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## Article

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# The Importance of the 1520 mm Gauge Rail Transport System for Trans-Eurasian International Trade in the Exchange of Goods

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## Abstract

The article presents the importance of a specific rail transport system in the logistics service of cargo transported between two generators of international trade in goods – China and the European Union. Using selected operational data relating to the railway systems of several countries (including Belarus, Kazakhstan, Latvia, Russia, and Ukraine), it indicates the great economic importance of the *1520 Space* – an area dominated by broad-gauge infrastructure. Beyond the comparative aspect, and against the background of the influence and importance of railways for the economy, it presents the scope and costs of investments that are necessary and desirable to ensure the efficiency and optimization of goods flows. The study covers the growing share of Trans-Eurasian container transport in the volume of cargo handled using the *1520 Space* rail infrastructure, which is a key link in Trans-Eurasian supply chains and of which the Russian railway system is an essential component.

**Keywords:** Trans-Eurasian rail transport of goods, international railways exchange, *1520 Space*, transport infrastructure

**JEL:** N70, O57, R41

## Introduction

The development and improvement of transport communications is one of the priority areas of a modern economy. Throughout the world, railways were a key innovation during the Industrial Revolution, fostering the integration of national and international markets (Keller and Shiue 2008, p. 38; Donaldson and Hornbeck 2013). In general, more railways and larger rail networks tended to point to greater economic growth as a result of increased trade and a greater degree of economic integration (Caruana-Galizia and Martí-Henneberg 2013, p. 169).

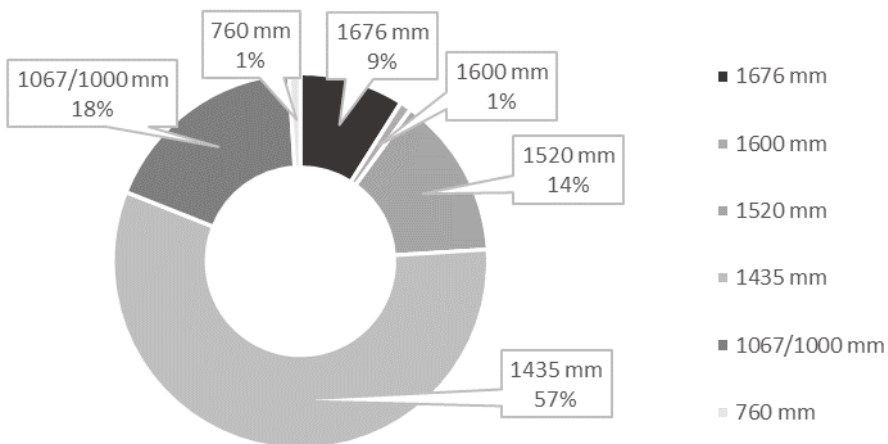
In the Western world, the construction of new railways was mainly for economic reasons, including the need to develop newly acquired areas. In Russia, the economic factor remained significant, but it was primarily the need to integrate new parts of the empire with the “continent”, often perceived as including the region in the military control system, which contributed to the construction of new transport connections, especially railways. The Western world witnessed the biggest boom in history – the railroad boom, a genuinely revolutionary element of the Industrial Revolution (Drucker 1999, p. 50). Over the past two hundred years, the railroad has created change equivalent to that over the past several millennia. Up to now, the railroad has played an important role in developing modern civilization, and has contributed greatly to bettering humankind and making human existence easier (Matusitz 2009, p. 455).

Transport in any country serves as the material basis of the social division of labor, carrying diverse connections between production and consumption, industry and agriculture, mining and manufacturing industry, economic regions and population. It affects the whole process of expanded reproduction, the duration of the production cycle, and inventory (raw materials, fuel, warehouse capacity and the base), and it has an effect on the establishment and development of clusters. The quality of transport determines not only the economic situation of the transport, but also the efficient functioning and development of all other sectors of the economy (Gadelshina and Vakhitova 2015, p. 247).

The impact of railway construction is the location of the routes and corridors. However, decisions and reasons concerning where to build railways are not always determined purely by demand, as confirmed by numerous cases studies. For example, Durranton and Turner (2012) demonstrated that railways in the United States were built where land and labor were cheap, not where they were necessarily needed. Mojica and Martí-Henneberg (2011) found evidence that the construction of railways in Spain was rarely driven by demand but more by a perceived need to connect political and administrative capitals. For the countries included in the *1520 Space*, rail transport is a key component of the logistics system that supports economic processes. And in the case of Russia, rail transport is not only an integrator and a tool for internal economic activity. It is also an instrument of the implementation of economic policy by the state authorities in international terms, including competing with other economies. It often helps to create new solutions aimed at limiting the flow of goods when those flows are considered harmful from the point of view of the Russian *raison d'état*.

## Comparative indicators of rail transport system in selected countries of the 1520 Space

The railway transport system of the Commonwealth of Independence States, Ukraine, and the Baltic states operates on the basis of the 1520 mm track gauge infrastructure. The difference between this track gauge and that of neighboring countries is an obstacle to the efficient logistics handling of international exchange, but it is not a factor that only occurs in the post-Soviet space. Track gauge is the inner distance between the rail tracks and is normally measured in millimeters. A break-of-gauge happens along a route where there is a difference in track gauge between one network and the other, and as a result, the rolling stock of one gauge cannot ply over the other. The break-of-gauge usually happens at international borders when a train moves from one network to another, but it can also happen within a country if the rail network within that country has different track gauges. Around the globe, most of the railway network is built on the six gauges shown in Figure 1, from 1000 mm to 1676 mm.



