rail competition has progressed in the reformed railway freight market, which is probably a first step to becoming an active competitor in the wide European transport market. Further R&D will be needed to explore and contribute towards the ultimate goal of inter-modal competition.

When inquiring about the competing rail operators’ advantages over RETRACK, only a few questions were filled in. Four of them mentioned higher flexibility and frequency. Other important factors mentioned were faster availability and shorter transit time.

The respondents were asked to rate the competing transport providers on the same service quality factors and using the same 1–5 Likert scale as used to rate the RETRACK service. Six out of nine respondents provided information on the competitors’ service quality factors (see Figure 7).

The frequency of transport stood out clearly as significantly the highest rated quality of service provided by RETRACK’s competitors. Availability of capacity of the competing services is also stronger than for RETRACK. The most disadvantageous rating for RETRACK’s competitors was the higher price level. Scores for the remaining service factors lie around the mid-level.

Vleugel and Eidhammer (2012) found that the RETRACK services are able to compete on transport price with both barge and road transport, for dry bulk, in the RETRACK corridor between Cologne and Győr. The barge transport price is estimated to be 19% higher than the RETRACK service, while road transport is estimated to be at least twice that of RETRACK. These figures are in line with the findings of the customer survey, which concluded that price and cost effectiveness are the most important motivations for customers to use RETRACK.

6.4. Customer interest in an extended RETRACK service

The respondents were questioned about their interest in the use of the RETRACK service if it were made available for additional destinations. The majority of respondents (six out of nine) were positive, with one ‘maybe’ and one ‘no’. The respondents were also asked (open question) to express their opinions on what works well and what should be improved with the RETRACK service. Seven respondents answered this question. Most were positive, pointing out mainly short transit times and favourable prices. One respondent mentioned fast availability of containers at the terminals. However, most respondents used the opportunity to suggest improvements as well. One respondent wished for more available destinations and higher frequency. Some respondents stated that reliability/punctuality could be improved. Most demanded service improvement in general and improved information systems, in particular. On the information system, they provided a variety of suggestions, such as: booking information; updates on the goods in transit; proactive information; and better information flow.

7. Findings

The current paper conducted an assessment of rail freight services run by a new-entrant operator, from two aspects. First, the assessment of progress between the first and second year of the RETRACK rail freight service, using pilot diary data, and secondly assessment of a comparison between the RETRACK service and its unnamed competitors, on the same corridor, based on a customer satisfaction survey.

The assessment using pilot diary data covers the period from February 2010 to February 2012. The comparative assessment suggests that the frequency and availability of the RETRACK service have improved over the months, in particular the increase in train departures since November 2010. The transit time performance is highly variable, due to both train running times and dwell times at hubs and border crossings. The transit time variability of the RETRACK service may have affected one of the most important service quality factors – reliability – although this is no worse than its competitors. This may indicate that the transit time reliability factor lies partly outside of the control of rail freight operators (both new entrants, such as RETRACK, and incumbent competitors such as DB Schenker) due to, for example, higher prioritisation of path allocation for passenger services and lower priority for freight services.
In the early part of the operation, the RETRACK service concentrated on the main corridor, assembling goods in the hubs in Cologne and Győr. Later on the service responded to market needs, for example by applying a hub and spoke (or satellite) service concept, by adding new feeder (with single wagon loads) and distribution lines, as well as by changing hubs, from Győr to Hegyeshalom, in order to achieve higher operational efficiency. By doing this, the RETRACK service has been able to compete on:

- Transit time with competing rail and non-rail services;
- Transport prices;
- Frequency of service – by expanding from one to three trains, in each direction, every week; and
- Offering a customer-oriented service that fulfills the requirements of new market segments, such as single wagon-load, and wagon group traffic.

As a consequence of this competitive ability, the RETRACK service has experienced the following successes:

- Increased freight volumes from existing customers and an increased number of regular customers;
- Shipments for one-time customers being continued into the second year;
- An expanded service on new feeder/distribution lines from both hubs; and
- An enlarged customer base in terms of cargo type (from low value grain to high value chemicals).

The respondents of the customer satisfaction survey were experienced rail customers and thus the shipments on the RETRACK service can be characterised as ‘typical’ rail shipments (i.e. large volumes and long distances). RETRACK’s competitors on the corridor were incumbent rail service providers. Thus the current evaluation of the rail freight service quality level is mainly about rail-to-rail competition and is less applicable to competition with other transport modes. The RETRACK project originally aimed at securing modal shift. It did not succeed in this as might have been anticipated. The ability to compete with road freight services needs to be addressed to identify why rail did not and/or does not do this and what will be required to enhance its competitiveness? Initially RETRACK secured traffic from intra-rail competitors and subsequently some traffic from other modes including road. The rail freight operators will have to continue efforts of enhanced competitiveness to shift cargo from road on a longer time horizon.

