

Transport and Telecommunication, 2014, volume 15, no. 2, 151–163
Transport and Telecommunication Institute, Lomonosova 1, Riga, LV-1019, Latvia
DOI 10.2478/ttj-2014-0014

THE DIFFERENCES IN EFFICIENCY MEASUREMENT: THE CASE OF EUROPEAN RAILWAYS

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In the world railways are organized in two ways. In one case, infrastructure management and organization of traffic and commercial activities are integrated at the level of one of the enterprise whereas in the other case the functions of the carrier and the manager of the infrastructure are separated. This article addresses approaches of different scientists and politicians on both forms. The analysis of the case of Lithuania has been carried out. The case of Lithuania is a typical one – historically the railways have had a monopoly with the infrastructure and transportation not separated. This article presents a critical view of theoretical pros and cons of both the models.

Keywords: railway liberalisation, infrastructure management, competition, transportation, state enterprise, market regulation

1. Introduction

In Europe for the past two decades there has been a debate between the railway companies, national governments, the European Commission and the researchers, whether the infrastructure should be separated from the carrier or integrated.

As for the benefits of the separation model, it is often argued that having separated the interests of the infrastructure manager and carrier, the development of the railways will be ensured and the efficiency will be raised only due to the resulting tension of interests, as both the infrastructure manager and carriers will attempt to work effectively. So far, the knowledge accumulated by the scientists is not yet comprehensive or complete, and the results are contradictory. So, what are they?

Ivaldi and McCullough (2006) demonstrated that the railway company which operates in accordance with the integration model (i.e. operating as not separated), has 20–40 per cent cost advantage compared to companies operating within the separation model – that is, in case of separation the costs increase.

Cantos et al. (2002), when investigating railway performance, concluded that the highest railway productivity was observed before the separation model was implemented and infrastructure was open for the carriers' competition. They analyzed the interaction between infrastructure costs and freight / passenger rail transport performance. According to them, the work by separation model implies inefficiency.

Asmild, Holvad, Hougaard&Kronborg (2008) shows that the separation at the level of accounts obviously contributes to improving the efficiency of rail operations. Although there are indications that rail efficiency grows after a full implementation of the institutional separation – the results are not statistically significant. So the question of whether the separation model promotes the efficiency of a railway sector remains unanswered. However, one can consider that the increasing rail efficiency after the implementation of separation model can actually be the result of separation of accounts that is occurring at the same time.

Friebel et al. (2004), Beria et al. (2012), Sánchez-Borràs (2010) examined the effectiveness of railway reform in the EU old member states. One of the factors the influence of which was attempted to be assessed by researchers was the separation effect on the efficiency of rail activity. Significant differences between integrated and separated enterprises were not detected. The separation model is not

a prerequisite for efficient railway operations. In order to create a positive effect of the reform, it is necessary to carry it out by consecutive and separate phases – with the introduction of the full reform package the railway efficiency remains not only unchanged, but it could even decrease. This indicates that the rail sector's ability to absorb reform is limited: introducing reforms step by step allows the adjustment of further steps according to the needs and enables to abandon harmful moves.

Wills-Johnson (2008) came to the conclusion that the separation model in practice does not bring greater losses, partly due to the fact that integrated railway companies themselves are not very capable of optimally managing the wheel-rail interaction.

Calvo and De Oña (2012) raise a question if rail charges connected to costs in the light of monopoly approach.

What do these data show? Even if it would seem that the results show the benefit of the integrated model, all agree that the information leading to say that one or the other model is more effective, is missing. The observed results of the reforms offer a look at each rail system as a unique and specific arrangement; the same choice for one form of railways will prove to be successful, while for the others – devastating. However, these results should be seen as indication that the integrated railway company is more likely to deal with operational tasks more efficiently. Given that Lithuania made a decision on railway reforms without carrying out the economic justification of the reform, the possibility should be considered that Lithuania may be placed among those countries not being able to afford the separation model.

The EU railway reform goals are to create a single market for rail transport, increase the volume of rail operations (including their significances for other modes of transport), the efficiency and quality of services. None of the EU Directives requires a complete separation between the infrastructure and operations, and a consensus on the optimal organizational model on railway transport functioning is not made. It can be said that so far the greatest achievement of the discussion on “effective” and “ineffective” models is namely the perception that general guidelines on the realization of railway reform cannot be found, so it is increasingly being perceived that rail transport is a specific activity influenced by a number of factors – both as one of the network industries, and as one of the transport modes.

Therefore, it is also important to be aware of the source of ideas to reform the railway sector by applying a separation model. This idea – to dissociate the train traffic and infrastructure so that external carriers would be able to compete by using common rail, is related to telecommunication, electricity and other transport sectors. For example, road and air carriers have been continuously competing by using the infrastructure operated by infrastructure managers not associated with the carriers. However, practice has shown that the benefits of this model applied in a variety of networked industries also differ – it is associated with a higher success in one form of modes, whereas elsewhere – with less. For example, this model has proven to be successful and more adaptable in the electricity and gas sectors rather than in the telecommunication and rail sectors. Therefore, it is clear that the debate on rail reform successes and failures in various countries is questioning not only specific solutions and situations in various countries which led reforms, but also the idea of the applicability of such a reform in the railway sector.

As for the problems raised in this article, we would like to note that the discussions on the railway reform involve at least three different and not necessarily related railway reform components:

- Organization model (choice of either a separation model or the integrated model);
- Rail liberalization (to develop competition by giving an open access to all or to impose restrictions on potential market entrants);
- Form of ownership (privatization or maintaining public ownership?).

The main focus of this text is on the discussion of the arguments for and against each model. The separation of functions of the carrier and the infrastructure is identified by the term “separation model” (“vertical separation”, “vertical unbundling”). The model of working without separation of these functions is identified by the term “integration model” (“vertical integration”). The issues of liberalization and the development of competition will also be reviewed in this discussion. However, the problem of privatization will not be addressed. Quite a number of commentators of the Lithuanian railway reform have expressed their belief that before taking further steps in the railway reform Lithuania has to gain knowledge of other countries' reform experience. This article attempts to discuss the experience of other countries although a list of “for” and “against” arguments found in the literature has been significantly narrowed.

