



RAILWAY TRANSPORT IN THE CONDITIONS OF GLOBALISATION

Gintaras Sinkevičius¹, Stasys Dailydka²

¹JSC “Lithuanian Railways”, Mindaugo g. 12, LT-03603 Vilnius, Lithuania
Email: g.sinkevicius@litrail.lt

²Vilnius Gediminas Technical University, Faculty of Transport Engineering,
J. Basanavičiaus g. 28, LT-03224 Vilnius, Lithuania
Email: geltr@vgtu.lt

Abstract. At the beginning of the new millennium, the system of global economy entered the new stage of changes. Structural changes that characterise the fields of global production and international trade affected the field of transport largely too. As the globalisation of international trade intensifies, the movement of resources and goods in international trade is facilitated in parallel. Transport is the ground for the formation of local and international market which assists in the development of market economy and which, along with trade, is influenced by the globalisation processes. In the field of railway transport, globalisation is associated with the development of railway network in the international space and building of transcontinental railway corridors in order to integrate global trade regions. Globalisation processes are of great importance to railway transport as railway transport is an alternative kind of conveyance for sea transport in the shipment of goods and freight in long distances. Railway transport plays an important role in the context of globalisation processes lately and becomes a serious competitor for sea transport. Railway transport services are in very great request when it is needed to convey freight of big value in big distances in a short period of time. In this case railways offer many advantages. The article also analyses the globalisation processes related with changes taking place in the global economic space, due to which new freight carriage tendencies form in global markets, global transport networks and logistics chains. This determines the unavoidable transformations in the railway transport service sector and the demand for them while servicing global markets and also increasing competition of railway transport sector as well as an attractiveness to the customers, which are using of railway transport services.

Keywords: globalisation, international, network, corridors, interoperability, freight, intermodal, market, cooperation, development.

JEL classification: F13, F68, L91, L92, O19, R40.

1. Introduction

The globalisation of the world economy and expansion of international cooperation, intensifying information transmission and communication processes have preconditioned the emergence of large international corporations. The integration of market economies at an international and inter-regional level is becoming the main element of economic growth (Freeman 2006). As such processes develop, transport becomes one of the catalysts of economic growth. With the expansion of geography of transport links globally, there is a need for a more intensive process of the exchange of goods between regions as well as for faster delivery of freight and goods. Developing cooperation and communication links encourage changes in the field of railway transport. Constantly improving information technologies and implementa-

tion of innovations inevitably impact railway passenger and freight transportation, which is reflected in the improvement of the information exchange between railway undertakings and logistics operators involved in transportation processes with a view to shortening the freight delivery time and providing high-quality transportation services to customers. It is very challenging to harmonise the freight transportation process in the global market because a railway transport connection goes through the territory of a dozen of countries, each of which has a different legal framework regulating the transportation of freight, different freight transportation rules, different technologies, and different technical parameters of railway infrastructure. According to the findings of comprehensive studies, in the global freight transportation chain, a very important role is played by the interconnection of railway transport links between

railway lines and their interconnection with other modes of transport, including a common chain of logistics terminals, which accumulates global freight flows into a common freight processing and distribution system. Ongoing globalisation processes in railway transport are vitally important for the railways and logistics companies of small countries. The consolidation of the international transportation market can worsen the competitive weight of small railway undertakings and their possibility to participate in global freight distribution processes. In order for small undertakings to survive in the market, they need to adapt to the global business environment and conditions dictated by it.

It should be noted that the article has been prepared on the basis of the personal experience of the authors in monitoring changes in the international railway transport business and participating in international cooperation activities and various international events. Events of this character are attended by high-ranked state officials and representatives of railway undertakings operating in the global network and of the business world, who discuss global business trends in railway transport in the conditions of globalisation. The personal experience of the authors of the article allows making assumptions in the assessment of globalisation on railway undertakings and simulating possible decisions, especially those related to the integration of small-sized undertakings in global railway and business networks while raising the level of internationalisation.

The issues of globalisation raise many discussions recently. In scientific literature, the merging of railway undertakings and logistics companies into an integrating formation helping them to achieve a high level of economic efficiency and competitive ability in operating in the global market has been mentioned increasingly often. The comprehensive studies performed speak to the fact that the result of the activities of railway undertakings is determined by the coordination of freight transportation activities and distribution of freight in the global logistics chain and strict optimisation and planning of transport flows as well as by the sustainable development of international railway corridors with regard to the dislocations of raw materials and goods consumption within the global environment (Harman 2004).

