



Analysis of the potential of the development of rail container transport market in Poland

Final Report

Contract No 2018CE16BAT079

Written by JANA PIERIEGUD, Ph.D.
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LIST OF ACRONYMS AND ABBREVIATIONS

BAC	Baltic-Adriatic Core Network Corridor
BCh	The Belarusian Railway
BRE	Belt & Road Economies
BRI	Belt and Road Initiative
BY	The Republic of Belarus
CEF	Connecting Europe Facility
CIS	The Commonwealth of Independent States
CNC	Core Network Corridor
CZ	The Czech Republic
CAGR	Compound Annual Growth Rate
EAEU	Eurasian Economic Union
EFC	European Financial Congress
ERTMS	European Rail Traffic Management System
ETCS	European Transport Control System
EU	The European Union
FEACN	Foreign Economic Activity Commodity Nomenclature
GDP	Gross Domestic Product
GVC	Global Value Chain
GUS	Statistics Poland
HS Code	Harmonised System of Trade Classification
IEC	Infrastructure Economics Center (Russia)
IMF	International Monetary Fund
KPI	Key Performance Indicator
KPK	National Railway Programme (Poland)
NBC	North Sea-Baltic Core Network Corridor
NOSTRAC	North-South Transport Corridor
OIU	Public-service infrastructure
OSJD	Organisation for Cooperation of Railways
PL	The Republic of Poland
PKP PLK	PKP Polskie Linie Kolejowe S.A.
PPP	Purchasing Parity Power
RFC	Rail Freight Corridor
RRT	Rail-Road Terminal
RZD	Russian Railways
TELTC	Trans-Eurasian Land Transport Corridors

TEN-T	Trans-European Transport Network
TEU	Twenty-foot Equivalent Unit
TiVA	Trade in Value Added
tkm	tone-kilometres
TRACECA	Transport Corridor Europe – Caucasus – Asia
UIC	International Union of Railways
UIRR	International Union for Road-Rail Combined Transport
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UTK	Office for Railway Transport (Poland)
	International Union for Road-Rail Combined Transport
WEF	World Economic Forum
WTO	World Trade Organisation