**Figure 1.** Share of the infrastructure of individual track gauges in the global rail network

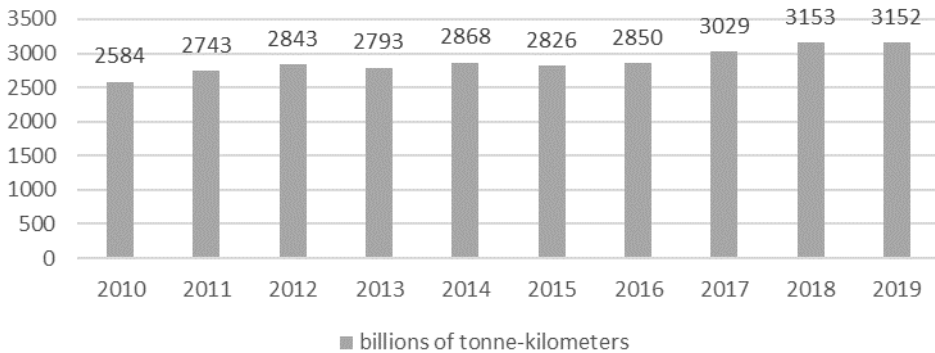
Source: *Monograph Series...*, n.d., p. 10.

As Figure 1 shows, 57% of the global rail network is on standard gauge (1435 mm), e.g., Europe, the United States, China, and Iran, while 1520 mm infrastructure exists on 14% of the global rail network. It includes all fifteen former republics of the Soviet Union and Mongolia. Additionally, Finland's rail infrastructure is based on a track gauge of 1524 mm, which technically includes it in the broad-gauge *1520 Space*. However, as a member of the European Union, and therefore part of another economic market, it is not included as part of the 1520 system in economic analyses for this area.

For many countries of the *1520 Space*, rail transport is the backbone of the economy. Railways perform most of the work in a country's transport systems, ensuring the transportation of products from the place of extraction, and from the produc-

tion site to the place of sale in the domestic or foreign markets. They are also a connecting link in transit traffic. The importance of railway transport is confirmed by its high share in the structure of freight turnover: the share of railway transport in the freight turnover of the Russian Federation exceeds 46% (excluding pipeline transport – 87.1%), in Belarus – 37% (63%), and in Kazakhstan – 41% (49%).

Freight rail transport is significantly influenced by the global geopolitical and economic situation, as well as changes in the freight base and directions of transportation that take place in a number of major countries. In the *1520 Space* between 2010 and 2019, freight turnover, the key indicator that reflects the work of railway transport, increased by 22%, to 3152 billion tonne-kilometre [t-km] (Figure 2). Its dynamics in that period were multidirectional, but in general, there was an upward trend. In particular, between 2010 and 2012, for almost all countries, the *1520 Space* was characterized by an increase in cargo turnover, which is associated with the recovery of economies after the global economic crisis.

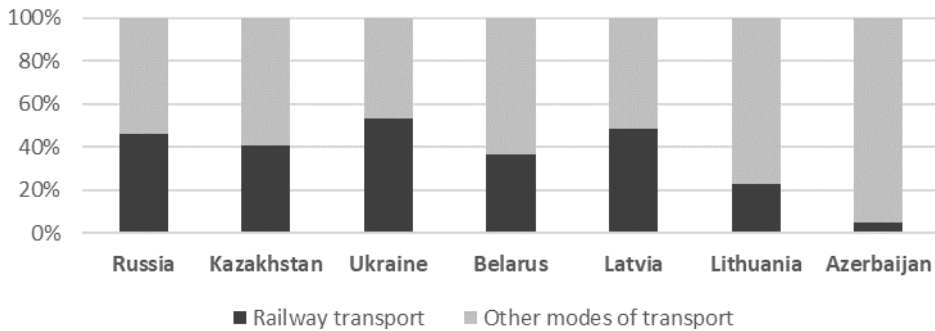


**Figure 2.** Freight turnover on the railway network of the *1520 Space* countries, 2010–2019  
Source: Rynok gruzovyh zheleznodorozhnyh perevozok stran Prostranstva 1520, Moscow 2020, p. 7.

The countries included in the *1520 Space* are economies in which the share of rail transport in the transport of goods is particularly important. Figure 3 presents the rail utilization rate in selected countries against the background of the importance of other modes of transport. These data show that the greatest importance of freight transport by rail is in Ukraine (53.6%), Russia (45.9%), Latvia (48.3%), and Kazakhstan (41%).

Nevertheless, Russia remains the main rail system in the *1520 Space* and holds a key share in the structure of its freight turnover. Russia’s share from 2010 to 2019 increased by 4.7 p.p. and reached 82.5%. Against the background of the general growth in cargo turnover, there is a change in its structure and the contribution of countries (Table 1). Between 2010 and 2019 in Kazakhstan, cargo turnover increased by 5.1% to 224 billion t-km, and in Belarus – by 4.3% to 48.2 billion t-km, while their share in the structure of turnover in *1520 Space* decreased by 1.1 p.p. and 0.3 p.p., respectively. The growth in freight turnover in Kazakhstan and Belarus was largely facilitated by an increase in traffic in transit traffic, which influenced the geography and general structure of freight transportation.