With reference to the results of the studies carried out by the authors, it can be stated that changes in the global environment encourage businessmen, railway transport undertakings, logistics companies, and research institutions to look for new solutions and common contact points helping to resolve freight transportation problems

and overcome obstacles, to identify bottlenecks between different regions of the world and to find ways helping to attract a bigger portion of the transportation of goods to railway from other modes of transport. Recently, the topic of the development of railway network and transport connections by integrating European and Asian railway networks deserves growing attention. Intensive discussions go on the establishment of a common system of the railway network and corridors of the Eurasian region. This topic is dealt with in the works of the researchers F. Pekhterev (Ф. Пехтерев 2011), U. Sahbaz (2014). The authors consider the problems in integrating the railway lines of different countries into a common international network of railway corridors and discuss solutions relating to the optimisation of a continuous process of the transportation of passengers and freight by railway while strengthening the positions of railway transport in the global market of transport services. As the railway network is developed in the global environment, realistic preconditions arise for the development of global supply chains, which include the consolidation of freight transportation flows, logistics services, and railway infrastructure capacities into an integral trade artery. The re-discovered New Silk Road is one of the most significant examples in this area (Frederick 2010). This freight transportation route has long been known as a convenient freight transportation method, which connects freight flows of separate countries. This solution creates added value for railway undertakings operating in the global environment as well as for transit states through whose territories railway corridors pass. Each transit state tries to create an intermediate logistics point in the global logistics chain in order to attract additional freight flows. It is one of the most important elements of the integration of transit states in the global logistics chain and a method to adapt to the circumstances of the global market.

In the context of the consolidation of Eurasian railway transport capacities, the possibilities to establish a business model of jointly operating railway transport companies is considered (Translogistics Kazakhstan 2013; Macheret (Мачерет 2012)). The advantages of the activities of railway transport companies in accordance with this model are based on the coordination of joint activities, use of common information systems and programmes, harmonised railway rolling stock and train traffic control and use, freight transportation process planning and coordination, maintenance of a common freight transportation tariff polity, maintenance of a coordinated investment policy, etc. (Wyman 2014). The detailed analysis of the

literature suggests that the unification of business capabilities in the global market provides railway transport undertakings and freight carriers with a competitive advantage, which manifests itself in the implementation of a uniform strategy for the implementation technical standards and innovations and a uniform technical policy (Lapidus (Лapidyc) 2012; Wojewódzka-Krol 2011). The harmonisation of these characteristics provides railway transport with strategic advantages in the aspects of functionality, operating efficiency, and technological flexibility. It should be noted that the Eurasian region has several dominating railway gauge systems that operate in separate regions and each of them differs by its physical, technical, and technological parameters, which hinder the harmonisation of the transportation process in the global environment and hinder integrating the transportation process, from a technological point of view, in a common Eurasian railway network as an integral railway system. This task is addressed today by states, railway undertakings, and research institutions. In addition, it is sought to achieve a high competitiveness level of the railway transport sector by pursuing a consistent railway transport sector management policy helping to develop transport facilities and integrate them in common global economic activities.

When the forming in the global environment the network of railway corridors crossing the territories of different countries, it is important to achieve the integrity of railway infrastructure and technical parameters as well as of traffic safety requirements throughout the entire length of the corridor. Therefore, the degree of integrity of individual countries is highly dependent on the country's determination to adapt to the jointly developed global system of railway corridor parameters allowing integration in the global logistics chain and forms conditions to connect to global transport links and railway transport flow planning as well as to train schedule matching systems. Organisations for economic cooperation forming in the global environment, for example, EurAzEC – the Union for Customs and Economic Cooperation of Russia, Kazakhstan, and Belarus, create preconditions in the market of railway transport services for the emergence of integral shipping and logistics companies, which operate in an common chain of transport and logistics services, while synchronizing their actions throughout the freight transportation route and coordinating processes of the transportation and distribution of freight flows within the global network. Based upon observations of events related to economic cooperation in the post-Soviet space, it can be assumed that the emergence of EurAzEC will strengthen the coor-

dination of processes of economic cooperation within the whole space of the CIS member states and, in respect of railway transport, within the space of the 1520 mm railway gauge system.

2. New development trends in international trade and their impact on the development of railway transport

Globalization processes involve most active freight transportation markets. Recently, much attention is paid to the transportation of freight between Asia and Europe. The situation when a major part of goods is manufactured in China, while the main consumption and sales market is in Europe resulted in the formation of flows of freight and goods of the Eurasian continent. These trends became the cause of the gradual formation of railway corridors. At present, trade volumes between Europe and Asia amount to around USD 700 billion. The Asian region accounts for around 60% of the world's manufacture and generates around 40% of the whole world's trade volumes. It is forecasted that by 2015, trade volumes will increase to USD 1 trillion (New Silk Way, November 2013).

