

## RAIL CONTAINER TRANSPORTATION IN THE EURASIAN SPACE IN 2021



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# A BRIEF OVERVIEW: TOLERANCE FOR UNCERTAINTY

Eurasian rail container freight traffic continued to grow steadily in 2021, outperforming target indicators. Over the past year, 693K TEUs travelled along the Eurasian railway route, which is 27% more than the figure for 2020.

In an environment of high rate volatility and carrying capacity constraints on alternative modes of transport, railways are demonstrating excellent service and high levels of reliability to the market. Rail transport plays a strategic role as a 'land bridge' between Europe and Asia, offering exactly what shippers need: regular shipments, minimal transit times and stable prices.

In 2021, rail once again increased its share of trade flows between China and the EU. The Eurasian railway route transported goods worth a total of USD 38.8 billion, accounting for 5.5% of total trade for the year between China and Europe and showing an increase of 23.3% on 2020. The freight base for the transported goods largely comprised mechanical equipment and appliances, electrical devices and communications equipment, vehicles and spare parts, various devices and medical equipment, furniture and lighting equipment, clothing, plastics and ferrous metal products.

The astonishing growth in volumes has been marked by a number of infrastructure constraints. The past year saw several failures even in well-established rail transit settings, primarily due to restrictions on segments adjacent to the Eurasian route. Nevertheless, rail has generally managed to cope with the higher volumes, even taking into account the slight increase in average travel times, to as much as seven days on the 1,520 mm track gauge infrastructure.

The current state of affairs prioritizes the stress resistance of transportation, and this has been the main focus of stakeholders over the past year. In August, the heads of the Belarusian, Kazakh and Russian railways signed a memorandum on the development of Eurasian rail traffic in the presence of the prime ministers of the respective countries, confirming the commitment of the states to the consistent and comprehensive development of Eurasia's railway infrastructure.

The past year once again underlined the inherent advantage of rail freight transportation – its environmental performance – especially in the context of the growing decarbonization agenda and the EU and China's green policies. The [CO<sub>2</sub> Counter](#) on the ERAI website clearly demonstrates this advantage. Documenting emissions reductions achieved through the use of rail transportation is a priority at present.

The diversification of freight delivery routes was another area of focus in 2021, with improvements to railway logistics through the ports and terminals of Kaliningrad Region at the centre of attention. By the end of 2021, traffic volumes on this route had increased by 188.8% to 133,300 TEUs. Transportation along this route highlights the advantages of a multimodal approach to transporting freight: first by rail and then by sea to neighbouring countries, using the common CIM/SMGS consignment note.

Rail retained its key advantages of reliability, speed, and transportation costs in the difficult operating conditions of 2021 and against the backdrop of ever-increasing infrastructure load and international political turbulence. At the same time, the Eurasian railway route has shown its ability to operate in the face of growing uncertainty and pressure on infrastructure, operators and service providers alike.

# SUMMARY

- 1.** Over the past year, 693K TEUs travelled along the Eurasian railway route, which is 27% more than the figure for 2020. Freight volumes have been growing for six consecutive years and are outperforming target indicators.
- 2.** The Eurasian railway route transported goods worth a total of USD 38.8 billion, accounting for 5.5% of total trade for the year between China and Europe.
- 3.** The overall favourable backdrop of increased trade between the EU and China supports a positive appraisal of growth prospects for the Eurasian rail traffic freight base. Nevertheless, the EU's growing current account deficit complicates the issue of balancing freight traffic flows.
- 4.** In 2021, the WCI Drewry ocean freight rate reached the psychological threshold of USD 10,000. At the same time the ERAI index, which reflects the cost of transporting a container across the entire 1,520 mm track gauge area, remained stable at USD 2,700 per TEU. The volatility and high cost of maritime shipping is becoming a new reality for shippers, incentivizing them to get 'back on track' and use rail transportation.
- 5.** In 2019, about 9 trains departed per day, while in 2020 this figure reached 15.5. By 2021 it had risen to 18.6. A twofold increase in the intensity of shipments has therefore been achieved in just a couple of years.
- 6.** The average journey time on the Eurasian route stood at 7.28 days, which is higher than the previous year's figure of 5.82. The drop in freight speeds across the EAEU is the result of stress placed on the railway infrastructure due to sharply increased freight volumes. Rail nevertheless maintains its speed advantage over maritime transportation.
- 7.** In 2021 just 5% of containers on the route were empty, compared with 7% in 2020 and 14% in pre-pandemic 2019. The share of loaded containers on the EU–China route was 88.1%, with 99.4% of containers on the China–EU route travelling loaded.
- 8.** In 2021, goods belonging to 87 categories of the two-digit SS class under the Harmonized System (HS) Codes were shipped on the Eurasian railway route. Around 45% of freight fell into three basic categories of goods: mechanical equipment, electrical devices and vehicles. This indicates a sustainable freight base for the route.
- 9.** Most Eurasian rail transit routes showed an increase in volumes compared with 2020. At the same time, the level of diversification of supplies increased. While routes to Europe outside the top 10 accounted for 31% of traffic in 2020, that figure rose to 44% in 2021.
- 10.** The Eurasian route, which accounts for 82% of rail container traffic flows between China and the EU according to border crossing statistics, remains a benchmark for other routes and directions of rail freight traffic in Eurasia.