During the period under review, in Kazakhstan, transportation in domestic traffic significantly increased, and in Belarus, it increased for export.



**Figure 3.** The share of rail transport in total freight turnover in 2019

Source: own compilation based on the statistical data of national offices that supervise transport activities, Federal State Statistics Service, Database VNPInfo.ru and ROSSTAT.

**Table 1.** Dynamics of freight turnover in countries of the 1520 Space

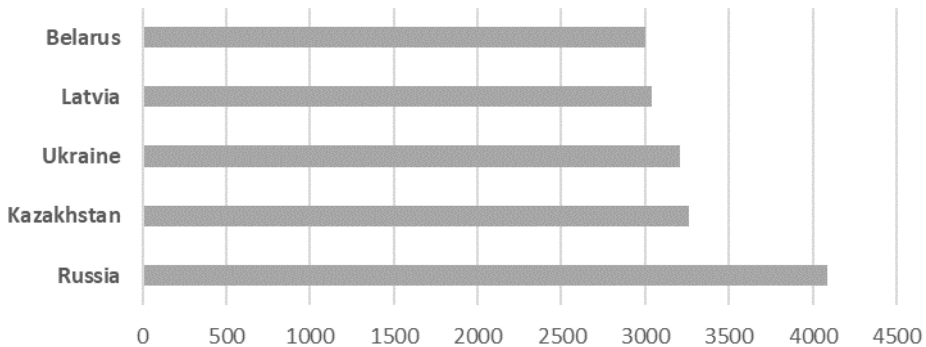
Country	Freight turnover (billions of tonne-kilometers)	Country share (percent)	Percentage point	Billions of tonne-kilometers
			Change compared to 2010	
			2019	
Russian Federation	2602	82.5	+4.7	+590.6
Kazakhstan	224	7.1	-1.1	+10.8
Ukraine	182	5.8	-2.7	-36.3
Belarus	48	1.5	-0.3	+2
Other countries	96	3.1	-0.6	+0.1

Source: Rynok gruzovyh zheleznodorozhnyh perevozok stran Prostranstva 1520, Moscow 2020, p. 8.

In 2018, freight turnover set a new record in the entire history of railway transport in the Russian Federation, and again in 2019. The increase in cargo turnover is associated with a change in the structure of the cargo base and the geography of transportation due to the positive situation in foreign markets and the growth of export shipments from the central regions of the country. Between 2010 and 2019, the volume of transportation of goods for export increased by 24.4%, while the volume of traffic in domestic traffic decreased by 0.5%. As a result, the average transportation distance increased by 23.5% to 1852 km in 2019. The change in the geography of transportation was due to the reorientation of shipments of coal – the main export cargo transported by rail – from West to East. In 2019, a record of 96.3 million tonnes was set for the transportation of coal to the Far East. This direction results from the importance of Russian coal exports to the countries of the Asia-Pacific region.<sup>1</sup>

<sup>1</sup> According to a KPMG report, in 2018, the main recipients of Russian coal were South Korea (26% of exports), China (23%) and Japan (18%).

An important factor in improving transport efficiency is the increase in the mass of the freight trains that run on the railway network. This is important not only from the point of view of handling the growing demand for transport, but also minimizing the effects of bottlenecks. After all, with limited capacity, running heavier and/or longer trains makes it possible to handle a larger volume of goods. This directly results in growth performance indicators. In this area, Russia is second only to the United States.<sup>2</sup> In order to master the growing traffic volumes, Russian Railways works to optimize and develop new transportation technologies. In 2015 alone, over 1200 trains with a gross weight of 12,000 tonnes were operated on 1200 km lines of the Russian Far East. Currently, heavy traffic is carried out in all major export directions. In 2019, more than 162,000 trains weighing over 6000 tonnes were dispatched. The average gross weight of a freight train in 2019 was 4090 tonnes, the highest in the *1520 Space*. To master and develop the technology of heavy-haul traffic, JSC “Russian Railways” is actively purchasing modern traction rolling stock: 3E5K electric locomotives (Russian marking: 3ЭС5К «Ермак» or «Атаман») and 3TE25K2M diesel locomotives (Russian marking: 3ТЭ25К «Пересвет» ).<sup>3</sup> Although cargo trains weighing 8000 tonnes run on the Russian rail network, they mainly transport coal to the Urals and to the Central Federal Region and are identified with the European part of the country. Figure 4 presents data on the average gross weight of a freight train among the *1520 Space* countries, achieving the highest indicators in terms of optimizing the gross of transports.



**Figure 4.** Average freight train weight in the top *1520 Space* countries (in tonnes)

Source: Rynok gruzovyh zheleznodorozhnyh perevozok stran Prostranstva 1520 Moscow 2020, p. 10.

2 According to data from 2014 published by the Institute for Natural Monopolies Research, the average gross weight of a freight train in the USA was 4375 tonnes, in Russia – 3929 tonnes, in China – 3550 tonnes, and in India – 3045 tonnes. These countries are the world leaders in terms of mass transport on its entire network.

3 These are now the most powerful locomotives on Russian railways: the electric 3E5K is rated at 9840 kW and the diesel 3TE25K2M is rated at 9300 kW.