China has been demonstrating a rapid growth in international trade volumes. Its main trade partner is the region of the European Union and markets of the EU Member States. Recently, China has been implementing the goals of the united transport strategy based on the so-called principle of the Great Leap, which are related to shifting China's manufacturing capacities and their relocation closer to the western border of the country and correspondingly forming the required infrastructure of transport and logistics services. It is a natural move in order to create an effectively operating system of the transportation of goods and freight using convenient transport links. China calls this economic development programme "Go West" and carries out intensive activities for its expansion in the context of long-term prospective. Moving from the east to west along the freight and goods traffic corridor, an important role is played by Kazakhstan, which is a significant point of accumulation of freight between Asian and European regions. The geographical location of Kazakhstan allows utilising the potential favourable to the development of transit services and provide logistics services in distributing freight flows crossing the territory of Kazakhstan. The Kazakh state invests heavily in the improvement of transit services infrastructure, consolidating freight delivered by all modes of transport within a single area and transships a major part of them, which is bound for Europe, onto railways. Therefore, Kazakhstan has a

distinctive competitive advantage compared to other neighboring countries.

In speaking of the increase of the production potential in the Asian region, it is also necessary to mention steadily growing Indian industrial capacities. This process goes on owing to heavy U.S. investments, which allowed strong growth in Indian production and export of goods. Annual Indian exports to the U.S. account for 9-10 % (Vektor Kaspiya (Вектор Каспия) 2013). Kazakhstan becomes an important link for Iran. A railway corridor connects Kazakhstan with Iran, the Persian Gulf, and the Indian Ocean. This link allows connecting freight flows delivered by ship to the ports of the Indian Ocean and moving them towards Europe by land. In this way, Kazakhstan becomes a kind of satellite of transit and logistics services, which can attract freight flows moving in various directions and create a respective optimal railway network uniting global freight markets and global transport networks into an integral whole.

3. Contemporary events in the development of logistics: challenges caused by globalisation processes

As the freight transportation market becomes global and international transport networks expand, logistics are assigned an important role. Support points of logistics in the global freight transportation chain play an especially important role. When large-capacity railway transport corridors have formed, there appear potential freight flows moving between different places of the world. Freight flows are distributed with regard to the needs of consignors and consignees as well as to the disposition of raw material production and production sites. Directions of the movement of freight and goods as well as trends of cooperation between customers and suppliers form demand for freight distribution and storage services that respectively forms preconditions for the establishment of logistics terminals in international or undercrossing global railway corridors, which are usually established at crossing points of freight flows circulating within the global network.

In order to enable effective organization of the movement of freight flows, logistics terminals should operate within an integral information system controlling the movement of freight flows. Therefore, a very important role in the global logistics chain is played by information technologies, which help to promptly process and manage large-volume freight flows and in the virtual environment in real time. Logistics terminals form one of the main integral parts of railway transport corridors, determining the competitiveness level of the railway corri-

dors and their attractiveness for business and also determining the integration of such corridors in the system of global transport networks.

Therefore, in speaking of the disposition of global transport networks, it should be noted that each transit country tries to join the global network of logistics terminals, which creates further added value to that transit country. Consistent train traffic and freight transportation planning, which is also arranged in a coordinated manner, is very important in the global logistics chain. A high level of the transportation process control allows achieving the reliability of services by very strictly controlling the freight transportation process at each stage of transportation.

Companies operating in the global market pay especially big attention to the disposition of logistics terminals in the global freight movement network and, according to that, form convenient transport links between different modes of transport seeking as high reliability of transport links and as high matching of transport movement schedules as possible. Such companies can easily and without difficulty carry out monitoring and distribution of freight movement in global networks and manage the freight transportation process from a single coordination center.

This business model helps the company to earn customers' confidence and ensure a high level of the provision of services, and also forms preconditions for consolidating its competitive positions in the global environment. This business model has been applied by the German transport and logistics company DB Schenker. This company has great experience in the global freight transportation market. It should be noted that small-sized logistics terminal operators or those operating in national markets are not able to offer such a level of services and often lose the competitive battle for freight flows and have no influence to participate in the global freight distribution process.

Small-sized logistics companies have to adapt to the business environment formed by logistics companies operating in the global logistics chain. In particular, a global logistics operator can offer a lower freight delivery cost because intermediaries participating in the transportation process, who seek to take their profit share from the total transportation margin, which eventually increases the freight delivery cost for clients, are eliminated from the scheme (Karasyev (Капачев) 2008).