# MUTUAL TRADE AND THE STATE OF THE FREIGHT MARKET

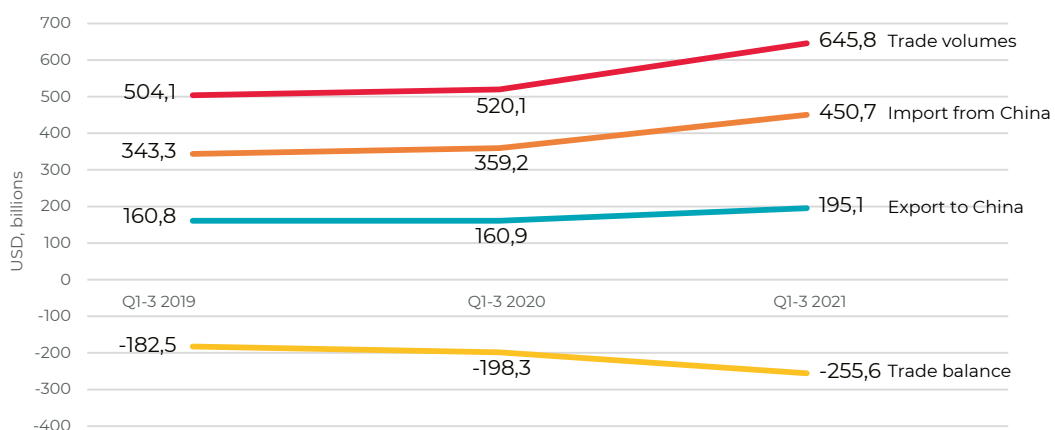
## Growth in EU–China trade and increasing trade uncertainties

Trade between the European Union and China is the central axis of trans-Eurasian transit as a whole and one of the key segments of global trade. Trends in EU–China trade determine the freight base of the Eurasian rail transit route and the balance of freight flows.

In the first three quarters of 2021, cumulative trade turnover between the EU<sup>1</sup> and China amounted to a record USD 645.8 billion, an increase of USD 125.7 billion (+24%) on the same period in 2020. At the same time, EU exports to China in the first three quarters of 2021 amounted to USD 195.1 billion (+21%), with imports from China reaching USD 450.7 billion (+25%). EU imports from China therefore displayed accelerated growth and proved to be the main driver of growth in trade turnover, as was the case the previous year. The state of bilateral trade is having a favourable impact on the prospects for further expansion of the Eurasian rail transit freight base.

Figure 1.

### EU 27 EXTERNAL TRADE WITH CHINA: Q1-3, USD (BILLIONS).



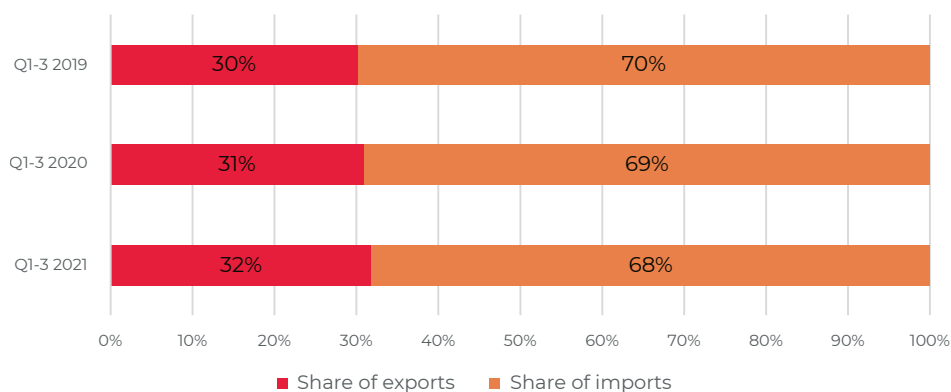
Source: International Trade Center (ITC).

<sup>1</sup> Hereinafter, the EU is taken to mean the European Union in its current configuration, representing 27 European nations.

Nevertheless, the EU's trade deficit with China is growing year on year. For the first three quarters of 2021, it amounted to USD 255.6 billion, an increase of 29%. The share of EU imports was 68% of bilateral trade turnover in 2019, rising to 70% in 2021. From a logistical point of view, the growing EU deficit necessitates a balancing act as China–EU traffic exceeds EU–China traffic. The intensification of this trend may lead to an increase in the share of empty containers, especially in EU–China transit, and will also require additional efforts to get European shippers 'back on track'.

### Figures 2.

#### RATIO OF EU 27 EXPORTS TO IMPORTS IN TRADE WITH CHINA.



Source: International Trade Center (ITC).

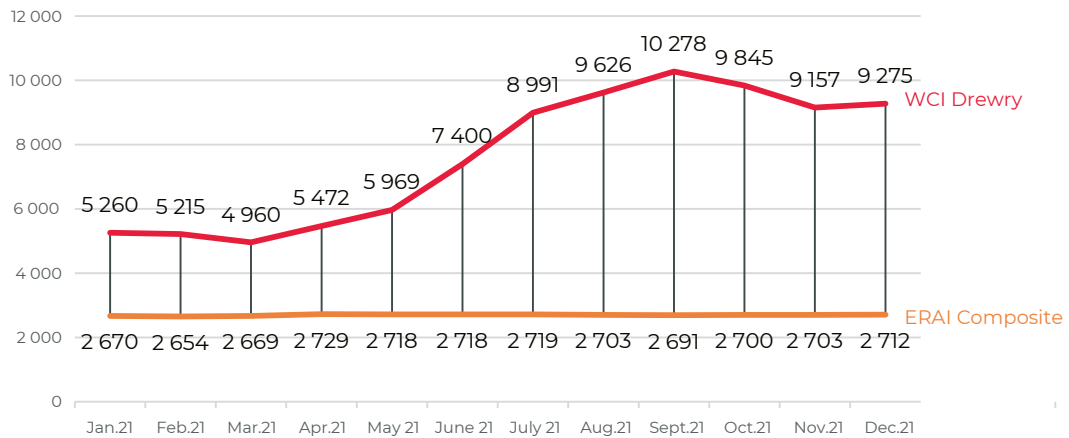
## The new reality of maritime shipping and stability in rail rates

The double-digit growth in Eurasian rail container traffic is the result of long-term efforts on the part of the businesses and the states involved in its development. The development of inland routes is however highly sensitive to the situation in other modes of transport, primarily maritime. The sharp increase in maritime logistics rates has accelerated the modal shift, with shippers transitioning to railway transportation. While the gap between the WCI Drewry ocean freight index and the Eurasian ERAI railway index was approximately twofold at the beginning of the year, it was more than threefold by December 2021.