EXECUTIVE SUMMARY

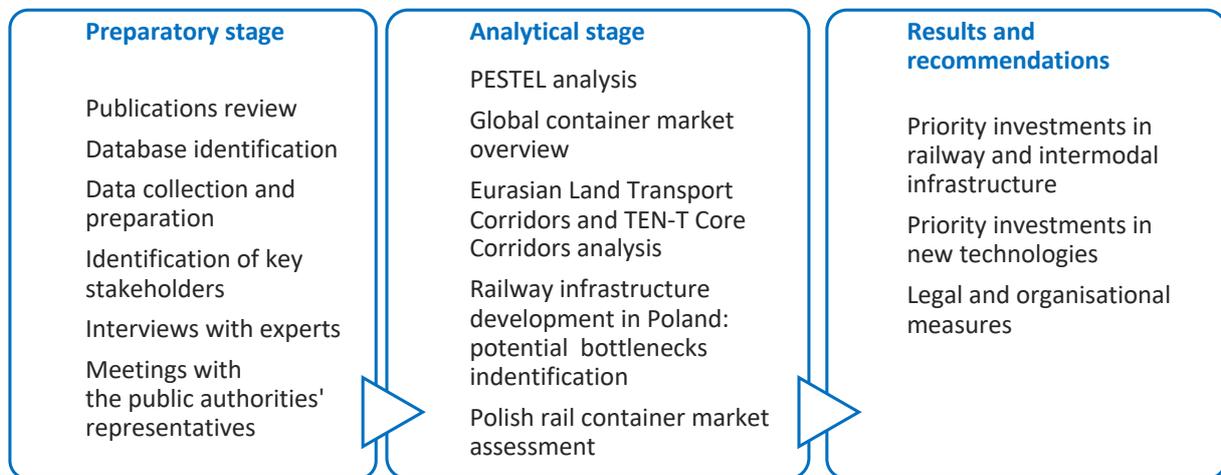
1. The development of rail container transport in Poland is affected by different groups of factors, such as: global megatrends, macroeconomic trends, technological progress, global and European transport trends as well as the competitive Polish rail market environment and railway infrastructure development.
2. Geopolitical and economic as well as technological and environmental factors will have the most significant impact on container transport market development in the next ten years both on a global and national scale. Macroeconomic trends and recent forecasts show that the global economy will experience a slowdown from 2020 onwards. Global trade is forecast to grow faster than the GDP. Poland has a significant imbalance between exports and imports in trade with China, which will be very difficult to compensate in the next years.
3. Germany and China are the most central economies, attracting value added from most neighbours. For Belt & Road Economies (BRE) there are two gravitational centres, China and Russia. Also, Poland, over half of whose export is global value chains based, is well-connected with other countries.
4. Containerised trade is expected to continue its growth during 2018-2026 at the average rate of 4.6% worldwide. The global container seaports' throughput is forecast to grow by 5.5% annually in 2019-2023 reaching almost 1,000 million TEU. The estimations for the Polish seaports, which showed a double-digit annual growth rate in past years, are still positive with over 6 million TEU in 2028.
5. The overall container handling in two world's largest ports, Shanghai and Singapore, were comparable to the volume jointly served by top 15 European container ports. In Europe, the leading northern ports reloaded twice as much as the southern ones. The three leading European ports (Rotterdam, Antwerp and Hamburg) are significantly ahead of the rest. Hinterland container train connections, including transcontinental, play a significant role for these ports' competitiveness. In 2017, the share of rail transport in hinterland traffic of Gdańsk was about 35%, while only 26% in case of Gdynia (compared to 41% in Hamburg and 53% in Koper).
6. The Northern Eurasian corridor (via China, Kazakhstan, Russia, Belarus and Poland) is currently the fastest and most reliable route for rail container transport between Asia and Europe with almost 325,000 TEU carried in 2018. Depending on the scenario, the traffic of 437,000 – 4,800,000 TEU is expected by 2030. Two significant factors will affect this development: rail transport subsidies by Chinese local governments and the infrastructure capacity along main railway routes and border crossings, especially between Poland and Belarus.
7. Between 2004-2018 the volume of rail freight transport performance in Poland increased by only 14%: from 52.3 to 59.6 billion tkm. A typical feature of Polish railway market is a low (about 7%) share of transit. At this stage the potential for a further growth (2019-2028) is rather low, and it may reach about 65 billion tkm. Modal shifts in Polish freight transport is suppressed by high dynamics of road transport. At the same time, no substantial changes in the commodities' structure of rail freight transport in Poland. In addition, rail operators' competitiveness and efficiency are reduced by railway infrastructure upgrade projects until 2023.

8. The increase of containerised rail cargo between 2004-2017, while reaching a 14% CAGR, showed a fluctuating growth. The last 3-year period of continuous growth, this time reaching 62%, occurred between 2016-2018. Such a positive trend is not expected to manifest itself again in the coming years. Considering the strong correlation between the volume of containerised freight rail transport and the GDP and the volume of Poland's foreign trade and its main trade partners, especially Germany and China, the forecast growth of the relevant seaborne transport, the potential for growth in rail transport can reach 1.2 million TEU, up to the level of 3 million TEU by 2028.
9. There is a growth potential for both core TEN-T corridors: the Baltic – Adriatic (BAC) and the North Sea – Baltic (NSB). The largest increase in international transport can be expected on mainline E20 as a part of NSB Corridor, generated by growth of transit between Europe and Asia (up to 650,000 TEU by 2028), but only in case the operational and technical bottleneck on the Terespol-Małaszewicze/ Brest border crossing is removed. The development of international rail container transport within the BAC Corridor depends on the upgrade of the railway access to Gdańsk and Gdynia seaports, opening an extended port (dry port) on their hinterland, which will allow for an efficient consolidation and deconsolidation of cargo moving to/from both main Polish seaports, as well as to remove the bottlenecks on the border crossing with the Czech Republic and Slovakia.
10. Over 50% of the land rail-road terminals' (RRTs) capacity in Poland is concentrated in three urban areas: Katowice (4 terminals with 26% of total capacity), Poznań (4 terminals with 19% of total capacity), and Warsaw (3 terminals and 8% of total capacity); another 10% are located around Wrocław and Łódź (2 terminals in each area). Many RRTs remain railway sidings, using existing track system, and not being intermodal terminals. The only four land RRTs have 700-m or longer loading-reloading tracks.
11. Major threats to Poland's rail container market development in next ten years include: a major fall in transport volumes in the event of a world financial crisis; trade wars between countries and regional trade agreements; no subsidising by China's government of the Chinese-European rail transport; insufficient transshipment capacity at the rail border crossings with Belarus.
12. A number of recommendations include activities, such as:
 - removal of bottlenecks in most major railway nodes and at border crossings in core and comprehensive networks;
 - construction of new rail-road terminals (in particular in Kraków, Łódź/Stryków, Warsaw, Wrocław, and in the Eastern Poland);
 - digital solutions implementation (for example, *Digital Corridor 4.0* and *Smart cross-border digital platform*);
 - the creation of a unit dedicated to rail-road transport development within the government administration, which will prepare a strategy for intermodal transport development in Poland, including a list of priority projects.