The next section discusses the choices of the EU countries in reforming their own rail systems, which in its turn raises the awareness of a wider environment on which Lithuania focuses on priority basis today. The third section discusses the interaction of the organizational model and the development of competition: Which of these models facilitates the emergence of competition and consolidation?

Or maybe opening railways to competition does not mean that viable competition will appear naturally? The fourth chapter examines which model is more preferable in solving one of the crucial issues for Lithuania – investments in infrastructure and management of the infrastructure itself. This topic is extended in the fifth and final chapter, the purpose of which – to present the conclusions of a number of studies that have sought to evaluate the effectiveness of one or another model.

2. Railway Reforms in European Union Countries – Separation or Integration?

The railway reform goals and trends appear to be defined by the railway reform guidelines set by the EU directives and other documents as well as the attempts demonstrated by the countries themselves to integrate into the EU railway sector. The countries have the opportunity to carry out the reform with flexibility in finding the best individual solutions that will take into consideration their interests and specific needs. Therefore, it should be borne in mind that railway reforms in the EU old countries developed as an attempt to deal with the situations and problems of namely those countries. Consequently, the reform results should be considered by taking into account the fact that in every country, especially in post-communist European countries, the rail transport situation in general and the problems are different.

With regard to the EU requirement to separate infrastructure and transportation (at least in the accounts), the EU countries have chosen different reform paths. IBM (2007) study authors have divided the EU / EFTA countries into three main groups.

This classification reflects the real current rail organization in these countries in 2007, not the one declared or targeted to be achieved during the course of the reform. An example of another classification – “prospective” – is given by Nash, Matthews, Thompson (2005). This classification distinguishes four models in terms of what level of separation the parties decided to achieve: 1) Swedish Model (complete separation), 2) French model – separation of partial functions, 3) German model – holding 4) The Irish model – only accounts are separated, in other cases the integration is maintained. It is obvious that Lithuania intends to implement the Swedish model whereas our neighbours, Latvia and Poland, are planning to implement the German model.

Table 1. EU / EFTA countries by rail management models

Level of separation		
Complete institutional separation	Functional, organizational, accounting and legal separation	Separation only at the account level
Britain Bulgaria Denmark Spain Netherlands Norway Portugal Romania Slovakia. Finland Sweden	Austria Belgium Czech Republic Italy Poland Lithuania Germany Greece (not all functions) France (not all functions)	Ireland Estonia Luxembourg Latvia Slovenia Switzerland Hungary

Source: IBM (2007)

What do different classifications presented by various researchers mean? On the one hand, the situation in the European railways is rapidly changing even today – some countries have not yet achieved the objectives set by the reform, others have responded by improving their reforms. On the other hand, there is a difference between a formal, declared situation and the real situation. For example, some EU countries have reformed their railways only to the extent that does not breach the EU directives, but does not change anything. French and Spanish rail reforms are good examples. In these countries, an alleged mechanism was designed to ensure independent infrastructure management, but in fact the infrastructure manager is totally dependent on the state-owned railway company-carrier. This suggests only one conclusion: all EU countries in reforming their railway must take into account what environment and what set of factors are surrounding Lithuania. When inertia and reluctance to reform railways are observed in other EU countries, it is worth considering what consequences of Lithuanian railway reform implemented in such an environment could be possible? Isn't there a threat to give away everything, but to get nothing in return?

3. Towards Integration – Lithuanian Case

The literature on railway reform recognizes that the choice of either the separation or integration model inevitably means a compromise: on the one hand, the assumptions of rail competition are being strengthened (separation) or weakened (integration); on the other hand, the coordination efficiency is being strengthened (integration) or weakened (separation).

We have already discussed that the decision on the rail operations organization model is being discussed as a major tool to help achieve the objectives of the railway reform – to create a common market, to increase the service quality, the efficiency of railway operation and that of the whole transport system and so on. However, it is important to understand that the relationship between one or another organizational model and the achievement of the objectives of the reform, is not straightforward even at the conceptual level. For example, the logic of the argument constructed by a number of discussions and research papers on railway reform issues can be presented as a simplified sequence of actions and consequences:

Separation → competition → the desired results, but by means of a compromise (coordination) Integration → coordination → desired results, but by means of a compromise (competition)

Figure 1. Conditions of separation and integration

In other words, a separation model is a tool assisting to promote competition on the common rail, which in its turn will help achieve other objectives of the reform. Thus, a common answer to the question of why infrastructure management should be separated from transport operations is as follows: having implemented the separation model, a transparent and impartial mechanism is to be developed that will promote competition among the rail sector carriers and will help achieve a higher quality of service, perhaps even at a lower cost. According to this concept, the organization model and rail liberalization are closely related. True, it is worth noting that possible negative consequences of liberalization are also taken into consideration.

However, today there are already plenty of examples, even within the EU itself, where market liberalization is ensured and competition is promoted by implementing vertical separation as well as maintaining vertical integration. In other words, both separation and integration create pre-conditions to market liberalization and the development of rail competition.

Integration → competition and coordination → desired results
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Figure 2. Integration by competition

When the separation model is implemented, coordination not only requires more effort and resources – it even decreases (newly introduced mechanisms are not always efficient, their development continues over time, and some of the functions are simply no longer carried out). Following „Deutsche bahn“ approach, the continuity of integration allows to reduce coordination costs incurred in implementing the holding model integrated institutionally, but broken into many layers, as well as having opened rail to the holding organizations, the major carriers in the German market carriers “strangers”, effectively managing their interaction.