After what appeared to be a record-breaking 2020, ocean freight rates eased slightly in March 2021 before ascending to new highs. In September, the WCI Drewry index crossed the psychological threshold of USD 10,000. One of the contributing factors was the blocking of the Suez Canal by the Ever Given container ship, which disrupted supply chains and cost the global economy USD 400 million per hour. This episode highlighted the vulnerability of maritime transportation, which, coupled with the increasing market price of transportation, further pushed shippers in the direction of inland routes.

Figure 3.

**ERAI COMPOSITE AND WCI DREWRY INDEX TRENDS IN 2021.**



Source: ERAI index.

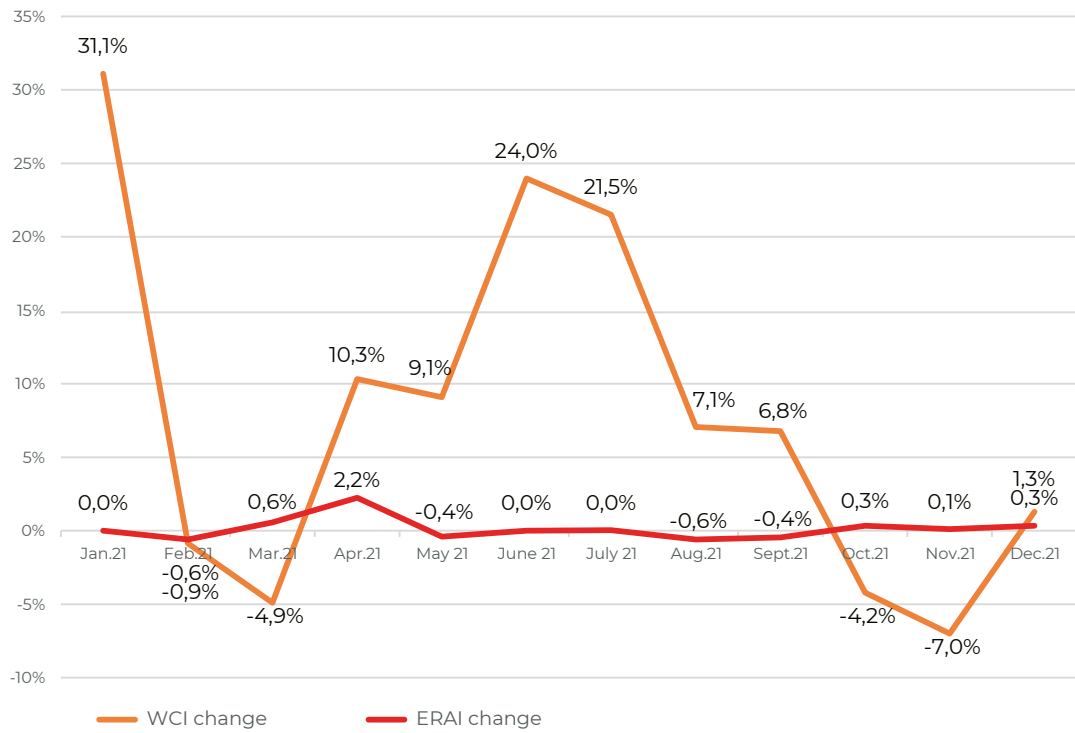
Against the backdrop of fluctuating ocean freight rates the ERAI index, which reflects the cost of transporting a container across the entirety of the 1,520 mm tack gauge area, remained stable and held its level of USD 2,700 per TEU. Over the last year, the largest swing in the ERAI index was recorded in April, when the ERAI Composite rate increased by 2.2%. On average, the fluctuation of the ERAI index did not exceed a single percentage point in any given month.

The WCI index, meanwhile, showed significant volatility. After peaking at the very beginning of the year, the ocean freight rate once again showed double-digit growth rates in June and July 2021. After declining in October and November by 4.2 and 7% respectively, however, it rebounded again in December during the Christmas season in Europe and preparations for Chinese New Year.



Figure 4.

**ERAI AND WCI DREWRY INDEX FLUCTUATION TRENDS IN 2021.**



Source: ERAI index.

The current situation in maritime shipping is becoming a new reality for shippers. Maritime carriers are uninterested in a return to the previous low prices given the record profits generated in 2021. In view of this, ocean freight rates are unlikely to return to pre-pandemic levels, though individual adjustments to current values are possible in 2022.

# THE STATE OF THE EURASIAN RAILWAY ROUTE IN 2021

Key transportation indicators and increasing container traffic

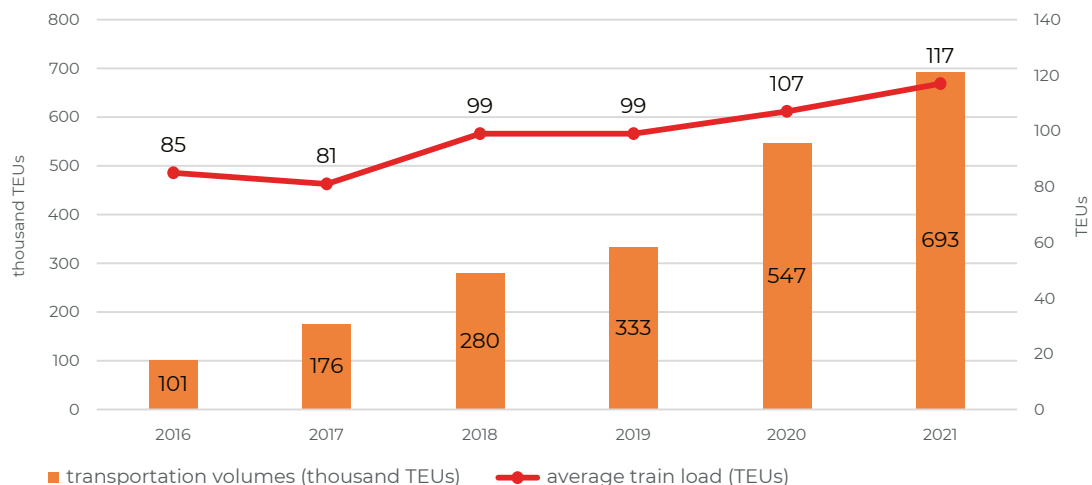
In 2021, a total of 693K TEUs travelled along the Eurasian railway route, which is 27% more than in 2020 (547K TEUs). The volume of transported freight has been growing for six consecutive years and is outperforming initial target indicators. Container traffic on the route has increased sixfold since 2016.