INTRODUCTION

The aim of this report is to propose investment and non-investment activities to stimulate the development of rail container transport in Poland, based on its assessed potential until 2028. It examines the external factors, global and European transport trends, and the competitive Polish rail market environment.

The research methodology includes the following three main stages:



In **Chapter 1**, the external environment factors affecting container business were identified using the PESTEL analysis. Findings from World Economic Forum (WEF), World Trade Organisation (WTO), United Nations Conference on Trade and Development (UNCTAD) reports, as well as current macroeconomic forecasts by International Monetary Fund (IMF), The Conference Board Global Economic Outlook and the European Financial Congress (EFC) have been used. The international merchandise current state of trade has been analysed using both the traditional Gross Trade Approach and the Trade in Value (TiVA) Approach, between different countries and selected groups of economies belonging to the Belt and Road Initiative (BRI) within the economic corridors. The analysis also explores the commodities structure in the trade between the EU, Poland, and China.

Containerised seaborne trade and liner shipping connectivity are described in **Chapter 2**, based on UNCTAD database. The container port throughputs are analysed on global and European scale, including the Mediterranean, the Adriatic, the North, the Baltic and the Black Sea ports. The development of selected seaports container capacity and their hinterland connectivity are investigated based on respective port authorities' data.

Chapter 3 focuses on main rail corridors between Asia and Europe and their interconnections to the TEN-T Core Corridors. Current transport trends are analysed based on data acquired from the railway operators' reports (RZD, KTZ, BCh) and the Polish rail regulatory authority, UTK. The forecasts for East – West – East and North – South – North rail traffic are presented using the findings of different studies (UIC, the European Parliament TRAN Committee, EDB Centre for Integration Studies) as well as the Baltic – Adriatic Core Corridor study.

Chapter 4 reviews railway infrastructure development plans in Poland. Railway lines used for intermodal transport and current bottlenecks both on the main lines and cross-border sections are identified using data collected in interviews with railway and intermodal operators, UTK's reports and the Baltic – Adriatic (BAC) and the North Sea – Baltic (NSB) Core Corridors studies.

The detailed analysis of Polish container market and their trends between 2004-2018 in comparison with other European countries is included in **Chapter 5**. Freight and container traffic intensity along main railway lines are examined using secondary sources, as PKP PLK's data on freight trains are not available. Also, main inter-urban and transit road traffic is analysed. The technical parameters and locations of rail-road terminals indicate their current potential. In addition, the examples of the strategies of four leading railway and intermodal operators developing their container business in the BAC and NSB Core Corridors are presented.

The conclusions review the main findings of the analysis. Polish rail container market development opportunities and threats are summarised using the SWOT table. Finally, priority investments in railway and intermodal infrastructure, new technologies as well as legal and organisational measures are proposed as **recommendations** for improving rail transport competitiveness in Poland.

1. EXTERNAL ENVIRONMENT FACTORS AFFECTING CONTAINER TRANSPORT

1.1. PESTEL ANALYSIS

The current and future external environment are turbulent. Therefore, it is important to indicate the most important changes that may affect the global, European and Polish container transport markets. To this end, PESTEL analysis offers relevant insights into the political, economic, socio-cultural, technological, environmental and legal factors.