Efficient distribution of functions within the holding means that the costs are “moved” from the holding to the overall rail system are much lower than those in case of the implementation of the separation model (then the costs would not be effectively absorbed within the system, but “moved” to the outside, for example, management of contracts and conflicts). So, following the experience of Germany, it is likely that the holding model with the infrastructure manager and at least one carrier working under one roof, will reduce the coordination costs attributable to all the rail system activities – their reduction will be directly related to the transportation market share associated with a specific carrier – the bigger the share – the lower the costs. It is obvious that without “bigger players” in the carrier market the implementation of separation will require a disproportionate growth of coordination costs. The question is whether the emergence of competing carriers is possible in the implementation of the integration model?

The reform leaders in Europe, assessed by all sections are mostly the same countries (except for Estonia in the last column). It is worth noting that according to IBM (2007) studies the countries' rankings are redistributed when analyzing the countries by the type of their transportation activities,

for example by Liberalization index leading positions are taken by Germany only in passenger transport – and by Sweden – in Freight transport (Britain is pushed out of leadership positions). Table 2 is based on the IBM (2007).

Table 1. Rail liberalization index

The liberalization of rail 2007 *				
Rank	Liberalization** (Total index)	Regulation and organization	Access availability and barriers	Competitive dynamics
1	Britain (827)	Britain (969)	Sweden (817)	Britain (793)
2	Germany (826)	Germany (905)	Germany (807)	Estonia (704)
3	Sweden (825)	Netherlands (865)	Netherlands (795)	Sweden (633)
4	Netherlands (809)	Sweden (857)	Britain (791)	Germany (555)
10	↓	Lithuania (820)	↓	↓
15	Lithuania (684)		↓	↓
16			Lithuania (650)	↓
20				Lithuania (184)
* The number of the collected points by ranking is given in parentheses next to the country name. Maximum number of points: 1000 points				
** The liberalization index is calculated as that of the other two categories – Market regulation and Access availability – derivative. The last, the index of Competitive dynamics is not used in calculating the total Liberalization index				

In order to assess which model of organization separation or integration – proved to be more appropriate in Europe, it should be noted that Sweden and Germany, prevailing leaders in the railway reform have implemented different organizational models (separation –Sweden, integration – Germany). Thus, despite the different organization models, both countries are among the four EU countries rated as leaders in the liberalization of rail – both in terms of various criteria and competition in the market. Reviewing the results, the authors of the IBM report note that countries with the most dynamic market and biggest competition (i.e., Great Britain, Estonia, Sweden, Germany and the Netherlands) apply different organizational models.

Germany separated the infrastructure and railway operations, forming the organization of a holding structure back in 1994. The carriers working in Germany complain of discrimination, although acknowledge that the conditions for their operation have improved in the last few years. However, the following fact must be taken into consideration – in 2007, 350 carriers were working in Germany (more than in all other EU countries combined). Germany's rail transport role in the total transportation activities has been stable for a long time, but has begun to grow quite rapidly in recent years, whereas in the passenger transport sector it has grown since the beginning of the reform. IBM report notes the success of the reform, as the indicators of the performance of the last year show that Germany's negative trends in the rail sector have finally changed towards growth.

Sweden completely separated their infrastructure and transportation activities in 2001. It seems that the creation of a separate infrastructure manager did not guarantee a non-discriminatory system. For example, IBM (2007) report presents the information that a number of carriers reported discrimination – just in 2006 there were three cases in which the decision was taken in favour of the carriers, rather than the infrastructure manager. By the way, in 2007 the number of carriers working in Sweden was significantly lower than that in Germany – eight carriers were working in passenger and 14 – in cargo transportation sectors. It is worth noting that in Sweden the “new” carriers, originating not from reformed “traditional” carriers play a more significant role rather than in Germany or in most other European countries.

Thus, based on these data, it can be said that both, the one and the other model have enabled the competition to develop. Yet, neither the one nor the other model eliminated discrimination problems. However, it is interesting to note that the “independent” operators play much a more important role in the Swedish rail transport activity. For example, Nash & Rivera-Trujillo (2004) describe the Swedish model as the most successful in Europe. However, the Swedish achievements could be explained not only as a result generated by the separation model but as a consequence of a specific Swedish transport system (e.g., a simple railway network, standardized wheel–rail interaction and not overloaded traffic, a small intermodal transport competition (Ksoll, 2004).

Observation of the rail reform process in different countries shows that both models can be associated with positive outcomes. It is important to emphasize that market liberalization and competition can also be ensured within the framework of the integrated model. The World Bank's position is also similar: it is recognized that the separation could contribute to the fact that the competition in the given market would be "fairer", but the separation is not a prerequisite in order to create competition. The establishment of a separate infrastructure manager is associated with a situation of mistrust that regulatory mechanisms will be created to ensure non-discriminatory access to infrastructure. However, the separation itself does not mean that regulation issues have become obsolete. On the contrary – after the separation of activities a complex regulatory mechanism is required. Also, the separation and the consecutive demand to ensure the activities of the whole railway system are associated with increasing costs that even by proportion are not likely to outweigh the benefits generated by the separation model. It should be added that in the context of global practices a separation model has proven to be not the most successful way to develop competition, even though the EU countries have experienced varying success in promoting competition, so far the results are described as disappointing. Why? Transportation market liberalization in Europe is associated not so much with the newly evolved market players as with the development of the activities of existing companies operating in other territories, most often with the railway companies of different countries entering the markets of other countries. It seems that even given open access to the infrastructure to other carriers, competition may not appear due to the specifics of the railway system. For example, there are indications that rail operations cannot fundamentally be cost-effective either in case of separating the wheel-rail interaction (separation model), or in case of specializing the activity and thus breaking the benefits generated by the scope economy. By the way, the decision to create competition within the rail may be unnecessary and inefficient, if the competition occurs between different railways. In addition, the railways face other modes of competition.