After the breakthrough year of 2020 which saw a 64% increase in freight transportation volumes, the main focus in 2021 was on managing increased demand from shippers in terms of the available infrastructure capacity along the route. Container loads on trains increased again in 2021, from 107 the previous year to 117. Over the last six years, the average train load rose by 37.6%, indicating an increase in the efficiency of freight transportation.

Major efforts are also underway to develop the XL train transportation project, which provides for the creation of elongated container trains. There has been a 37.4% increase in the number of combined trains (on a '3 in 2' basis) compared to 2020.

Figure 5.

## TRANSPORTATION VOLUMES AND CONTAINER LOADS ON TRAINS.



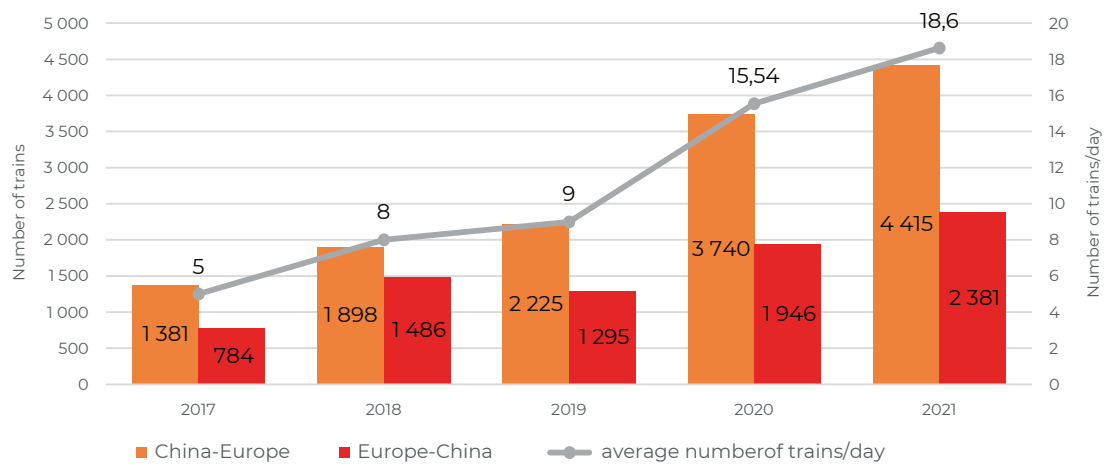
Source: authors' calculations.

The number of departing trains continued to grow in tandem with the higher volumes of transported goods. The growth trend in the average number of trains per day clearly illustrates the rapid growth in volumes of transported goods in 2020 and 2021. About 9 trains were sent per day in 2019, rising to 15.5 in 2020 and reaching 18.6 in 2021. A twofold increase in the intensity of shipments was therefore achieved in just a couple of years.

At the same time, the gap between the number of departures in the direction of Europe and China seen the previous year remained in 2021, with 4,415 trains departing for the EU and 2,381 trains sent to China. This situation is an objective consequence of the EU’s persistent trade deficit with China.

Figure 6.

**NUMBER OF TRAINS BY DIRECTION.**



Source: authors’ calculations.

The rapid growth in transportation volumes on the Eurasian railway route has led to a corresponding increase in the load on the 1,520 mm track gauge area infrastructure and, as a result, a drop in the average speed of container trains and an increase in the average journey time.

The average speed of a container train fell from 936 km/day in 2020 to 747 km/day in 2021. In 2019, before the boom in demand for Eurasian container transportation, the average speed reached a historical maximum of 1,056 km/day. The average journey time along the Eurasian route was 7.28 days in 2021, higher than the previous year’s figure of 5.82 days. The goal of achieving transit speeds of at least 1,150 km/day on the 1,520 mm track gauge infrastructure nevertheless remains unchanged.

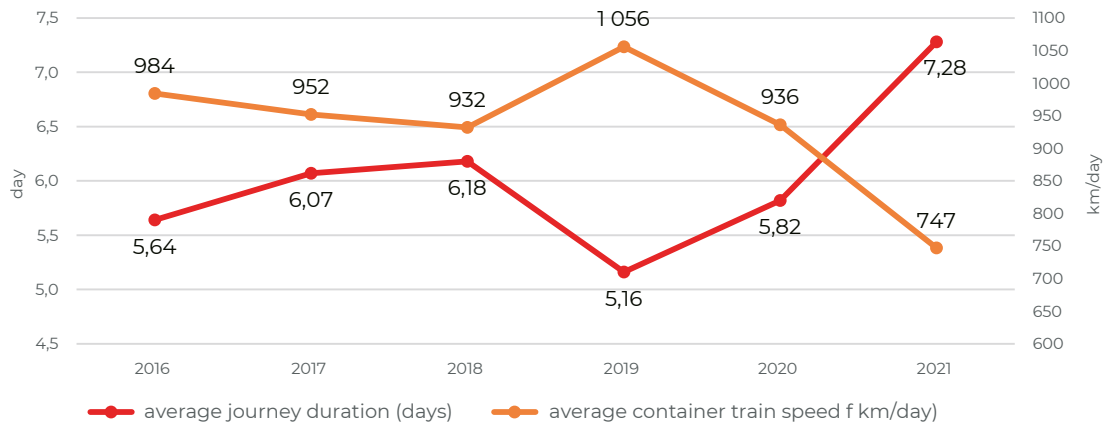
The drop in the speed of freight passing through the EAEU is the consequence of stress placed on the railway infrastructure due to sharply increased freight volumes. Towards the end of 2021, due to additional freight volumes in the run up to the Christmas and New Year holidays, the situation escalated at Kazakh and Belarusian border crossings.