The main trend in recent years in the *1520 Space* countries is the steady growth of container traffic. Special attention is paid to the development of transit container traffic. Russia, as well as Kazakhstan and Belarus, are the key connecting links between the EU and the Asia-Pacific region, and therefore, the transportation of goods in containers is one of the most dynamically developing directions. In the period from 2015 to 2019 alone, the volume of transit container traffic in Belarus increased 3.3 times, in Kazakhstan – 3.1 times. At the end of 2019, first place among the CIS countries in terms of the volume of transit container shipments went to Kazakhstan (664,600 TEU in 2019), ahead of Russia (618,000 TEU) and Belarus (504,100 TEU). Currently, on the territory of the *1520 Space* countries, transportation is carried out along a variety of transit routes and corridors.

The concentration of freight traffic on the main lines of transport and economic relations is characterized by rail transport. In this case, the main burden falls on a relatively small length of the railway network. Half of the total turnover is done by 1/6 of the railways. On the average Russian railway network, congestion of 27 million t-km per 1 km operating length has traffic density two times higher. The most congested line include the Trans-Siberian Mainline, especially its Omsk to Novosibirsk section – the most congested part of the railway in the world.

## **The essence of the economic importance of *1520 Space* rail transport on the example of Russia**

Russia's vast geographical terrain and extreme seasonal changes mean that having functional domestic transport networks has always been crucial both for connecting the country internally and for promoting trade with international partners. As a country reliant on the extraction and export of natural resources such as oil, gas, and coal, Russia must reliably convey these products across large swathes of territory to ensure GDP growth and economic security. This imperative presents both a problem and an opportunity for the Moscow-based political leadership (Ferris and Connolly 2020, p. 3).

At the end of 2019, 86,958 km of publicly accessible railway lines were in operation in the Russian Federation,<sup>4</sup> of which 44,067 km (50.7%) are electrified lines, and 44% are double- and more track. In addition, there are 32,000 km of industrial railways and sidings. In the transport of goods, rail transport is one of the two dominant modes of transport: in 2018, it handled 46.6% of the total load (48.1% was pipeline transport); excluding pipelines, the role of rail in freight turnover was 88.5%.

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4 Including fragments of railway lines that cross neighboring countries but are managed by Russian infrastructure undertakings, e.g., the sections (Petuhovo) Gorbunovo – Yunino (Isilkul) and (Irtyshskoe) Urlyutyub – Nyzlytuz (Terengul) leading into Kazakhstan, which is key for freight transport on the Trans-Siberian corridor.



Rail transport in Russia is a branch of the economy that guarantees that all economic sectors function continually. From the very beginning, it was projected that the railroad would influence the social and economic development of the country, territorial development and planning, and national security. The railroad continues to play a decisive role. Together with its direct influence (the provision of jobs, JSC Russian Railways' tax payments to the budget, transit charges, etc.), the industry is characterized by the highest multiplicative effect compared with other branches of industry. There are several reasons for this. The railroad industry uses an effect system as a result of transportation redistribution among all means of transport and improving the efficient load on the transport network. The railroad industry's development is closely connected with allied industries: Russia's transit potential increases, and territory interconnection improves. All these factors contribute to reducing unemployment, increasing incomes, improving the investment climate, as well as raising standards of living. The importance of the railroad industry is enhanced by the vast territory of the country, which is connected with long transport times and changing time and climate zones. As a result, railways have advantages over other means of transport (Kirsanova and Lenkovets 2019, p. 421).

The share of transport in the structure of Russia's GDP is not indicated in official statistics. The adopted indicator "Transport and communications" does not make it possible to take into account either transport or communication. The indicator of 8% (the share of transport in Russia's GDP) is the aggregate indicator of two industries (Shcharbin 2020, p. 70).

Regarding the infrastructure of the Russian railway system, the theme of economic bottlenecks is particularly important. As federal transport law does not allow the railway carrier to refuse to perform the transport service (unlike the international rail transport law does)<sup>5</sup> the need for the actual availability of railway line capacity takes on a special meaning. From the macroeconomic point of view, an interesting source of information is a simulation of the impact of infrastructure constraints on the volume of goods transport and the amount of goods that would not be accepted for transport. Table 2 shows the projected decline in GDP and the Russian federal budget due to insufficient development of rail transport infrastructure for economic needs between 2012 and 2020.

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5 *The Federal Law of 24.12.2002 on rail transport of the Russian Federation* (article 12) delegates to the departmental level the specification of technical and technological criteria, the lack of which is the basis for the carrier and infrastructure manager to refuse in transport service. They were introduced by the *Regulation of the Minister of Transport of 6.09.2010*. They define the necessary procedure for agreeing the transport, which is related to the need for the carrier to have appropriate rolling stock and to obtain arrangements with other managers of the infrastructure on which the transport will be performed. At the same time, article 14 of the *SMGS Agreement* provides inter alia that the transport is performed when the appropriate rolling stock is available, the transport is agreed with all infrastructure managers, and there are no objective obstacles that are beyond the company's control that would limit their ability to perform transport services.

**Table 2.** Summary assessment of the projected decline in GDP and the Russian Federal Budget as a result of insufficient development of rail transport infrastructure for economic needs, 2012–2020 (in trillions of RUB, 2010 price level)

	Base variant (elimination of narrow throats)	Variant A (transport on the existing one railway network)	Variant B (alternative routes of transport)
GDP	421.5	415.4	416.3
GDP losses compared with the base variant		6.4	5.5
Budget losses compared with the base variant		1.5	1.3

Source: Doński-Lesiuk 2020, p. 140.