Assessing the "Lithuanian Railways" in terms of the international context, particularly from the perspective of post-Soviet countries, it is obvious that already today the Baltic railways compete with each other. Taking into account the discussed above development of competitive rail business in Europe, it is evident that the EU rail market can develop in a similar direction – only in this case the activities of the carriers will develop moving on both, their own and foreign rails.

One of the negative consequences of the separation model discussed in literature is the declining incentives to invest. However, it is recognized that this problem is decreasing in the context of increasing market competition: if an investor sees that there are a few carriers competing for the deployment of a service, he will be interested to invest, because it guarantees a stronger negotiating position. On the one hand, opening up the market to competition, but without developing the infrastructure as Estonia's experience has shown, can be problematic. Russian carriers started to work actively on the Estonian market which greatly disturbed the politicians and the public. One explanation why the EU carriers do not rush to the Estonian market is technical incompatibility of rail systems.

As for the benefits of the separation model, it is being emphasized that separation will enable to completely and certainly refuse cross financing and transparency will be created in handling costs and revenues. This, for example, will allow governments to decide on the expediency of investment by carrying out an informed cost-benefit analysis of investment projects. Based on the Swedish experience, it could be argued that effect generated by the model results in creating a favourable investment climate for government investment. For example, the Swedish government is investing more in infrastructure development being sure that the funds allocated for the infrastructure opportunities development will not "be eaten" by inefficient transportation activities. Of course, it is reasonable to raise the question: Are there any other possible measures to eliminate opportunities for cross-financing? The Germans, for example, solved this problem by regulatory mechanisms.

On the other hand, it is important to emphasize that in the rail sector neither the carrier nor the infrastructure manager can make investment decisions independently of one another's interests and plans, for example, how high-speed trains would be used if there are no tracks suited for them and vice versa? From the German point of view, the success of investment decisions can only be assured by an integrated model, because it means a long-term, reliable relationship between rail transport participants – a stable relationship that is necessary for the vast majority of investment decisions in the railway sector.

Lithuania, despite aspirations to integrate into the EU's rail system still holds the marginal position between the two technical (1435 mm and 1520 mm) systems and remains strongly associated with post-Soviet space. Among its crucial questions remains the implementation of investments in order to upgrade dilapidated railway infrastructure and reliable investment projects that would assist JSC "Lithuanian Railways" "to move" from the marginal position between the two railway systems to an intermediate position. However, neither the reformers working by a separation model nor the reformers promoting an integration model so far managed to create an investment environment that would successfully

promote private sector investments. Nor the “independent” infrastructure manager is able to ensure the function in question.

In fact, a number of indications can be found in the literature that separation by itself already means rail performance growth, but the use of infrastructure becomes less efficient. For example, the depth study was carried out in Dutch port of Rotterdam seeking to evaluate the efficiency of rail operations at the port after the railway reform. The researchers came to the conclusion that the reform, particularly the appeared competition between carriers is associated with a number of positive results – improved quality of services, decreased costs. But they acknowledge that the reform did not help to optimize resource management – even the opposite trend is observed. Most importantly, the perspective of the system has disappeared – companies are handling issues in accordance to their own interests, which ultimately comes down to the inefficient use of infrastructure.

In addition, the debate on rail reform often presents an argument is that the relationship between the train wheels and the rail is much better managed through a single entity whereas the separation of wheels and rail creates a situation where the carrier loses the incentive to optimize this relationship. For example, the literature deals with the situation where there is no incentive for the carrier to grind wheels. Considering the fact that for wheel grinding the carrier spends 2 million a year, the company will save only \$ 1 million for performing this work. However, not ground wheels may cause 10 million dollars in damage for railway track. In theory, the infrastructure charging mechanisms should be able to solve this problem, but in practice this has not yet been achieved.

4. EU Policy Implication. Case of Lithuanian Railways

For example, Lithuanian railways which are basically run by the integrated model are often described in reports as ineffective, as limiting competition, as one of the most expensive in terms of the use of infrastructure. The proponents of the separation model make use of these as their basic arguments. However, when one looks at the deeper reasons or evaluates the external circumstances, such negative assessments can be rejected, what is more, completely different conclusions may be provided.

One of the most important issues in rail efficiency is the fact that 50 per cent of all freight in Lithuania is transported by rail, while the EU average is less than one fifth. In this regard modal distribution in Lithuania is much more efficient, and more secure to the environment than that within the EU.

Furthermore, it should be noted that Article 6 of the Directive 91/440/EEC regulates the transport infrastructure and accounting separation, the separation of essential functions of the infrastructure, and Paragraph 2 of Article 6, provides for the possibility to manage the infrastructure either by establishing a separate division in a company or establishing a separate entity. Neither this Directive nor any other EU legal act requires a complete separation of infrastructure and operations.

Listed below are some examples of when the Lithuanian Railways are accused of ineffectiveness and reasoned explanation of the situation is provided.

The European Commission’s second report to the Council and the European Parliament on the rail market development monitoring SEC (2009) 1687 (hereinafter – the Report) emphasizes that Lithuania’s rail market is to be considered as the most close.

Source of Fig. 3 is Questionnaire of the European Commission’s second report to the Council and the European Parliament on rail market development monitoring {SEC (2009) 1687 completed by the EU members of May–June 2009.