Despite the infrastructural challenges, the long-term commitment of the governments of the EAEU member states and national railway administrations to increase capacity, coupled with increased efficiency in freight transport and reduced customs and administrative barriers, will make it possible to gradually

overcome the current challenges. Furthermore, the increase in rail travel times is comparable to maritime transport delays. Road transport is also under pressure due to China's zero tolerance policy towards COVID-19 and the resulting delays at border crossings.

Figure 7.

**JOURNEY SPEED AND DURATION.**

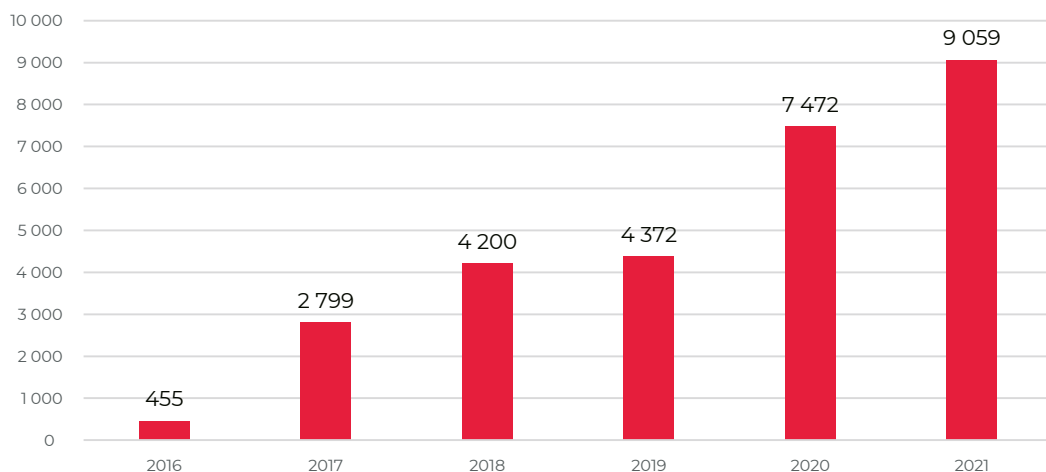


Source: authors' calculations.

Another consequence of increased volumes of transported freight is the number of cars in service along the Eurasian railway route. In 2021 there were 9,059 cars on the route, which is 21% more than a year earlier (7,472 units). In 2019 the number was just 4,372, followed by a sharp increase in 2020.

Figure 8.

**FLEET OF CARS IN SERVICE.**



Source: authors' calculations.

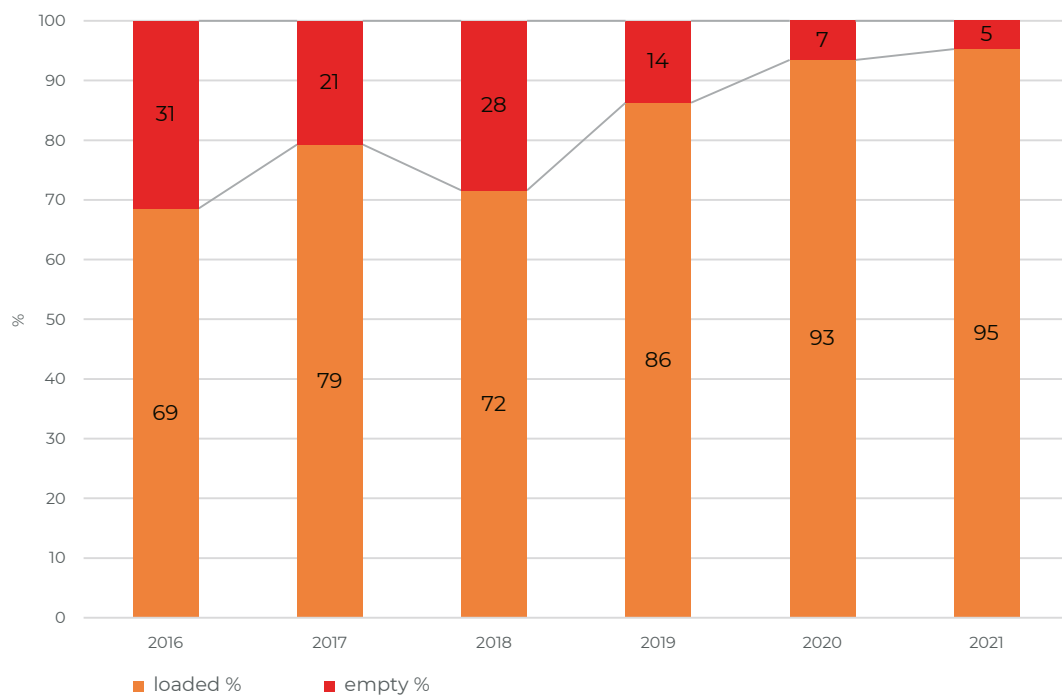
The freight base for the route and record container loads

One of the most important transport and logistics indicators is the ratio of loaded to empty containers. One particular aspect of container transportation is the need to constantly manage return freight in order to prevent container build-up. The EU's trade deficit with China presents transport and logistics companies with the challenge of balancing freight flows.

Thanks to the successful work done by Eurasian railway traffic market participants, the share of empty containers continues to decline for the third year in a row. In 2021, only 5% of containers travelled along the route empty compared with 7% in 2020 and 14% in pre-pandemic 2019. In 2016, the figure was as high as 31%.

*Figure 9.*

**RATIO OF LOADED TO EMPTY CONTAINERS.**

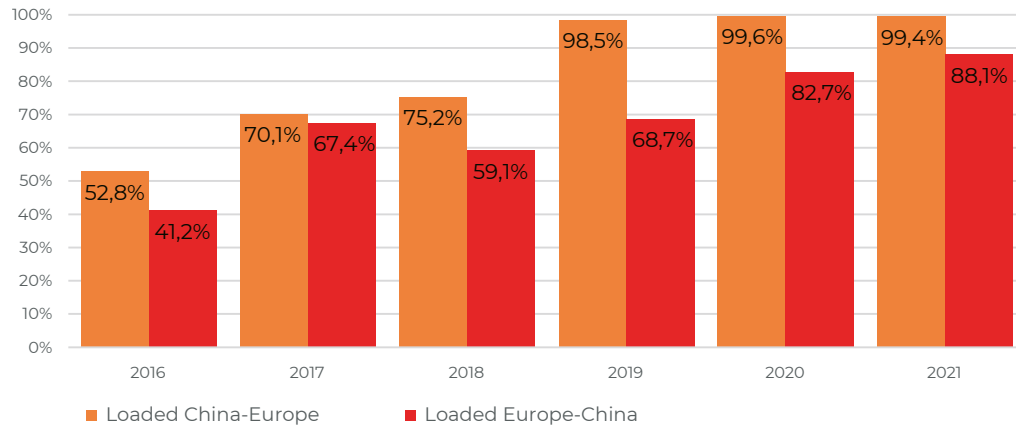


Source: authors' calculations.