4. Globalization and railway gauge systems

The most important condition ensuring the highest train speed in transcontinental railway corridors during their formation is the interaction of the

railway corridors in different geographic areas and their technical compatibility, allowing the trains to transport goods over long distances without stopping and with minimal time costs. A corridor integrity from the technical and technological aspects can be attributed to the compatibility term. Existing differences in technical parameters compels the railway operators to perform additional actions during the freight transportation process, for example - to trans load the freight from one gauge wagons to another gauge wagons, change a locomotive at the border crossing point, renormalize the freight transportation documents, perform maintenance etc., and these actions eventually lead to the increase in freight delivery time and costs (Пехреп 2013). Speaking about Eurasian transportation it should be said that different railway gauges exist both in Europe and Asia. A railway gauge system of 1435 mm width predominates in the European region, while a railway gauge system of 1520 mm width predominates in the CIS countries. Besides the differences in railway gauge width, a number of differences in other parameters exist as well, for example - traffic safety and alarm systems, axle load amount, track characteristics, different freight and passenger transportation rules and legal base. These differences are fundamental, they define the geographical, organizational and legal dependence of railway system activities. In the global railway transport area, each of these systems constitute separate areas of 1435 mm and 1520 mm railway systems, where dominant players of freight railway transport market have formed. The 1520 mm area is dominated by Russian railways, while the 1435 mm area is dominated by German railways. These companies control most of the freight railway transport services market and thus have a big influence on freight flow distribution, freight transportation rates, freight wagon traffic etc. As a result of this, the railway areas are relatively divided into separate territories that make up the "1435 mm railway system's area" and the "1520 mm railway system's area" which play an important role as an instrument for realizing geopolitical, geoeconomical policy and institutional cooperation - this instrument is used by big countries of the world, such as Russia, in order to develop economic ties with the European Union. In this case it should be noted that the 1435 mm gauge system is represented by the European Union, while the 1520 mm railway area is represented by EurAsEC - the newly formed customs and economic cooperation union of the CIS countries. This union, like in the EU, applies equal legal framework compatibility provisions regarding the economic and customs area. In the future, this formation will gain greater political weight, allow-

ing it to negotiate with the EU like equal in all global areas of economic cooperation, including railway transport, and helping Russia to seek economic benefits (RailwayPro 2013).

Railway transport companies that operate globally are looking for common agreements, in order to facilitate freight transportation between Europe and Asia from the technological and technical aspects. In order to solve these issues, effective solutions must be used, such as the influence of the international railway organizations OSJD (International Organization for Cooperation of Railways), UIC (International Union of Railways) which, operating globally, tackle various issues regarding the unification of freight transportation documents, establishment of uniform safety requirements, creation of common technical characteristics for railway corridors etc. Later these decisions are moved to the transnational level, trying to turn them into political resolutions or agreements, connecting different historically developed railway systems into one railway system that operates in the Eurasian area. With intensifying cooperation and increasing production and trade between the railway systems, the Western technology is gradually being supplied to the area of 1520 mm railway system. Such tendencies, without a shadow of a doubt, will compel both systems to move to a unified technical standards system, to establish unified railway production certification requirements. Political agreements are also being sought which could draw both railway areas closer together in order to achieve the common goal. One example of this is the Russian proposal to the European Union to lay the 1520 mm gauge to the city of Vienna in Austria, extending the wide gauge from the city of Košice in Slovakia to Bratislava, and later to Vienna. The arguments for such a decision are related to the fact that the costs of transport services when carrying freight from China to Europe could decrease by 20% to 50%, and there would be no need to transload the heavy cargo containers from one gauge onto another. The freight delivery time would be 15 days (Пехреп 2013).

5. Modern containerization: needs, opportunities and outlook under the conditions of globalization

With the increasing volume of trade, containerization (i.e. cargo transportation in containers) is increasing as well. Railway transport is intensively being integrated into the transportation flows between China and Europe. This railway transportation mode is a business niche that is not yet fully tapped. Freight transportation by railways has great potential. The Eurasian area sees the pro-

cesses of joining forces and establishing joint companies that are capable of servicing large amounts of freight containers which go from China to Europe. The goal of such companies is to draw the flows of freight containers from sea transport to railway transport, to synchronize the freight transportation and logistics processes into one system, and to concentrate the freight transportation flows to separate railway corridors, thus achieving a synergistic effect. According to experts, after establishing the unified railway freight and logistics companies, the amount of freight container transportation could be increased by around 30 % (Trans-Logistics 2013).