The data presented in Table 2 shows that if the previous level of density and distribution of the railway network is maintained, i.e., current transport conditions, Russian GDP will lose 1.3–1.8% compared to the variant involving the expansion and modernization of infrastructure at the bottlenecks. It shows that economic efficiency investment in rail transport is vital for Russia. All the more so as, when the budget funds involved in modernizing the infrastructure to remove bottlenecks cover 50% of the total investment costs, using optimization indicators, it can be concluded that the real costs will be 3.5–4 times lower than the reduction in GDP that results from capacity constraints.

At the same time, after completing the necessary infrastructure improvement projects, budget revenues will double their costs, financed from public funds. Simulations carried out by the Strategic Analysis Center Foundation, which estimate the volumes of loads that would not be accepted for transport due to infrastructure limitations, indicate that by 2020, up to 13% of shippers' potential demand for transport cannot be satisfied.

At the same time, the problem of exhausted railway line capacity concerned as much as 19,500 km in 2020. Considering Russia's strategic position in international transport, of crucial importance are the railway lines that are part of the transport corridors, as well as other lines used for transport, which are essential from the point of view of international economic exchange (e.g., leading to seaports and deposits of export raw materials). The technical condition and the technology of transport in Russian ports organization used determine the effectiveness of internal and international economic exchange. For the Russian authorities, another important factor that determines the need to modernize and expand the rail transport infrastructure is that 70% of the volume of goods handled by rail is carried by 30% of the Russian rail network, and this is precisely the case with international corridors which give Russia a special place in the handling of international trade in goods (Doński-Lesiuk 2020, p. 143).

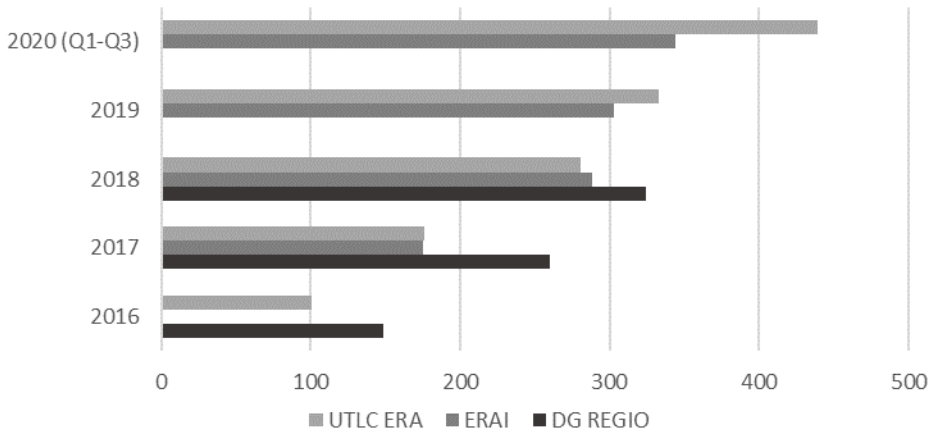
## The strategic importance of the 1520 *Space* rail transport system for international transit

Due to the rail transport system's specificity and strategic importance, it is generally shaped by the state. It is of particular interest to the authorities, not only because of its importance for the domestic economy and international exchange, but also because of the defense tasks of the transport infrastructure, which is part of the critical infrastructure. It consists of a set of systems and assets, physical or virtual, so essential to the nation that any disruption of their services could have a serious impact on national security, economic well-being, public health or safety, or any combination of these (Alcaraz and Zeadally 2015, p. 16).

The sharp disruption to the global economy in 2020 in connection with the Covid-19 epidemic did not change growth trends in rail forwards. Data from Chinese Railways shows 2920 trains on Asia-Europe routes between January and April 2020, carrying 262,000 TEU (up 24% year-on-year). In August 2020, the number of monthly trains hit a record of 1247 (up 62% compared to 2019). August was also the sixth consecutive month that China-Europe freight train traffic registered double-digit percentage growth year-on-year. How much traffic increased (despite the initial drop at the peak of the pandemic in China) can be seen in the statistics for the CR terminals. While in 2019, a maximum of ten trains were cleared and accepted daily in Alashan (the Xinjiang China-Kazakhstan border point), in February 2020, there were five trains, in March 2020, eleven trains, in April 2020, fourteen trains, and in June 2020, nineteen trains a day. In the first half of 2020, the Changan terminal in Xian (Shaanxi, Central China) cleared 1667 trains to Europe, meaning an almost twofold increase in traffic year on year. The weight of the shipped cargo increased similarly, reaching 1.3 billion tonnes (Czubiński 2020). Figure 5 shows the increase in the volume of rail container freight between China and the European Union (thousands of TEU).

The growing importance of container transport by rail on the Asia-Europe-Asia routes is also confirmed by data from Russian Railways (RZD). Between 2016 and 2019, the trend towards the containerization of goods steadily grew, leading to an increase in container cargo flows in export and transit directions. Thus, in 2018, Russian rail export shipments of containers amounted to 900,000 TEU, and transit container traffic reached 377,000 TEU. The container market in Russia grew by 9% at the end of 2019. High rates of market growth were supported by two segments transit (+22%) due to routes between China and Europe and exports (+14%). RZD forecasts for 2020 show a growth rate of 7%.