The most problematic area for balancing the flow of goods is transportation from Europe to China. Nevertheless, the share of loaded containers in Europe–China traffic in 2021 was 88.1%, exceeding the 2020 figure (82.7%). This is well above the 2018 figure of 59.1%. This trend indicates the effectiveness of work done to attract European shippers and improve the efficiency of the route.

Since 2019, there has been a tendency for an almost total dominance of loaded containers in China–Europe traffic. In 2018, the share of loaded containers in freight flows from China to Europe was 75.2%. Over the past three years it has not fallen below 98.5%, and last year reached 99.4%.

Figure 10.

**SHARE OF LOADED CONTAINERS IN FREIGHT TRAFFIC BY DIRECTION.**

Source: authors' calculations.

In 2021, according to [ERAI data](#), goods belonging to 87 categories of the two-digit SS class under the Harmonized System (HS) Codes travelled along the Eurasian railway route. The Eurasian railway route transported goods worth a total of USD 38.8 billion, accounting for 5.5% of total trade for the year between China and Europe.

The classification of freight shipped on the route remains stable. As in the previous year, 45% of freight fell into three basic categories of goods: mechanical equipment (17.4%), electrical devices (17.3%) and vehicles (10.5%).

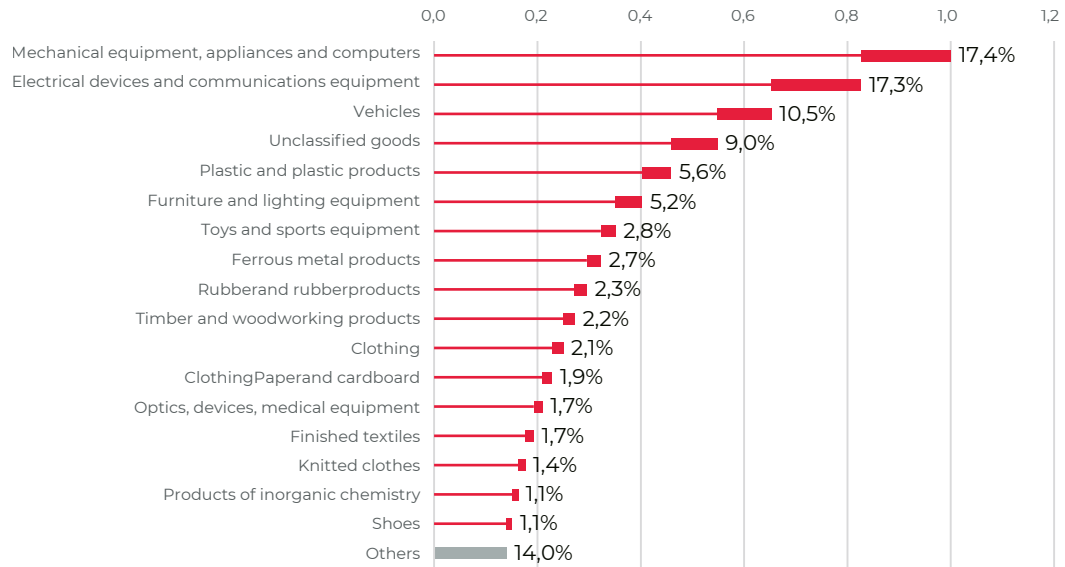
The share of mechanical equipment remained unchanged compared with 2020 and the share of electrical devices increased by 0.9% while, conversely, the share of vehicles transported decreased by 1.3%. The severe shortage of chips (semiconductors), which led to the suspension of a number of industries in Europe and disruptions to supply chains of goods reliant on the transnational division of labour, could provide an explanation for the reduction in the share of automobiles.

The next most important goods in the freight base of the Eurasian railway route are plastics (5.6% of transported freight), and furniture and lighting equipment (5.2%). In 2021, supplies of toys and sports equipment (2.8%), ferrous metal products (2.7%), and rubber and rubber products (2.3%) showed significant relative growth.

The supply of timber and woodworking products (2.2% of freight transported in 2021), clothing (2.1%), optical equipment (1.7%) and finished textile products (1.7%) decreased slightly compared to 2020.

The freight base of Eurasian rail freight transportation is provided for by the regions of Central China and Germany, the economic locomotive of the EU, along with several Central European nations. This geographic spread accounts for the dominance of manufactured goods. The gradual transfer of Chinese industrial capacities to the less developed regions of Central and East China, as predicted by experts, will sustain and expand the freight base for the route in the long term.

Figure 11.

**CLASSIFICATION OF FREIGHT TRANSPORTED IN 2021, TEUS.**

Source: ERAI index.