Table 1.1. PESTEL analysis of container transport market

Factors and their impact assessment: * - low, ** - medium, *** - high	Description
<p style="text-align: center;">Political, Geopolitical and Geo-economic ***</p>	<ul style="list-style-type: none"> • the growing nationalism of world politics; • rising of geo-political and geo-economic concepts, such as: China’s the <i>Belt and Road Initiative</i> (BRI), also known as the <i>One Belt, One Road</i> (OBOR); Polish-Croatian <i>Trimarium Initiative</i>, covering the basins of three seas: the Adriatic, the Baltic and the Black Sea. • political conflicts between different countries impact trade relationships and commodity prices; • increasing role of bilateral connectivity partnerships, including EU-Asia Connectivity Strategy, EU-China Connectivity Platform, the 16+1 Framework and Economic Relations Between China and the Central and Eastern European countries; • increasing polarisation of societies, interstate conflicts and failure of national, regional and global governance (e.g. failure of rule of law, corruption, political deadlock) are among the global risks; • Brexit could lead to a lack of direct vessel calls from Asia into British seaports; it gives additional potential of transshipment growth for other European seaports; • Germany’s central geographic position as well as geo-economic potential are not only crucial for its relations with Central-Eastern Europe but also for its role as a European transit country; • Polish-Russian political relations are not conducive to the development of trade and freight transit through Poland.
<p style="text-align: center;">Economic ***</p>	<ul style="list-style-type: none"> • the new Globalisation 4.0 approach will re-shape frameworks for national and multinational cooperation, as well as production, transport and services business models; • open economies entail increased contributions of global trade towards GDPs and the growing importance of GVC in the global economy in the near future (see Section 1.3.2); • an increase in the share of exports of BRE in global trade is expected; • a forecast slowdown in the global economy, especially in China, will result in a lower growth rate of container transport and seaport throughputs;

Factors and their impact assessment: * - low, ** - medium, *** - high	Description
	<p>in the event of another economic and financial crisis – a breakdown of container transport;</p> <ul style="list-style-type: none"> • rising of trade wars between some countries (such as USA and China), as well as intensification of so-called trade paradox in which politicians formally support free trade, but often take action in the opposite direction, impact global and regional transport markets; • rising of price wars and destructive competition between global shipping alliances can result in an opportunity for some seaports and pose a risk to others; • growing competition between economic corridors in Eurasia; • economic downturn suffered by Poland’s main trading partners.
Socio-Cultural *	<ul style="list-style-type: none"> • progressing urbanisation will cause many economic, social, ecological challenges; • rising of mega-cities in Asia and Africa will shape economic and transport corridors; • behaviour of consumers, including e-consumers, will continue to have a significant impact on the decision to launch marketing channels in different regions; • sharing economy business model may affect trade in relation to certain consumer goods and transport services.
Technological **	<ul style="list-style-type: none"> • digital technologies affect the complexity and length of global value chains, reducing the costs of coordinating geographically dispersed tasks, but at the same time providing increased incentives to (re)locate production nearer large markets or near centres of innovation; • digital technologies foster trade in certain types of goods (time-sensitive, certification-intensive and contract-intensive goods), while at the same time reducing trade in digitizable goods; • the rapid growth of business-to-consumer e-commerce, including cross-border transactions, is a major implication for maritime trade, shipping and rail connections between Europe and Asia; • digitalisation and automation of transport and logistics operations have provided opportunities that did not previously exist: technological development can facilitate business intelligence for asset management and optimized operations; • digitalisation and global connectivity enable new business solutions; digital platforms allow for an improved supply chain efficiency; • the rise of large-scale cyberattacks and or malware causes significant economic damage, geopolitical tensions, or widespread loss of trust in the internet; the importance of cybersecurity in transport sector will rise; • blockchain holds potential to improve the security of the <i>Internet of Things</i> environment.

Factors and their impact assessment: * - low, ** - medium, *** - high	Description
<p>Environmental **</p>	<ul style="list-style-type: none"> growing environmental awareness of citizens, business and governments; the decarbonisation of transport is a part of governmental climate change mitigation programmes – a strong political support for rail and water transport as well as multimodal transport development in Europe; stronger focus on energy efficiency in production as well as transport and logistics business.
<p>Legal **</p>	<ul style="list-style-type: none"> national laws and international agreements foster or inhibit the development of mutual trade and transport relations; implementation of new digital solutions will require legislative changes; regulatory climate-protection mechanisms are being introduced worldwide.

Source: own elaboration based on UNCTAD (2018a), UNCTAD (2018b), WEF (2019), WTO (2018a), UPRS (2017).