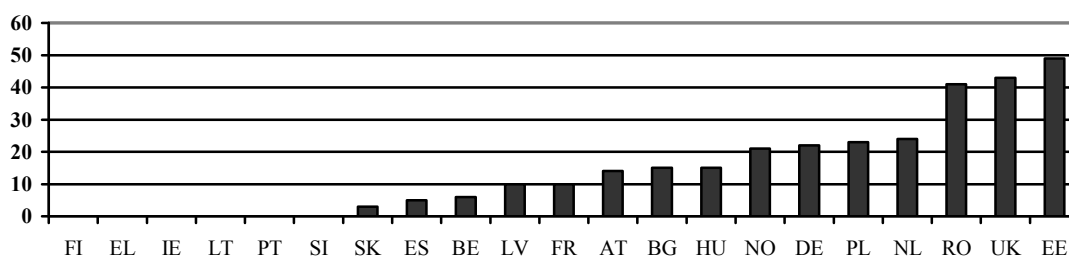


Figure 3. Market Share (%), belonging to the new rail freight operators in late 2008

Even though there is a relatively considerable number (24) of the licenses issued in Lithuania, the actual freight service providers – carriers were not indicated on the filled in questionnaire of the Lithuanian report, consequently, Lithuania is regarded as a country with a de facto monopoly situation in the railway market. A relatively significant number of licensed companies are determined by the requirements of the legal framework of Lithuanian Republic. According to the Lithuanian legal framework even companies that perform manoeuvring tasks (wagon pulling / pushing on its territory, access roads and marshalling yards) by their own manoeuvring locomotives, are required to obtain carrier license issued by the State Railway Inspectorate. This resulted in a relatively large number of licensed carriers.

This resulted in a relatively large number of licensed carriers. The majority (17 of 24) of licensed companies are cargo owners or owners' representatives (based on various agreements – trade, expeditions or capital ties). Today these companies for shipping make hiring contracts with JSC "Lithuanian Railways". The companies that aim to become carriers can be naturally associated with the desire to carry their own load. The goals of these companies to become carriers can be inspired by the expectation to transport their cargo themselves. These goals may be related to their expectations to perform transportation by themselves which is more cost-effective compared with the current cost of hiring JSC "Lithuanian Railways".

A more detailed analysis of licensed companies shows that by using licenses companies only ship carriages from the train station (or access road) to the loading / unloading location, i.e., are involved in the manoeuvring traffic. Freight contracts with customers are made only by JSC "Lithuanian Railways" (other licensed transportation companies do not perform freight operations). In most cases in Lithuania the companies that took out licenses do not have defined plans to carry freight business, but only: (a) carry out manoeuvres (such as "Akmenes cementas", "Lifosa", "Žvyrokarjerai"); (b) carry out the rail infrastructure repairs (e.g. "Geležinkelio tiesimo centras", "Alkesta", "Vitrast").

This situation resulted from licensing procedures applied in Lithuania. According to EU directives a licensed railway enterprise is the one that carries out transportation of freight or passengers. While according to the Railway Transport Code of the Republic of Lithuania, freight contract shall come into force in the primary station and expires in the terminal; access roads for freight are not mentioned. In Lithuania's case, many licensed companies are from the field of industry, for which manoeuvring locomotive operations comprise only part of their technological process. They do not provide freight services. Some companies use their manoeuvring locomotives to perform slight work for other companies, yet the State Railway Inspectorate treats these activities as those of a railway operator that requires a license. However, pushing wagons in access roads or yards should not be considered as cargo transportation. Some of the companies by means of their transport access the station paths (repair companies – sub-stations) while SRI's position is that one cannot enter into public infrastructure without a license. Any entrance to the station road or sub-station is considered by the SRI as the use of public railway infrastructure and is based on Code of Railway Transport, Article 28, which specifies the right to use public infrastructure granted to licensed companies. According to the data of report SEC (2009) 1687 in Lithuania one of the largest infrastructure access charges are applied.

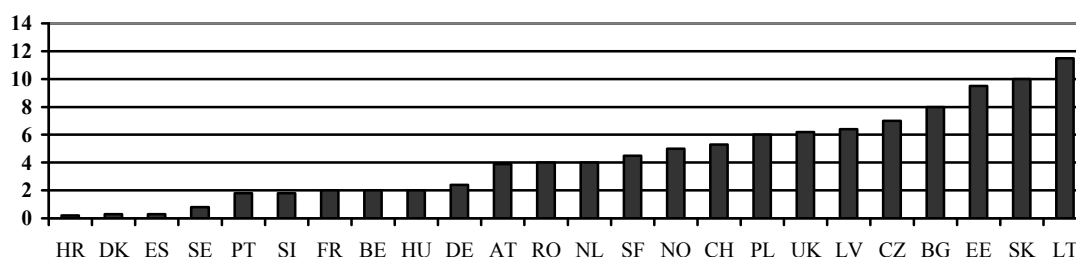


Figure 4. Charges for the use of railway infrastructure applied for the standard 2000 gross tons of freight trains (Euro / train-km)

Source: ITF, Report on the charges for the use of railway infrastructure, 2008

However, it should be noted that in Lithuania, apart from the EU funds, the infrastructure by 100 percent is kept, maintained and restored by the company JSC "Lithuanian Railways" that includes all of these costs in the infrastructure rate. In accordance with UIC data, in 2008 Sweden allocated

2.9 billion Euros for rail infrastructure maintenance, in 2009 Great Britain – for their infrastructure – over 4 billion Euros.

It is obvious that the European countries where the railway infrastructure is largely maintained by taxpayers (data are presented in Annex 10), the infrastructure charges are lower than those in Lithuania. Western Europe rail infrastructure maintenance is financed with taxpayers' money due to the fact that the EU's transport policy is targeted to the transfer of cargo from road to rail. In the EU only 17 percent of goods are transported by rail. It causes huge traffic jams on the roads. In Lithuania rail transport accounts for about half of all cargo transported. In addition, 2/3 of the total freight traffic is transit cargo from foreign (Eastern) countries. If the Lithuanian tax payers contributed to rail infrastructure maintenance (as is done in the EU), there would be a real opportunity to reduce infrastructure cost, thus to create an opportunity for the coming private operators. However, there is a real question whether Lithuanian taxpayers at their own expense should support business of foreign operators who carry goods in transit through Lithuania. The objective data on rail infrastructure fee justification or unreasonableness can be obtained only having conducted a detailed JSC "Lithuanian Railways" analysis in terms of its structure of cost and its reduction.

In summary, the use of railway infrastructure is regulated by several European Union directives. Article 5 of Directive 2001/14/EC establishes a right of access to infrastructure objects and Annex II of Directive 2001/14/EC specifies lists of services provided by the infrastructure managers. JSC "Lithuanian Railways" ensures access to infrastructure under these directives.