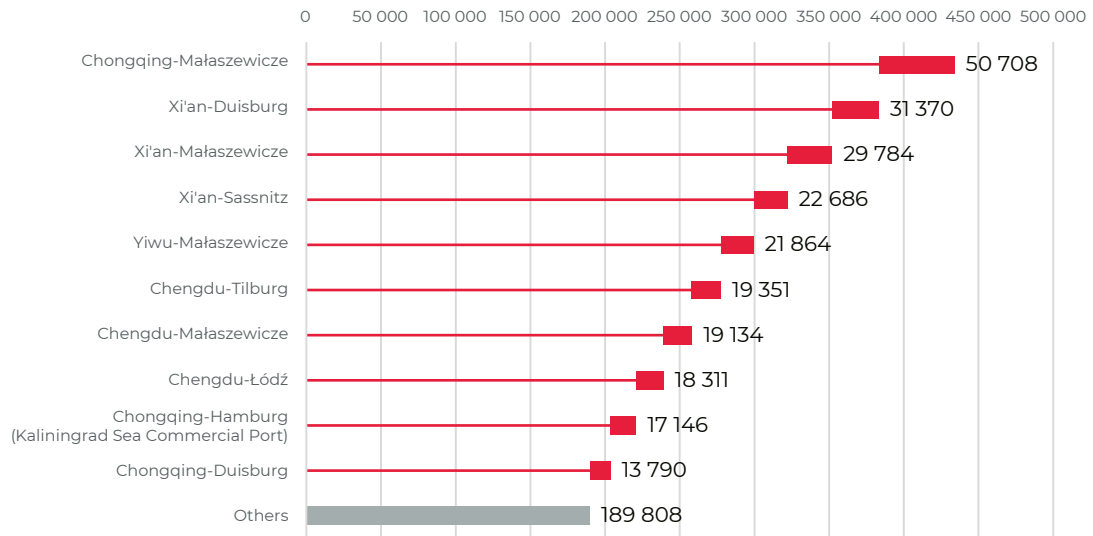
## The geography of transportation and alternative transit routes

By the end of 2021, 68 new journeys had been made along the Eurasian railway route (for a total of 369 journey routes in service), with 22 new points added to the location map. Two new locations in the UK – Immingham and Folkestone – are particularly noteworthy, as the island nation was not previously part of the route network. The key routes for shipments from China to Europe in 2021 were:

- Chongqing–Małaszewicze (50,7K TEUs);
- Xi'an–Duisburg (31,4K TEUs);
- Xi'an–Małaszewicze (29,8K TEUs).

Figure 12.

**KEY CHINA-EUROPE ROUTES IN 2021, TEUS.**



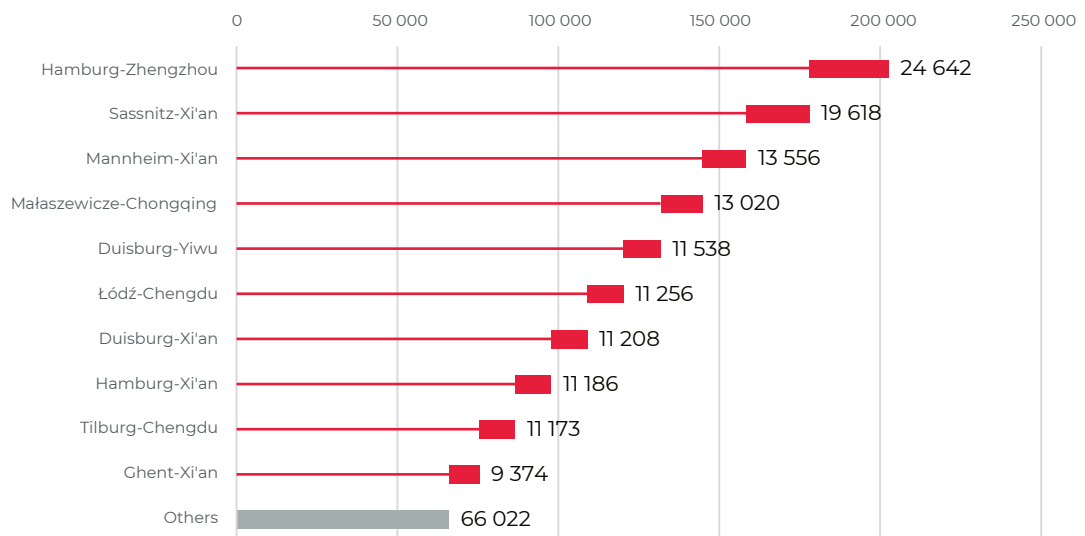
Source: authors' calculations.

The key routes for shipments from Europe to China in 2021 were:

- Hamburg–Zhengzhou (24,6K TEUs);
- Sassnitz–Xi'an (19,6K TEUs);
- Mannheim–Xi'an (13,6K TEUs).

Figure 13.

**KEY EUROPE-CHINA ROUTES IN 2021, TEUS.**



Source: authors' calculations.



The key European transit points for the Eurasian railway route in Europe are the border crossing of Małaszewicze where the track gauge change takes place, Germany’s largest port of Hamburg and the German cities of Duisburg, Sassnitz and Mannheim, Łódź in Poland, Tilburg in the Netherlands and Ghent in Belgium. Among the most important points along the route in China are Xi’an, Chengdu, Chongqing, Yiwu and Zhengzhou.

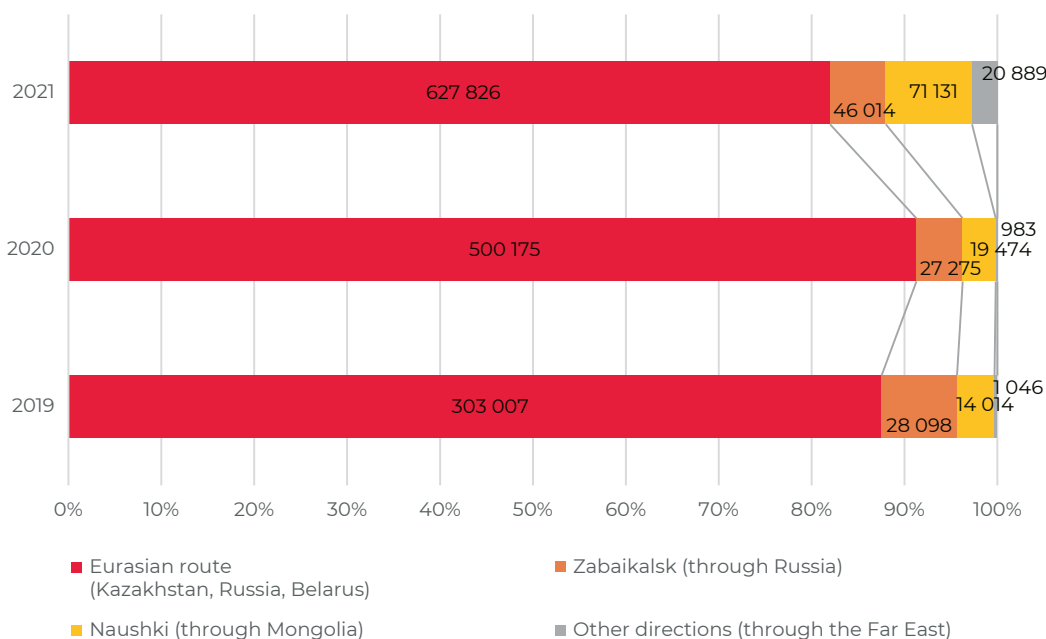
Compared with 2020, most routes displayed an increase in trade volumes. The diversification of supply routes has also increased. The cumulative share of the top ten routes in both directions has declined in favour of new locations, especially in the China–Europe direction. In 2020 the routes in the China–Europe direction outside the top ten accounted for 31% of traffic, rising to 44% by 2021.