On the one hand, forecasts of key macro parameters of the Russian economy in 2020 are more optimistic than in 2019, which implies an increase in entrepreneurial and consumer confidence and, consequently, an increase in the import direction. An increase in freight traffic in transit from Japan and Korea to Europe is also expected. According to Russian analyses of the logistics sector, the boom in transit through Russia on the China-Europe route took place in 2018-2019 (Doński-Lesiuk and Skurpel 2020, pp. 75-76).



**Figure 5.** The volume of container transport by rail in the China-Europe exchange<sup>6</sup>  
 Source: own compilation based on the Directorate General for Regional and Urban Policy (DG REGIO), Eurasian Rail Alliance Index (ERAI), and the United Transport and Logistics Company (UTLC ERA) transport volume data.

In Russia, the basic document that defines actions to improve the conditions for rail transport is the *Strategy for the development of rail transport in the Russian Federation until 2030*, introduced on June 17, 2008, by order of the President of the Russian Federation No. 877-r. This document includes a forecast of the growth in demand for transport in 2030, specifying:

- in the minimum variant – loading 1970 million tonnes (147% compared to 2007) and transport of 3050 billion t-km (146% of the volume in 2007),
- in the maximum variant – loading 2150 million tonnes (160% compared to 2007) and transporting 3300 billion t-km (158% of the volume in 2007).

The *Strategy's* forecasts envisage that in 2030, the lines leading to the Saint-Petersburg Railway Junction, towards the North Caucasus and the ports of the Primorsky Krai, as well as lines serving the exit routes from Western Siberia and the Urals to the Far East, will be the most loaded. The same as and the Moscow Railway Junction. The assessment of the demand for rail transport included in the document, resulting from parallel investments in the infrastructure of seaports, indicates that cargo volumes to/from Russian ports will increase 1.5–2 times and as much as 2–2.5 times in the Azov-Black Sea direction. The increased demand for transport from the Urals is estimated at 1.8–2 times compared to the present state, and 1.5–1.8 times in the direction of the Urals. This is due to the expansion of the resource base Yamalo-Nenets Autonomous Okrug.

The greatest increase in the demand for transport (even 7–10 times) is expected on the Baikal-Amur Mainline (BAM), which leads to the ports of Vanino and Sovetskaya Gavan, due to the ongoing significant intensification of the use of raw materi-

<sup>6</sup> Data on the number of containers differ due to the different scale of statistical data from individual sources (only selected railway lines or corridors, etc. are analyzed).

als from the Republic of Sakha (Yakutia). For them, BAM remains the only overland export channel.<sup>7</sup> Additionally, of particular importance are the investments to specialize the Trans-Siberian Mainline for passenger and container transport. According to the *Strategy*, until 2030, investments in rail transport infrastructure include:

- the construction of a second plain line on sections with a length of 1767 km (minimum variant) to 3055 km (maximum variant),
- the construction of new lines enabling transit transport to bypass the Irkutsk, Perm, and Novosibirsk junctions and the northern bypass of the Yekaterinburg junction,
- the construction of the third perimeter line around the Moscow Railway Junction,
- the electrification of sections with a total length from 3132 km (minimum variant) to 3580 km (maximum variant), including the prior preparation of a number of detour lines,
- equipping from 1085 km (minimum variant) to 3128 km (variant maximum) of sections with an automatic line block,
- reconstructing and modernizing the traction network on a total length of 50,900 km, including the reconstruction of 763 substations (especially on Trans-Siberian Mainline and its branches),
- modernizing line blockades on sections with a total length of 1171 km and equipment of 11,515 km of routes with devices that allow the operation of two-way on the track intended for opposite-direction tracks to be used,
- modernizing the Ulan-Ude–Naushki line, connecting the Trans-Siberian Mainline with the Russian-Mongolian border crossing on the Trans-Mongolian route to China.

For the increased importance of Russia's transit rail transport system, by 2030, 16,017 km (minimum variant) / 20,730 km (maximum variant) of new lines are planned to be built. Depending on the variant, 4,573 km / 4,660 km of lines have been identified in *Strategy* as 'necessary due to the needs of the new freight corridors'.

As part of the comprehensive plan to modernize and expand the main infrastructure by 2024, it is planned to increase the carrying capacity of the Baikal-Amur and Trans-Siberian Mainlines to 180 million tons, as well as the railway infrastructure on the approaches to the ports of the Azov-Black Sea (to Novorossiysk<sup>8</sup> and other important seaports from the perspective of international trade). It is also envisaged to increase the throughput to ensure the four-fold growth of the volume of transit con-

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<sup>7</sup> Sakha-Yakutia exploits resources of crude oil, gas, hard coal, metal ores, rare metals, and various aggregates. Currently, there are 1500 known deposits of mineral resources. Its raw material potential, the richest entity of the Russian Federation, is estimated at RUB 78.4 billion. According to data from the Ministry of Natural Resources and Ecology, 47% of the total developed coal resources and 35% of the developed oil and gas resources of the East Siberian-Far East area are concentrated in Yakutia.