The main advantages of an integrated railway company are related to the consolidation of marketing activities, joint use of freight wagons, use of unified information technology systems, coordinated organization of the container loading and unloading works, joint chain of logistics terminals. The activities of an integrated railway company are related to the unified organizational process and interaction with railway infrastructure. When organizing train traffic, it is important to properly allocate resources and plan a train schedule for the whole route, in order to minimize time costs in the train route. The advantages of a unified railway company are the following:

1. Favorable conditions for reorienting some transit freight flows from transoceanic routes, which usually use long-distance ships, to alternative railway transport routes and creating land freight ports.
2. Formation of international railway transport corridor system that could ensure a stable interaction between the largest centres of global economic activities generation.
3. Formation of a unified railway transport corridor system, connecting parts of national railway networks of individual countries, integrating them into a joint railway corridor system or making them a connection of separate railway standard systems.
4. Creation of a flexible freight transportation and infrastructure tariff system, applying a same-level tariff amount throughout the whole section of a corridor, organizing multimodal and combined transportations.
5. Simplifying the border-crossing and customs procedures when crossing the borders of states with different legal bases, coordinating the border-crossing and customs technological systems with controlling state institutions, in order to expedite the freight and passenger border-crossing procedures and to shorten their transportation time.
6. Creating a unified chain of logistics terminals that operate under the same standards which would

be harmonized for a joint infrastructure in the international railway corridor network.

7. Creating a joint system of global logistics consisting of individual elements of the logistical chain, thus creating a quality intermodal transportation product.

8. Implementation of a joint legal system, advance freight transportation document declaration and a joint bill of lading CIM/SMGS.

9. Accurate and effective establishment of a periodicity and trips for shuttle trains, achieving the customers trust of such a service type.

10. Improvement of cooperation between international partners, establishment of joint companies and development of internationalization.

One example of a unified transport and logistics company is an associated transport company established in 2013 by the state railways of Kazakhstan, Russia and Belarus (hereinafter - ATLC – Associated Transport and Logistic Company). This company was established in order to exclusively organize the railway transportation of freight containers between China and Europe. The heads of the three states' railway companies collectively decided to organize a regular traffic of shuttle container trains between China and Europe according to an established schedule. Such a project is considered to be an example of innovative solutions in the field of global railway transport services.

It should be emphasized that a unified transport and logistics company is created in a unified economic area and will operate in the territory of EuRazEC - the joint customs union of the CIS states. According to calculations, the ATLC company will be able to ensure a fast freight delivery on the route of Chungking (Central China) - Duisburg (Germany), lasting 16-17 days instead of 45-60 days which are needed to transport freight by sea transport. Simplified conditions for passing through the territory of Kazakhstan, Russia and Belarus will be applied for the trains operating in the unified customs and economic area, since customs checks at border points will not be repeatedly performed and the freight will be transported under equal rules. Having a greater negotiating weight, the ATLC company will be able to negotiate more easily with the railway companies of China and Europe regarding a coordinated development of railway infrastructure in the border areas, as large freight flows usually concentrate there.

There are strong arguments in favor of creating the ATLC company, that will help attracting more customers to use its services. The freight from China to Europe is expected to be transported in compliance with the highest requirements for traffic safety, the trains should run without delays under a strictly controlled schedule, they will be

able to offer a competitive freight transportation rate, freight protection and freight tracking by using the satellite tracking system, a coordinated policy for developing the railway corridor and implementing the technological and information technology equipment will be exercised, unified standards for formalizing the freight and customs documents, as well as a fast freight processing in the logistics terminals, will be used, and problematic issues will be operatively resolved at the inter-institutional level of EurAzEC (Харламова 2007).

A conclusion can be made that, after the launch of such a company, the railway corridor potential will increase, the traffic will grow, logistics terminals will be established etc. A launch of such a company in the global network of transport and freight services will give a positive impulse to the freight railway transportation sector. Freight transportation operators expect a maximum flexibility from this company, the quality of customer service should increase.

However, in summary it should be noted that the creation of similar companies can radically change the situation for small carriers. Small railway undertakings will not be able to compete because they do not have an equivalent leverage to offer lower rates, better service quality and flexible cooperation conditions. It goes without saying that for small companies it will be much harder to attract freight flows to alternative routes, since smaller market players will not be able to offer adequate freight transportation conditions. Such consolidation processes can eventually negatively affect the freight transportation market due to the formation of monopolistic conglomerates which might worsen the conditions for bilateral cooperation with the smaller participants of the market. After the formation of the CIS economic cooperation union, difficulties may arise in directly addressing business relations with a member of the economic union, for instance with Belarus or Kazakhstan (Ладвищенко 2011).