In terms of alternative China–Europe–China railway routes, the Eurasian route through Belarus, Kazakhstan and Russia continues to dominate. According to border crossing statistics, the Eurasian route (with border crossings at Dostyk and Altynkol) accounts for 82% of the container flow in Eurasia.

At the same time, the past year was marked by the rapid development of other inland rail transportation routes. Based on container flow statistics, the Russian border crossing of Naushki, located on the border between Russia and Mongolia, was immediately behind the Kazakh border crossings with 71,1K TEUs (a +265% increase compared to the previous year). The Zabaikalsk border crossing between Russia and China accounted for 46K TEUs (+69%) and border crossings in Primorsky Territory saw 20,9K TEUs (+2,025%) in traffic.

Figure 14.

**SHARE OF MAJOR CHINA–EUROPE–CHINA RAIL CONTAINER TRANSIT ROUTES, TEUS.**



Source: authors' calculations.

The Eurasian route, which accounts for 82% of China–Europe–China rail container traffic according to border crossing statistics, remains a benchmark for other railway freight transportation routes and directions in Eurasia. The development of routes passing through alternative border crossings is based on a different freight base. For the Far Eastern border crossings, the sources of freight are North China and Japan, while the Eurasian route is geared towards West and Central China. Nevertheless, the accelerated development of all routes increases the attractiveness of trans-Eurasian railway transit and the 1,520 mm track gauge area.

# OUTLOOK FOR 2022

The record figures for 2021 are not so much a consequence of the market situation, which is also affecting other modes of transport, as the result of many years of effort and work to develop Eurasian rail container traffic, the systematic strengthening of existing competitive advantages and the search for new ones. Through the integration of the resources of infrastructure owners, the development of end-to-end transportation technologies and an agreed-upon tariff policy, it has been possible to create a unique transport and logistics product in the 1,520 mm track gauge space, which is seeing high demanded from customers in both Asia and Europe.

Despite the global economic recovery and hopes that the impact of coronavirus waves will shortly subside, international container logistics is growing used to the new reality of high ocean freight rates and the sustainable development of an inland rail alternative to deep ocean freight transportation. In 2022, the key issue for the railway sector will be the ability to maintain current freight volume growth rates. This goal puts operational efficiency and improved infrastructure capacity at the forefront. At the same time, the route across the EAEU is interdependent with the adjacent infrastructure of the 1,435 mm track gauge area. Another important factor, therefore, is the ability of all stakeholders to work together for the common good. Regular services through 'minor' terminals at the Polish–Belarusian and Polish–Ukrainian–Belarusian borders are expected to be launched in 2022.

In addition to the infrastructure aspect, the removal of administrative and customs barriers could play a significant role in improving operational efficiency. This could include, for example, the introduction of a single electronic consignment note for the entire route, which is something the Eurasian Economic Commission and EAEU member nations are working towards. A test shipment of empty well cars using only an electronic consignment note was conducted on the Eurasian railway route at the end of 2021. The train travelled along the Brest–Dostyk/Altynkol route. The pilot project is the first step in the transition to an end-to-end electronic format for consignment notes in the transportation of goods both across the EAEU space and, in future, along the entire China–Europe–China route. The creation of a single blockchain system and a single CIM/SMGS space is on the long-term agenda.

The diversification of routes within the Eurasian railway corridor continues. A further increase in the volume of transported goods through the ports and border terminals of Kaliningrad Region is expected in 2022. Multimodal transportation in China–Europe–China traffic, including with the use of the common CIM/SMGS consignment note (since 2019), is becoming an increasingly attractive option. There are also plans to develop the northern branch of the route to Finland.

Another important task is the development of projects to introduce electronic navigation seals that will make it possible to expand the categories of transported goods falling under the regime of countersanctions in Russia. The pilot transportation of containers carrying sanctioned goods across Russia has been underway since spring 2020, using the GLONASS electronic navigation seals. In total, 1,200 TEUs of sanctioned freight were transported along the Eurasian railway route in 2021, compared with 600 TEUs transported in 2020. This transportation segment has

great potential and is of interest both to EU food producers and Chinese consumers. The delivery times for inland rail shipping are much lower than by sea, while costs are comparable. At the same time, delivery by rail is much cheaper than by air, which is especially important for products with a short shelf life.

Furthermore, test transportations using intelligent sealing systems were also carried out in 2021 as part of a multilateral agreement signed in 2019 by the Belarusian and Russian railways, the Eurasian route operator and manufacturers of intelligent sealing systems in order to conduct tests and identify procedures for rapid responses from the security services of Belarusian Railway and the Departmental Security Service of Railway Transport of the Russian Federation. The further development of this project in 2022 will ensure the highest possible level of freight safety, which is a key criterion for users of trans-Eurasian transportation services.

The past year has shown the ability of the railway sector to operate under conditions of stress and uncertainty. 2022 should prove the sustainability of Eurasian rail transit and its acquisition of new advantages along with the existing ones.