<sup>8</sup> Novorossiysk is the largest port of the Russian Federation, in 2019 handled 156.8 million tons of cargo, which is 18.7% of the total transshipments in Russian seaports.

tainer traffic. It includes reducing container transportation times by rail, in particular, from the Far East to the western border of Russia (i.e., the border crossing with Belarus on the Moscow – Minsk – Western Europe and Baltic States corridors) to seven days. It is also planned to increase Russia's economic connectivity with major neighboring markets and a corresponding increase in the contribution of Russian Railways to the country's GDP growth. That one state-owned enterprise (RZD) alone will increase its share of contributions to the Russian Federation's GDP from 5.1% in 2018 to 5.4–5.6% in 2025, according to *The Long-term Development Program of Russian Railways until 2025*.

## Conclusion

Much attention has focused on Russia's so-called 'pivot to the East' – its military and political alliances with rising powers such as China, and its attempts more broadly to recruit Central and Southern Asian countries into coalitions against the West. Russia's cultivation of political and economic ties with countries such as India, Vietnam, and Japan is long-standing. However, it has been given fresh impetus by the deterioration in diplomatic relations between Russia and the West. The introduction of Western sanctions, following Russia's annexation of Crimea in 2014 and military intervention in eastern Ukraine, has obliged the Kremlin to seek alternative trade partners and to redirect its trade links from West to East (Ferris and Connolly 2020, p. 3). This shift has added urgency to Moscow's desire to promote the economic development of the Russian Far East to potential partners – Japan, India, or South Korea.

The development of modern and competitive transport and communications infrastructure is one of the key conditions of high and sustainable economic growth that will achieve and ensure the country's economic security. Since rail transport is a strategic resource in increasing the competitiveness of the economy, successfully solving the many interrelated tasks of its operation is possible only by studying domestic and foreign experience, and testing fundamental hypotheses and proposals which are made in a wide range of opposing directions of economic thought (Gadelshina and Vakhitova 2015, p. 248).

The existing infrastructure of Euro-Asian inland routes and ports facilities provide good potential opportunities to further develop the inland transport of goods between Europe and Asia. However, competition of transport routes on the Euro-Asian continent was not about the simple choice between transport routes and/or transport modes. It is the competition of logistic decisions based on intermodal services and value-added services, and it focuses on the needs of particular supply chains. Those require regular services, high punctuality, flexible costs, value-added services availability, and delivery speeds that are appropriate for certain types of cargo.

Taking into account the observed and planned investments aimed at improving the efficiency and effectiveness of rail transport of the Russian Federation, its rail

transport system can attract traffic as long as it remains competitive in the context of supply chains. And without a doubt, it will remain the most heavily loaded with transport services in the *1520 Space*. The quality of infrastructure, of course, remains only one of several factors to optimize freight flows. Nevertheless, the modernization of the Trans-Eurasian transport corridors, including the construction and expansion of border terminals at the junction of railway lines with different track gauges, directly affects the competitiveness of supplies. This is happening not only due to the increase in capacity and transport capacity, but also the implementation of favorable legal solutions. Russia is participating in several projects to harmonize system solutions that support the international trade in goods and forwarding. This seems to be done based on its own interests and the particular needs of using *soft power* in relation to some neighboring countries. However, the economic benefits of participating in the transit of international supply chains are and will remain important for Russia. It is part of the economic benefits that result from its geostrategic location and the possibility of creating logistic channels of transcontinental importance.

## References

- Alcaraz, C., Zeadally, S. (2015), *Critical Infrastructure Protection: Requirements and Challenges for the 21<sup>st</sup> Century*, "International Journal of Critical Infrastructure Protection", 8, pp. 53–66, <https://doi.org/10.1016/j.ijcip.2014.12.002>
- Caruana-Galizia, P., Martí-Henneberg, J. (2013), *European Regional Railways and Real Income, 1870–1910: a Preliminary Report*, "Scandinavian Economic History Review", 61 (2), pp. 167–196, <https://doi.org/10.1080/03585522.2012.756428>
- Czubiński, R. (2020), *Zatory na chińskiej granicy*, <https://www.rynekinfrastruktury.pl/wiadomosci/kolej/pociagi-chiny--europa-zatory-na-chinskiej-granicy-72477.html> (accessed: 31.10.2020).
- Database Federal State Statistics Service, <https://rosstat.gov.ru/folder/23455> (accessed: 31.12.2020).
- Database *VNPinfo.ru*, <http://vnpinfo.ru/novosti/item/14007-gruzooborot-po-vsem-vi-dam-transporta-v-2019-godu-viros-na-06.html> (accessed: 10.01.2021).
- Donaldson, D., Hornbeck, R. (2013), *Railroads and American Economic Growth: "A Market Access" Approach*, "NBER Working Paper", 19213, National Bureau of Economic Research, Cambridge, <https://doi.org/10.3386/w19213>
- Doński-Lesiuk, J. (2020), *Nowy Jedwabny Szlak. Transport kolejowy w obsłudze logistycznej*, CeDeWu, Warszawa.
- Doński-Lesiuk, J., Skurpel, D. (2020), *The Growing Importance of E-Commerce as a New Trend Factor Shaping in Rail Transport between Asia and Europe*, "European Research Studies Journal", XXIII (2), pp. 68–78, <https://doi.org/10.35808/ersj/1935>
- Drucker, P. (1999), *Beyond the information revolution*, "The Atlantic Monthly", 284 (4), pp. 47–57.