In the same report the Lithuanian railways are named as closed, because there are no active foreign operators. Yet, the reasons why there are no foreign operators should be taken into account. Western rail width is 1435 mm, while in Lithuania there is the so-called "Russian" gauge (1520 mm of width). "RailBaltica", European gauge construction project that was supposed to start in 2007, to reach Kaunas in 2010 and later be extended to Riga and Tallinn, has been significantly delayed. At the end of 2010 only about 6 miles from the border with Poland were built. The difference between the Russian and European gauge systems is not only in the width of gauge, but also in transport technology schemes, vehicles, traffic management and automation. Western rail operators today do not have appropriate technical feasibility to enter into the Lithuanian rail transport market.

Western rail operators are interested in Lithuanian railways. Foreign operators' expectations are associated with the European gauge and RailBaltica project. The interest focuses on the connection between Germany and Lithuania. After constructing RailBaltica to Kaunas and building an intermodal terminal a realistic chance would appear for this section to be used by foreign operators.

JSC "Lithuanian Railways" have signed a cooperation agreement with the German company CargoBeamer AG, which has developed a semi-trailer reloading on rail technology, has installed its first prototype terminal and made its first test shipments within Germany for company "Volkswagen". The development of this technology has been contributed a lot by the German national railway company Deutsche Bahn, which has still been actively supporting the project. There is already a large customer base focused and waiting when they will be able to move their trailers to carry via "East-West" rail corridor through the Baltic countries and especially Lithuania. The planned corridor is Rotterdam–Kaunas with 3–5 trains per day. There is already Deutsche Bahn Group-owned company "Schenker" operating in Lithuania. Companies of Deutsche Bahn Group as well as the companies under its influence – potential rail operators in Lithuania and their activity is likely to come true after the implementation of the project RailBaltica.

„Lithuanian Railways" has entered into an agreement with a subsidiary of Rail World – Rail Polska concerning cooperation in gauge conversion system Talgo trial in Lithuania.

JSC "Lithuanian Railways" and the German logistics company DB Schenker enterprise DB Schenker Rail has signed a letter of intent on DB Schenker freight train traffic from the Polish border to Mockava.

Latvian railway companies (as well as the national carrier LDZ Cargo) take an active interest in the availability terms of the safety certificate in Lithuania; several meetings with the State Railway Inspectorate were held.

Railway operators of eastern countries are basically the national carriers of those countries: Russian Railways, Belarusian Railways, Ukrainian Railways, Kazakhstan railways and so on.

The interests of Russia and its government and business groups to participate in Lithuanian economic processes are justifiable (e.g., energy resources supply, distribution and sales). Russia's interest in the railway sector in the Baltic States is proved by Estonia's practical example. Among the Lithuanian firms that have obtained licenses are those that are large-scale Russian industry (e.g. steel) export freight forwarders (transport and trade brokers), or their direct or indirect representatives. In addition, because it

is irrelevant whether the license is obtained in Lithuania or in another EU country (e.g. Latvia, Estonia), the Eastern capital firms with licenses from any EU country, may transport goods by Lithuanian railways (although for the capital firms from Eastern countries, assessing the costs and risks, today it is easier to make contracts with JSC "Lithuanian Railways").

The Lithuanian operators' access to the market is prevented by the amount of initial deposit of infrastructure fees and the size of the investment required. The basic fee paid for the Freight Directorate of JSC "Lithuanian Railways" depends on the reserved train kilometres and actual gross kilometres, whereas for the levied fees the carrier is given the minimum access package (reservation of train lines and availability of these lines; traffic management and organization; document management; information provision; access to path stations; objects of infrastructure). The fact that the initial deposit of the main fee is about 15–20 per cent of the total fee can be seen as a barrier to enter the market for smaller companies that lack of working capital.

JSC "Lithuanian Railways" can be considered as monopoly in the Lithuanian rail transport market. The conducted analysis shows that currently all shipments are made by JSC "Lithuanian Railways" and licensed rail transport companies mainly are cargo owners or owners' representatives and in order to carry out transportation they make contracts of employment with JSC "Lithuanian Railways". Freight contracts with customers are made only by JSC "Lithuanian Railways".

JSC "Lithuanian Railways" faces competition in international transportation area. International shipments cover 2/3 of the JSC "Lithuanian Railways" market where the competition is observed not within the country but with Latvian, Estonian, Russian railways.

Domestically, JSC "Lithuanian Railways" compete with other modes of transport.

The comparison of the specifics of Lithuanian railways with the structures of Western and Central European countries shows significant differences. Lithuanian railways features which are incompatible with the current operating structure of the integral rail division are as follows:

- Most of the trains in the infrastructure are freight trains (2/3 train kilometres, more than 90 percent of gross km) and over 90 per cent of the income earned from freight;
- Two thirds of freight revenue earned from transit cargo of third countries;
- Infrastructure integrated into the CIS rail network;
- Joint fleet of wagons with the CIS countries;
- Highly flexible freight train traffic schedule, the ride of freight trains planned for about 6 hours before. This is due to the arrangement specifics of traffic crossing the Russian–Belarusian border, unpredictable work of Klaipeda port loading companies;
- Trains are selected, wagons are formed in distribution stations not according to individual clients or the type of the cargo, but according to the destination of transportation, which allows to reach the maximum exploitation of the available infrastructure and the fleet of vehicles;
- Passenger transportation activity is not subsidized by state funds as it is opposite in many EU countries (Nash 2010);
- Rail infrastructure is not financed by the state (with the exception of the EU funds for development projects).