The findings of the customer survey (illustrated in Figure 7) suggest that the most highly valued RETRACK service factor was the price level, which was lower than its unnamed competitors on the corridor. Also, the RETRACK service was better in terms of transhipment and handling time, reliability and information flow/management. Frequency and availability of service were the lowest rated service qualities of the RETRACK service. In contrast, these two are the strongest service quality levels offered by its (incumbent) competitors on the corridor. In all of the remaining service levels, the RETRACK service performed better than its competitors. Taking the experience of the pilot demonstration of the service and assessment from two aspects, the study suggests that:

- New-entrant rail freight operators are able to operate pan-European rail freight service as well as single wagons and wagon groups;
- The customers appreciated the services and quality offered by the RETRACK operators;
- The RETRACK business model can be replicated elsewhere; but clear agreement on cost and benefit sharing will be vital for the venture;
- The RETRACK approach has led to knowledge transfer between operating companies, R&D organisations, policy makers;
- Access to terminals, sidings and infrastructure must be non-discriminatory (between incumbent and new entrant) and competitive and for that the policy makers and infrastructure managers have a great role to play;
- The new-entrant operators will need European support for the start-up phase for such service operation on another corridor;
- The RETRACK has supported the EC’s transport and economic policies in terms of increased intra-rail competitive ability, but the modal shift aspect (from road) is yet to be achieved;
- To achieve the modal shift, the rail operators will have to offer services for, among others, non-rail cargo (i.e. LDHVs) matching road freight service quality (discussed in section 2).

8. Conclusion and recommendations

The research, development and demonstration experience of the pan-European rail freight services indicates that new-entrant rail freight operators can run a pan-European international rail freight service, efficiently and effectively, and can compete with other rail freight operators in the freight market, by meeting key customer service requirements. The RETRACK operators adopted a flexible, pragmatic and market-oriented approach that should be a lesson for future R&D managers in the sector. However, the RETRACK operators were not able to shift cargo
from road, which is a key EC policy objective. Similar results were found in the Technical and operational innovations implemented on a European rail freight corridor (CREAM) project, part-funded by the EC (CREAM, 2012). This is partly due to the rail sector’s slow response to changes to meet the requirements of modern supply chains. The findings of the RETRACK and CREAM rail freight projects suggest that the European rail freight operators (whether incumbents or new entrants) may have improved their competitiveness in the new market environment, but that this is not yet good enough to compete fully with road freight transport. Apart from technical and operational difficulties, some of which have been inherited from the past, they need to adopt measures to lower the operational cost base to a level comparable with road freight – for example by more intensive asset utilisation. Given this experience, the research recommends that the pan-European corridor-based rail freight service development approach be followed, as supported by national governments and/or the EC (by part-funding as well as by helping to overcome challenges during project implementation). Supports in different forms (e.g. exemption of vehicle tax, free parking, free toll-road etc.), is given to trucking industries in different European countries (E-Mobility NSR, 2013). For example, to support a transition to environmentally friendly transport system, Norwegian authorities have introduced a number of incentives for electric vehicles diffusion.

This corridor approach facilitates higher volume of cargo flow for longer haul services, which are important prerequisites for an effective rail freight service operation. However, the authors believe that EU subsidies will be necessary for such pan-European services to succeed – in particular those run by new entrants. At the early stage of such an operation on a new corridor, the EC should continue the financial contribution to new-entrant rail freight operations, to allow them to reach to a commercially viable position within set time limitations, as promised by the Commission of the European Communities (2009, p. 5). This will enable advances in the achievement of two important European transport policy objectives of the competitive and sustainable European freight transport market (European Commission, 2011, p. 5). Proost et al. (2011) elaborates, although primarily for transport infrastructure, how such support mechanisms could be further explored. The authors recognise that subsidy is contradictory to competitive market policy, but at the same time believe that to achieve a sustainable and efficient rail freight system in Europe, there is a need for time limited financial and management support, a strong integrator and an upfront commitment for sharing costs, benefits and risks by all involved parties.