The establishment of the ATLC company will increase the activities of freight transportation from China to Europe. However, this company will become a monopolistic conglomerate which will influence the distribution of freight flows throughout the whole 1520 mm railway area. It is not clear of what will be the situation of other, smaller railway undertakings operating in this area and what possibilities to participate in the global transportation process will they have and whether they be competitive. The ATLC goals will be difficult to achieve because small companies are limited by financial resources and insufficient capacities. The technology issue becomes very relevant as well. In case of insufficient level of technological development,

they will struggle to integrate and adjust to the advanced or high technological solutions in the global railway corridor network.

The activities of the ATLC company is identified with the activities in the unified economic area EurAzEC - it improves competitive positions of certain states in the context of the global transport services market. Having a political weight and competitive edge, the ATLC company will be able to implement a successful expansion throughout the whole 1520 mm railway system area. This will occur through the following key criteria: development of international transport corridors in the territory of the unified economic area EurAzEC, offering of complex freight and container transportation services on the basis of One-Stop Shop, significant competitive advantage by offering large business volumes compared to equivalent and alternative leaders of the business sector, unified position in negotiating with China and the EU, joint control of the unified economic area's transport assets, freight delivery time and cost reduction by optimizing the traffic movement schemes.

To sum up it can be said that significant economic changes are expected after implementing the concept of the joint transport and logistics company. The economic returns of the joint and co-operated transport logistics company will reflect in the increase of GDP for the countries that generate raw materials and freight, that consume the goods, and that transport and distribute the freight and goods. A significant added value will be shared by railway transport companies, logistics companies, the owners of freight wagons and other segments which participate in the transportation chain. But the end-user will benefit the most, who will be able to get a quality service for a affordable price and a fast freight delivery in the global delivery market.

6. Effects of globalisation processes on the development of railway transport in the EU economic area

Intensive changes are going on in the region of the European Union in the context of globalisation processes too. As the regulations of the White Paper of the EU Transport Policy are implemented, it is aimed to create the single EU transport area and join the transport networks of the EU Member States into the single TEN-T network. The objective is to join remote EU territories by transport links and to establish the railway corridor network that would be adapted for freight transportation. The freight transportation requirements are laid out in the Regulation concerning a European rail network

for competitive freight No. 913/2010/EC. The Regulation defines the requirements for the technical, technological and administrative parameters of the corridors. The Regulation also provides for the mandatory condition that logistics terminals should be established in the frame of the corridor, which would form the unified chain of logistics.

While creating the single EU railway transport area, a significant priority is granted to scientific research and innovation implementation, paying special attention to the implementation of the joint system of technical standards that aids in the improvement of the railway system functionality, enhancing of the railway line capacity and reduction of railway transport running costs. A number of measures are targeted at the environment protection, rational use of natural resources saving electric power, cutting the amounts of toxic exhaust CO₂ emissions to the environment, and implementing technologies setting economic train traffic modes. The implementation of these measures is closely related with the EU industry which manufactures production for the railway transport. Technical, technological and innovative solutions are accepted in parallel with changes dictated to railway transport by customers and business environment. The implementation of measures of wide range in the transport field is laid out in the EU framework programme Horizon 2020. Railway transport is one of the composite parts of the programme. Respective solutions are searched for increasing the competitiveness and efficiency of the railway transport sector. One of them is the Shift to Rail programme. The programme is exclusive by the fact that purposive scientific work and innovation application projects are funded using the means of the EU financial funds on the EU Member States level; it is aimed to unite scientific institutions, universities, research institutes, manufacturers of railway transport production, certification centres and to establish the European Rail Research Advisory Council (ERRAC). After uniting scientific, business and manufacturers' efforts, the Council will search for effective solutions that will assist in the consolidation of railways in the EU transport service market and obtaining of its bigger share in the transport service market in future.

In the context of globalization processes, the European Union aims to introduce the unified European Railway Transport Management System (ERTMS) along with the development of railway corridors network. The system would operate in the entire network of the main EU railway lines, which would enable to improve the competitive ability of railway transport by eliminating the still existing nonconformities in railway networks of the EU Member States. In this way the prerequisites for the

formation of the single EU railway network appear, and at the same time it is aimed to create the unified train traffic control. This circumstance is not a good solution for national railway infrastructure managers, as in this way national infrastructure managers are deprived of autonomy while establishing train traffic priorities. The priority right will be determined for carriers operating in the common EU network, and national carriers will appear in the second plan from this point of view. Therefore, as the single EU railway transport network is developed, the question of technical parameters and interoperability of railway networks appears, which is the main obstacle in the creation of the single EU transport area.

The concept of technical interoperability appeared in the field of railway transport from the beginning of implementation of the EU legal acts regulating the compatibility of railway transport in the unified EU area and market. As we know, a big variety of railway systems exists in the territory of the EU, the technical parameters of which are hard or completely impossible to harmonise. For example, the EU territory encompasses the Baltic States and Finland, where the system of the wide 1520 mm track gauge is used due to historical circumstances; in principle, it is impossible to harmonise it with the European 1435 mm track gauge system dominating in the EU Member States.