Structure of charges for the use of railway infrastructure. Although the charges (fees) for the use of railway infrastructure in the country are among the highest in Europe, these fees are paid by freight carriers, rather than from the national budget, as is the case in most Western European countries. In this case, Lithuania implements the principle of "user pays". From this point of view, JSC "Lithuanian Railways" can be seen as an efficient railway company that, without receiving the state funding, is able to operate profitably, maintain rail infrastructure and the loss in passenger traffic. The only fee payer in Lithuania is Freight Directorate of JSC "Lithuanian Railways" which pays this fee for Infrastructure Directorate of JSC "Lithuanian Railways" (customers just pay the freight rates for Freight Transportation Directorate).

Infrastructure charge (fee) on all roads (busy and no-load) is the same. Only the corridor from Kena to Klaipeda and the branch to Kaliningrad can be called as busy sections. This represents only a quarter of the total railway network. The infrastructure charge collected from busy sections ensures stable maintenance of the network. Non-loaded regional sections help to keep small industrial enterprises. The decision to dismantle non-loaded sections and stay with the development of only busy sections would conflict with the principles of regional development.

Network problem. Actually, the Lithuanian railway infrastructure does not involve alternative routes (parallel lines, bypasses) and the need for the application of different rates in lines for redistribution (optimization) of train traffic (for example, in case of a very loaded line to divert trains to another line). There are no objective (unambiguous) economic arguments for “increasing” or “decreasing” rates of certain lines: (1) with the reduced infrastructure charges on busy traffic lines (Corridor IX), the rest of the lines for carriers will be significantly more expensive; to organize local transportation would be inefficient and regional lines would have to be maintained from the state budget or closed; (2) with the increase in the rates of infrastructure charges on lines of busy traffic (Corridor IX) shipments to the port of Klaipeda would become more expensive, the carrier acting in intense lines would subsidize the maintenance of regional lines, for which the carriers carrying transit cargo should be able to reasonably make a claim.

A high price charged by the Lithuanian railway infrastructure can have a negative impact on the export competitiveness of the products made in Lithuania because the component part of the transport price in the field of heavy industry (construction, chemicals, and petroleum) is significant and may result in a general increase in product prices. However, cargo transport rate should not be confused with the infrastructure fee. Not the infrastructure charge but the freight carrier’s tariff charged on cargo is important for the economy (customers). Though European countries have lower infrastructure charges, the freight rates in these countries are not smaller.

Lithuanian railway efficiency is determined not only by the issues of the company’s organizational level and relationships with customers and other operators, but also the problem of Lithuanian rail system network. Lithuanian railway network was constructed and configured as part of the former USSR network, with the main unit and the control centre in Riga. The network was configured for (1) freight transport (mainly strategic cargo such as liquid energy products and military equipment), and for (2) the service of industry developed in Lithuania. After the collapse of the USSR most of the industrial enterprises that had rail sidings, collapsed or their volumes were significantly lower than the capacity proposed by rail. Current freight flows are formed exclusively in the two corridors directed to Klaipeda and Kaliningrad.

Russia’s policy of the last decade led to the formation of the main cargo flow by mainline leading to the Kaliningrad port. A large part of the infrastructure network remains unexploited, and some – heavily loaded. JSC “Lithuanian Railways” has to maintain the whole rail infrastructure, even in case if it is very little used. This is one of the reasons why the cost of infrastructure use is so high.

5. Conclusions

1. The choice of the separation or integration model inevitably means a compromise: on the one hand, the pre-conditions of rail competition are being strengthened (separation model) or weakened (integration model), on the other hand, the coordination efficiency is being enhanced (integration model) or weakened (separation model).

2. The establishment of a separate infrastructure manager is based on the expectations that the rail market liberalization objectives will be achieved more efficiently having set up an institutional mechanism that maximizes the possibility that the infrastructure manager is not interested in a particular carrier’s success. The experience of railway reforms in different countries that implemented both integration and separation models, shows that opening access to the rail does not guarantee the emergence of competition between carriers or resulting service selection, quality increase and cost reduction.

3. The separation model is implemented at the expense of scale economy specific to integrated rail. The determination to implement the separation model does not generate any stimulating investment environment as an infrastructure manager, without performing any transportation activity himself, is more interested in collecting the largest possible infrastructure fee with the lowest possible cost. However, if the infrastructure manager sees a few carriers competing for the deployed service he will be interested to invest, because it guarantees a stronger negotiating position.

4. The improvement of transportation performance indicators does not necessarily mean an efficient and sustainable use of the infrastructure.

5. Transportation market liberalization in Europe is associated not so much with the newly evolved market players as with the expansion of the activities of the existing companies to other territories, most commonly with the railway companies of certain countries entering the markets of other countries. Even given open access to the infrastructure for other carriers, competition may not appear due to the specifics of the railway system itself.

6. The separation of functions of the carrier and the infrastructure is identified by the term vertical separation or vertical unbundling. The model of working without separating these functions is identified by the term vertical integration. The integration model has several variants, such as holding or fully integrated model (the current case of Lithuania). In case of holding the infrastructure is managed by a separate legal entity which, as well as companies providing transportation service, belong to the same group, but must offer non-discriminatory conditions for all carriers for access to the infrastructure. Market liberalization and competition can be ensured not only within the framework of a separated model but also of the integrated model. Separation could contribute to the fact that the competition in the given market would be “fairer”, but the separation is neither a necessary nor a sufficient condition to create competition.

7. The use of railway infrastructure is regulated by several European Union directives. Article 5 of Directive 2001/14/EC establishes the right of access to the objects of infrastructure and Directive 2001/14/EC Annex II presents lists of services provided by the infrastructure managers. JSC “Lithuanian Railways” provides access to infrastructure under these directives. True, there is the question of the validity of the size of the infrastructure charges.

8. In Lithuania in 2010 there were 24 licensed rail transport companies, but all operations have been carried out by JSC “Lithuanian Railways”. Licensed rail transport companies are mostly cargo owners or owners’ representatives (based on various agreements – trade, expeditions or capital ties) and for transportation make contracts of employment with JSC “Lithuanian Railways”. It is, therefore, appropriate to consider the change in licensing procedures so that only cargo carriers would have to take out licenses, rather than industrial enterprises for their manoeuvring in access roads and yards or railway repair enterprises. Otherwise, when transportation is carried out by only one of the 24 licensed companies, it is natural that the sector will be negatively evaluated by the efficiency assessment methodology.