- Duranton, G., Turner, M. A. (2012), *Urban growth and transportation*, “The Review of Economic Studies”, 79 (4), pp. 1407–1440, <https://doi.org/10.1093/restud/rds010>
- Ferris, E., Connolly, R. (2020), *Networks and Links Why Russia’s Infrastructure is Holding Back its Pivot to Asia*, The Royal Institute of International Affairs, London.
- Gadelshina, L.A., Vakhitova, T.M. (2015), *The place and role of transport infrastructure in the interregional integration of the Russian Federation regions*, “Procedia Economics and Finance”, 24, pp. 246–250, [https://doi.org/10.1016/S2212-5671\(15\)00655-3](https://doi.org/10.1016/S2212-5671(15)00655-3)  
[http://www.mid.ru/vnesneekonomiceskie-svazi-sub-ektov-rossijskojfederacii/-/asset\\_publisher/ykggrK2nCl8c/content/id/2291549](http://www.mid.ru/vnesneekonomiceskie-svazi-sub-ektov-rossijskojfederacii/-/asset_publisher/ykggrK2nCl8c/content/id/2291549) (accessed: 13.12.2017).
- Keller, W., Shiue, C.H. (2008), *Institutions, technology, and trade*, “NBER Working Paper”, 13913, National Bureau of Economic Research, Cambridge, <https://doi.org/10.3386/w13913>
- Kirsanova, N., Lenkovets, O. (2019), *Influence of Railroad Industry on Social and Economic Development of Russia*, <https://doi.org/10.5593/sgem2019/5.3/S21.053>
- KPMG Report, *Обзор российского транспортного сектора в 2019 г./Obzor rossijskogo transportnogo sektora v 2019 godu*, <https://home.kpmg/ru/ru/home/insights/2020/05/russian-transport-sector-archive.html> (accessed: 11.01.2021).
- Matusitz, J. (2009), *The impact of the railroad on American society: a communication perspective of technology*, “Revista de Turismo y Patrimonio Cultural. PASOS”, 7 (3), pp. 451–460, <https://doi.org/10.25145/j.pasos.2009.07.032>
- Mojica, L., Martí-Henneberg, J. (2011), *Railways and Population Distribution: France, Spain and Portugal, 1870–2000*, “Journal of Interdisciplinary History”, 42 (1), pp. 15–28, [https://doi.org/10.1162/JINH\\_a\\_00203](https://doi.org/10.1162/JINH_a_00203)
- Monograph Series on Transport Facilitation of International Railway Transport in Asia and the Pacific*, United Nations Economic and Social Commission for Asia and the Pacific, ST/ESCAP/2681.
- ROSSTAT (2018), *Russian Statistical Yearbook 2018*, Moscow, [http://old.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/statistics/publications/catalog/doc\\_1135087342078](http://old.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1135087342078) (accessed: 10.01.2021).
- Rynok gruzovyh zheleznodorozhnyh perezovok stran Prostranstva 1520* (2020), The Institute for Natural Monopolies Research, Moscow.
- RZHD uvelichivayet svoy vklad v VVP Rossyi do 5,4–5,6% v 2025 godu*, <https://www.finanz.ru/novosti/aktsii/rzhd-uvelichat-svoy-vklad-v-vvp-rossii-do-5-4-5-6percent-v-2025-g-1028045933> (accessed: 9.01.2021).
- Shcherbanin Y.A. (2018), *Transport Rossyi: tri goda ekonomicheskikh sankciy*, [in:] A.G. Korovkin (ed.), *Nauchnye trudy INP RAN*, Moscow.
- Shcherbanin Y.A. (2020), *Transport Rossyi: shest’ let ekonomicheskikh sankciy*, [in:] V.V. Ivanter (ed.), *Problemy prognozirovaniya*, No. 3, pp. 69–81.
- Top-10 morskikh portov Rossyi*, <https://credinform.ru/ru-RU/Publications/Article/35ab611c19a1> (accessed: 9.01.2021).



## Znaczenie systemu transportu kolejowego o rozstawie 1520 mm dla międzynarodowej wymiany towarowej pomiędzy Europą a Azją

W artykule przedstawiono znaczenie specyficznego systemu transportu kolejowego w obsłudze logistycznej towarów przewożonych pomiędzy dwoma generatorami międzynarodowego handlu towarami – Chinami i Unią Europejską. Posługując się wybranymi danymi operacyjnymi, odnoszącymi się do systemów kolejowych kilku krajów (m.in. Białorusi, Kazachstanu, Łotwy, Rosji, Ukrainy), artykuł wskazuje na duże znaczenie gospodarcze systemu 1520 mm – tzw. infrastruktury szerokotorowej. Poza aspektem porównawczym, na tle wpływu i znaczenia transportu kolejowego dla gospodarki, przedstawiono w nim zakres i koszty inwestycji, które są niezbędne i pożądane dla zapewnienia efektywności i optymalizacji przepływów towarów. W badaniu uwzględniono rosnący znaczenie transeurazjatyckich przewozów kontenerowych w wolumenie ładunków obsługiwanych z wykorzystaniem infrastruktury kolejowej 1520 mm, która jest kluczowym ogniwem w transeurazjatyckich łańcuchach dostaw, a której kluczowym elementem pozostaje rosyjski system kolejowy.

**Słowa kluczowe:** transeurazjatyckie przewozy towarów koleją, międzynarodowe przewozy kolejowe, system 1520 mm, infrastruktura transportu



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