The definition of interoperability as a term of railway transport field is presented in the EU Directive No. 2008/57/EC, which is also called the Interoperability Directive. The main provision of this legal act is that railway subsystems (infrastructure, rolling stock, signalling equipment, road safety requirements) should allow the safe and uninterrupted movement of trains that would comply with the technical, running and legal conditions in the trans-European TEN-T railway network.

Changes of the railway transport system and the appearance of the technical interoperability oblige all EU Member States to make amendments in national legal acts regulating railway transport activity, which would provide for the introduction of legal, administrative and technical corrections.

The biggest economic benefit from the results of implementation of the Technical Specifications for Interoperability (TSIs) should be enjoyed by the manufacturers of railway transport production or system installers, who are active lobbyists. Several of the most active organisations are the Association of the European Rail Industry UNIFE, European organisations creating standards and technical norms CEN and CENELEC. It would be hard to evaluate the usefulness and economic effect of technical specifications implementation. Each state should calculate how much the adjust-

ment of national systems in order to harmonise them with the created EU systems would cost. Funding from the EU support funds is allocated for the implementation of the systems. It is evident that the single railway transport system should operate in the unified EU market, which would meet the needs of all EU people and business entities. This is why it is aimed to create the unanimously functioning European transport network on the basis of the system of uniform standards.

As the EU transport infrastructure is developed intensively, air pollution and negative impact of exhaust gas on the environment is faced. It has been established in scientific research that up to 62 % of the total amount of oil production will be used for transport needs until the year 2050. It is forecast that CO₂ emission will grow up to 170 % in the global environment (International Transport Forum 2014). These tendencies will make a negative impact on the life quality of people and increase the pollution of nature. In order to avoid the consequences of these negative processes, efforts are made to transfer the greater part of transportation services to railways.

With the development of transport links, the need appears to increase the interaction of transport modes by integrating all transport modes into one system, i.e. to encourage intermodality. In freight transportation process, it is very important to use each transport mode effectively and with lowest possible losses, making the choice on the basis of the transportation distance, time consumption, present transport infrastructure and transportation conditions. In this way cooperation among aviation, railway, road transport and waterborne transport is encouraged. However, despite this fact, special attention is paid to the railway transport as to one of the most ecological transport modes in the EU area.

7. Conclusions

- While the tendencies of international growth of economics are observed, integration and transformation changes are unavoidable in the global railway transport sector. Intensive processes of growth in the volume of goods exchange and freight transportation occur in the Eurasian region. Railway transport is becoming one of the key transport modes which enables efficient freight transportation in long distances at a reasonable price. Railway transport must adapt to the forming business environment and satisfy the contemporary transportation service and customer's needs.

- Logistics plays an important role in the global freight transportation chain. Logistics terminals are basic freight distribution points that determine freight distribution tendencies in the global railway corridor network. Transit countries have a huge potential in the development of logistics services and generation of added value. Logistics companies of small states have to adapt to the formed external business environment in order to participate in the integrated activity model of transport and logistics services.
- Two dominating track gauge systems exist in the global railway service sector. The system of 1435 mm track gauge prevails in the European region, while the wide or 1520 mm track gauge system is used in Russia and the entire area of the CIS Member States. The sector of railway systems is divided into two spheres of influence in which different technological, technical, organisational and legal parameters exist. These systems should be harmonised in the Eurasian transportation context. The compatibility of railway systems is determined by the technical interoperability characteristics and level. Each of the railway systems makes an impact on processes of business freight transportation by railways and the positions of railway undertakings in the global market of carriage services as well as their possibilities of integration into the global railway transport corridors. This aspect is vitally important for transit countries as, having flexible possibilities of technical interoperability and compatibility of railway systems, a country may participate in the global transportation process easily; still, it risks to lose the necessity of the carrier for ensuring transit transportation inside of the country. Railway system interoperability issues are solved via technical compatibility platforms operating in international railway transport organisations.
- Containerisation, i.e., transportation of freight in containers, increases with the growing volume of trade. Railway transport is integrating into transportation flows between China and Europe intensively. This kind of freight transportation by rail is a business niche that has not been used fully yet. Container transportation by rail has a good perspective. Processes are observed in the Eurasian area that capacities are united and associated companies are established, which are able to service large amounts of freight in containers transported from China to Europe.