9. The rail transport market share of JSC “Lithuanian Railways” can be valued as a monopoly (all shipments are carried out by JSC “Lithuanian Railways”). However, it should be kept in mind that JSC “Lithuanian Railways” competes not only at international level (internal transportation is only a small part of the total freight traffic) but also with the road transport. In this competitive context the company shows comparatively significant results. Yet, the fact that JSC “Lithuanian Railways” charge levied for the use of railway infrastructure is one of the largest in Europe reveals the potential for economic inefficiency. However, for economy (customers) not the infrastructure charge is the most important but the carrier’s freight rate, which is not higher than the rates used in European countries.

10. The majority of rail network managed by JSC “Lithuanian Railways” is low loaded and the passenger transportation operation suffers large losses. On the other hand, those circumstances that at first sight could be considered as economic inefficiency have both, social and economic justification.

11. The availability of low-crowded stretch and unprofitable passenger services are needed in the context of regional policy. Consideration can be given to solve the question of passenger transportation by rail demand and subsidizing by including local governance in subsidizing regional routes (changing the legal base).

12. The key market entry barrier to Western operators is the difference between Russian and European gauge systems, which results not only as a gauge, but as differences in technological transportation schemes, vehicles, traffic management and automation. Western rail operators today lack the technical capacity to join the Lithuanian rail transport market. After having built RailBaltica to Kaunas and constructed an intermodal terminal (in which the containers shipped would be reloaded from one platform to other platforms or trucks or by rail brought trucks continue to further run by road), there would be a real possibility for this segment to be exploited by foreign operators.

13. The fee for the use of railway infrastructure in Lithuania is one of the largest in Europe. However, these fees are paid solely by cargo carriers, rather than from the national budget (as it is in the case of most Western European countries). In this respect, JSC “Lithuanian Railways” can be seen as an efficient railway company, since it is able to operate profitably, to maintain the railway infrastructure and the loss-making passenger transportation. Not the infrastructure charge but the freight rate applied by the carrier is the most important factor affecting Lithuania’s economy. In European countries the infrastructure charges are lower while the transportation rates are higher.

14. Infrastructure charges could also decrease if part of the infrastructure maintenance costs were covered not by JSC “Lithuanian Railways”, but from the state budget. However, in view of the fact that currently two thirds of all freight traffic is transit cargo from foreign (Eastern) countries, moving this burden on the Lithuanian tax payers does not seem justified. This would mean that the Lithuanian tax

payers at their own expense would have to maintain business operators from third countries (non-EU member states) that would carry goods in transit through Lithuania.

15. The infrastructure charge collected from busy stretches ensures stable maintenance of the network. Although the decision not to dismantle non-overloaded stretches is based on regional policy purposes, however, it is appropriate to consider a possibility to introduce an alternative transport in not loaded stretches.

16. The justification of both, separation and integration (holding or full integration) differs from country to country. Therefore, it is necessary to have a comprehensive economic justification before conducting structural transformations in JSC "Lithuanian Railways". There are no EU legal requirements introduced for structural adjustment of the current system. It should be noted that currently one of the major issues of the sector's efficiency – high infrastructure charges. These charges depend on the network maintenance costs so the potential structural changes are not likely to affect its size. The potential reduction in infrastructure charges should be based on the network maintenance cost analysis, the aim of which would be – to answer – whether the infrastructure is managed efficiently.

References

1. Asmild, M., Holvad, T., Hougaard, J. L., Kronborg, D. (2008). Railway Reforms: Do They Influence Operating Efficiency? Working Paper No 08–05. University of Copenhagen. 29.
2. Beria, P., Quinet, E., de Rus, G., Schulz, C. (2012). A comparison of rail liberalisation levels across four European countries. *Research in Transportation Economics*, 36(1), 110–120.
3. Calvo, F., De Oña, Ch. (2012). Are rail charges connected to costs? *Journal of Transport Geography*, 22(3), 28–33.
4. Cantos, P., Pastor, J.M., Serrano, L. (2002). *Cost and revenue inefficiencies in the European railways*. Instituto Valenciano de Investigaciones Económicas, S.A. 33.
5. Friebel, G., Ivaldi, M., Vibes, C. (2004). *Railway (De)Regulation: A European Efficiency Comparison*. Working Paper. Universite de Toulouse, 36.
6. IBM Global Business Services. (2007). *Rail Liberalization Index 2007*, Brussels.
7. Ivaldi, M., McCullough, C. J. (2006). Sub-additivity Tests for Network Separation with an Application to US Railroads, SSRN Working paper 528542. 24.
8. Ksoll, M. (2004). Integration of Infrastructure and Transport: an Assessment from Industrial Economics and Railway Perspectives. Presentation at the 2nd Conference on Railroad Industry Structure, Competition, and Investment North-western University Transportation Center, Evanston (IL., USA), October 08–09. 22.
9. Nash, C. (2010). European rail reform and passenger services – the next steps. *Research in Transportation Economics*, 29(1), 204–211.
10. Nash, C.A., Rivera-Trulijo, C. (2004). Railway Regulatory Reform in Europe, Principles and Practice. Institute for Transport Studies, University of Leeds.
11. Nash, C., Matthews, B., Thompson, L.S. (2005). *Railway Reform and Charges for the Use of Infrastructure*. Paris, ECMT.
12. Sánchez-Borràs, M., Nash, Ch., Abrantes, P., López-Pita, A. (2010). Rail access charges and the competitiveness of high speed trains. *Transport Policy*, 17(2), 102–109.
13. Wills-Johnson, N. (2008). Separability and Subadditivity in Australian Railways. *Economic Record*, 84(264), 95–108.