The deregulation of the Staggers Rail Act of 1980 made such provision that resulted in the improved productivity, freight volume and reduced freight rates in the US rail freight sector (Association of American Railroads, 2012, p. 5). The European rail sector is yet to achieve such reasonable and fit-for-purpose reform. Among the foci of the European Commission’s Fourth Railway Package, issued 30 January 2013, was the facilitation of the less costly and hassle-free entrance (or exit) of new operators, in line with the suggestion by Brewer (1996, p. 93) that the requirements for a contestable market, including hassle free market entry and exit and entry involves very small or no sunk costs. The Railway Gazette (2014) reports that the European Parliament adopted major amendments that have scaled back the reform proposals on the independence of infrastructure management and financial transparency, within vertically integrated holding group structures. With this development, the authors believe that there will be little change or improvement compared to the pre-Fourth Railway Package market environment. We strongly argue for positive European rail reform that will make a real change, similar to, but not identical to the Staggers Rail Act in the United States.

The CREAM project consortium included an intermodal operator (or freight forwarder/cargo consolidator) from the outset and faced fewer challenges of the kind faced by RETRACK. The RETRACK consortium included TP, as an operating partner at a later stage, who effectively played the cargo consolidator role. This was essential and, without them, the project may not have seen success. Thus, future R&D project consortia should include such an integrator. The rail freight service primarily attracted existing rail freight customers. To attract customers from road to rail, it needs to significantly increase its competitiveness and attractiveness by offering a matching service quality (e.g. price, reliability, time, flexibility) and an extended service (e.g. door-to-door, point-to-point). The new-entrant operators can increase market share through enhanced co-operation with other service providers, including transport and logistics service operators, as ‘the efficient arrangement of international transport chains becomes more and more important’ (CREAM, 2012, p. 20).

Rail freight operation in a consortium model is still relatively new in the European context. Rail is markedly different from other transport modes where collaboration models are widely used (e.g. by shipping line) for long- and short-term basis. The RETRACK service evolved during its development and opera-
tional period and the experience gained proved very valuable and could be used by others.

Through an informal discussion with the RETRACK operator, the authors understand that the RETRACK operators are continuing to sustain as well as expand the service, through greater appreciation of the regular offerings, and that the service is now an integral part of nearly every freight transport offered on the corridor. This update (May 2014) is particularly important, since the EC’s support ended in August 2012 and the service is a completely commercial operation – a strong argument for time-limited governmental or EC financial, research and management support. It will be interesting to see whether, in the near and far future, such innovative approaches by new entrants become feasible and achievable on other European rail corridors.

8.1. Limitations of the study and further research

Readers are warned about some limitations of the research paper when considering the applicability of its findings. First is the limited number of survey respondents (nine) due to the fact that rail freight operators generally have fewer but higher volume cargo customers. The second limitation is that, due to a confidentiality agreement, the data on the cost and revenue/income of the operation are not presented; thus an important attribute/element of evaluating competitiveness is not explored in this research. A third weakness is that the customer satisfaction survey did not explore the relative importance of the service attributes. Future research will need to further explore the following issues:

- The relative importance of the service attributes (such as time, cost and reliability);
- The essential competitive attributes between rail and road;
- Whether such operational and commercial success can be achieved by new-entrant SME operators on another pan-European rail freight corridor, with a different set of R&D and operational partners; and
- Whether such operational and commercial success can be achieved by new-entrant or incumbent operators for the transporting of high added-value goods.

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Appendix A

Chronology of RETRACK project events/activities

Source: RETRACK project description of work (DOW) 7th amendment, p. 46
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Brief contents of RETRACK project events/activities

| Activity               | Description                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Research and Development | – Project setup, definition, and distribution of activities among partners;  
                          | – Making an inventory and analysis of the technical/technological and operational characteristics of infrastructure, rolling stocks, transshipment facilities and equipment, goods consolidation modules, operational, legislative, security and safety rules and procedures as input for demonstrating RETRACK rail services;  
                          | – Applying different methodologies and supportive tools for investigating the market potential and possible business models for RETRACK corridor;  
                          | – Writing the reports (Deliverables on WPs) and  
                          | – Disseminating the results (newsletters, conferences, workshops, professional and scientific publications). |
| Demonstration          | – Running train services (during the period February 2010/February 2012, 369 train operations were carried out. The maximum number of train departures has been 25/month);  
                          | – Setting up and updating the ‘demonstration diary’. |
| Training               | – RSM (Railway Management Software) training (simulating disturbed situations);  
                          | – ERTMS (European Rail Traffic Management System)/ETCS (European Train Control System) driver training (enabling drivers to operate along the equipped lines);  
                          | – Code of language training (developing a prototype ‘code of language’ for drivers and signalers). |
| Monitoring and Evaluation | – Meetings – total number: 40  
                          | – Periodic management reporting  
                          | – Periodic activity reporting  
                          | – Internal/external evaluation of progress |