- Associated transport and logistics companies that emerge in the global market obtain a huge competitive advantage against small-sized companies. Associated companies operating in the global market may offer flexible freight transportation conditions, low freight transportation tariffs, and high handling service level. The example of an associated transport and logistics company exists in the global market already – it is the Associated Transport and Logistics Company (ATLC) of Russia, Kazakhstan and Belarus. The impact of this company may aggravate the activity of small-sized railway undertakings as they will have to adapt to the business rules dictated by the dominating players of the market.
- Globalisation processes manifest in the EU by the implementation of aims of the single EU transport area and unified EU transport network TEN-T. As the regulations of the unified transport network formation are implemented, the policy of technical interoperability, innovation and application of new technologies is implemented at the same time in order to achieve the higher competitive ability of railway transport and to reduce the harmful impact of transport on the environment.

References

- „Trans-Logistics Kazakhstan“, No. 2, 2013.
- Challenge 2050. 2013. *The rail sector vision. International Union of Railways (UIC)*, Feb. 2013.
- ERTMS implementations benchmark. 2009. Final report. International Union of Railways (UIC).
- Eurazijos Sąjunga: iššūkis Europos Sąjungai ir Rytų partnerystės valstybėms. 2012. VŠĮ „Rytų Europos studijų centras“, 2012, Vilnius.
- Frederick, S.; Kuchins A. 2010. *The key to success in Afghanistan: A Modern Silk road strategy*.
- Freeman, B. 2006. People flows in globalisation, *Journal of economic perspectives*, 20(2): 145–170. <http://dx.doi.org/10.1257/jep.20.2.145>
- Harman, R.; Bolden, T. 2004. *Realising the New Opportunity for the Railways*. Oxford: Blackwell.
- Macheret, D. 2012. *An innovative and competitive transport product. Russia–EU cooperation*. Scientific Seminar. Russian Railways Joint Scientific Council, Moscow (VNIIZHT).
- New Silk Way. 2013. *International bussines magazine*. November, Kazakhstan, Astana.
- Proposal for a EU coordinated approach to R&I in the rail sector under Horizon 2020 in support to the completion of the Single European Railway Area. 2013. European Commission.
- Rothengatter, W. 2009. *Railway Gazette International* (10): 39–45.
- Russia resets its objectives. 2013. „RailwayPro“. *The railway bussines magazine*. Jan. p. 19-29.
- Sahbaz, U. 2014. *Black sea trust for regional cooperation*. On Wider Europe.
- Towards a Single European Railway Area. 2013. Union of European railway undertakings and infrastructure managers (CER).
- Van der Meulen, R. D.; Möller, L. C. 2006. *Railway Globalization: Leveraging Insight from Developed- into Developing Regions, Proc. 7th World Congress Railway Research*, Montréal.
- White book, policy of European transport 2010: time to decide (2001). Brussels, COM.
- White paper on Roadmap to a single European Transport area – Towards a competitive and resource efficient transport system. European Commission. Directorate for mobility and transport. March. 2011. Brussels.
- Wojewodska-Krol, K. 2011. Koleje duzych predkosci w Europejskiej polityce transportowej, *Problemy Kolejnictwa – zeszyt* 153.
- Wyman, O. 2014. *Study on the business case in railway transport*.
- Карасев, В. 2008. *Глобализация рынка транспортных услуг и транспортно-логистических систем в мировой экономике, автореферат диссертации, Москва/ Globalisation of transport and logistic services in the world economy system, summary of Doctoral Thesis, Moscow*.
- Ладвищенко, В. 2011. *Транспортная политика Европейского Союза, автореферат диссертации, Санкт-Петербург/Transport policy of European Union, summary of Doctoral Thesis, Sankt-Petersburg*.
- Персиянов, В. 2012. *Роль железнодорожного транспорта в глобализации международных транспортных коридоров/A role of railway transport in the globalization of international railway corridors*.
- Пехтерев, Ф. 2011. *О первом этапе разработки концепции развития сети железных дорог с шириной колеи 1520 мм. Бюллетень объединенного ученого совета ОАО «РЖД». №1, 2011/Bulletin of associated scientific center of JSC “RZD”*.
- Пехтерев, Ф. 2013. *Современные подходы и принципы формирования железнодорожных международных транспортных коридоров*. Евразия Вести. 04.2013. Москва/Modern approaches and principles on establishment of international railway corridors. EurAzia Vesti, Moscow.
- Пространство 1520: формула роста в системе экономических и торговых союзов. Аналитический доклад. Бизнес Диалог, 2012. «Вектор Каспия», ноябрь 2013;
- Харламова, Ю. А. 2007. *Геоэкономические перспективы российского железнодорожного комплекса// Безопасность Евразии. № 2. 2007*.