The 2019 Global Risks Report confirms that the world is facing a growing number of complex and interconnected challenges (**Figure 1.1**)¹. For example, geopolitical and geo-economic tensions are rising among the world’s major powers. These tensions represent the most urgent global risks at present. Reconfiguring the mutual relations of deeply integrated countries is fraught with potential risks, and trade and investment relations among many of the world’s powers were difficult during 2018 (WEF, 2019). Eurasia is an example of the geo-economic space which has significantly changed and reconnected in past 15 years (**Box 1.1**).

Box 1.1. Geo-economics and Eurasia’s reconnection

Geo-economics is simply a new, sophisticated and updated version of old mercantilist praxis applied to a new global system where states, still central players, interact with new non-state and sub-state actors, but where geographic locations (and historic divisions) are no longer relevant. Geo-economics is thus a sort of ‘soft’ geopolitics behind the classical concepts of hard, state-centred geopolitics. At the same time, geo-economics questions the assumption that in the spread of globalisation and inter-dependence sees the end of power conflicts and rivalries: market access has substituted territorial conflicts and physical conquest.

While trade interconnectedness and evolution in global and regional production networks are indeed driven by the interests and needs of private companies on the global market, these are dependent on states and public actors at both national and local, urban level, for obtaining access to markets, security, favourable tax regimes and, particularly, infrastructure. Otherwise, considering the increasing integration of transnational production networks (Global and Regional Value Chains) at regional and cross-regional level, the spatial location of economic activity and distances between production centres and final markets are not only an important element to

¹ A *global risk* is defined as an uncertain event or condition that, if it occurs, can cause significant negative impact for several countries or industries within the next 10 year.

consider for a micro-economic analysis of trade and production, but they assume relevance in reshaping centre-periphery relations and hierarchies among states and hence gain geopolitical relevance. This emerging new system both exhibits more conflict and is more economically integrated, since market interdependencies do not only take place in the virtual spaces of finance and do not per se lead to inter-state cooperation. Shifting direction in trade flows, changes in the physical distribution of economic activities inside and between the major centres of economic power and (re)emerging transport routes among them, represents the three complex geo-economic transformations which define the form of geo-politics and geopolitical analysis assume in the present day.

Eurasia – with the land-locked continental countries at its core – can be considered the main stage where this complex process of destructuring and restructuring of the geo-economic space, cooperation and competition has been taking place since the turn of the millennium. The shift in the geographic distribution of centres of power from Europe to Asia is matched by a parallel shift in trade flows, for instance from North – South (developed – developing countries) to stronger South-South relations and in the relative weight of trade routes (from exclusively maritime to a emergence of a mixed maritime-continental connectivity).

As paths of economic growth and recession along with financial and macro-economic policies among the biggest world economic players (i.e. China, Japan, the US and Europe) de-synchronize at the global level, a process of re-synchronization and re-aggregation of economic and commercial dynamics is taking place at the continental and regional level. A ‘new continentalism’, originally fuelled by energy trade and now increasingly encompassing non-energy manufacturing trade, is emerging.

Today, while emerging powers and markets in wider Eurasia – including Asia and the Middle East – have entered a period of economic uncertainty and potential political instability, the West is not able to assume its traditional role as political-diplomatic stabilizer and global economic shock-absorber. Meanwhile, in the past decade, the integration of wider Eurasia – driven primarily by Asia – has led to the synchronization of the economic dynamics across a vast space, encompassing the Indian and the Pacific Oceans as well as continental Eurasia. These three separated sub-systems are now beginning to take shape as a single, coherent and self-sustaining geo-economic space and countries in this space are increasingly forced to coordinate their strategies toward greater connectivity and economic exchange, despite geopolitical fragmentation and the potential for political-military conflicts or economic crises.

Against this backdrop, in the coming decades, the development of functioning transport networks in the still poorly-connected but geo-economically integrating Eurasian – macro-space will prove the catalyst both for overcoming the present domestic economic constraints in many Eurasian economies and re-shaping the economic, industrial and commercial face of the continent for many years. This geo-economic tectonic shift has the potential, to redefine the geopolitical balance in the mid-term perspective not only inside Eurasia but between Eurasia and the West as well.

Source: Pepe (2016); Pepe (2017).

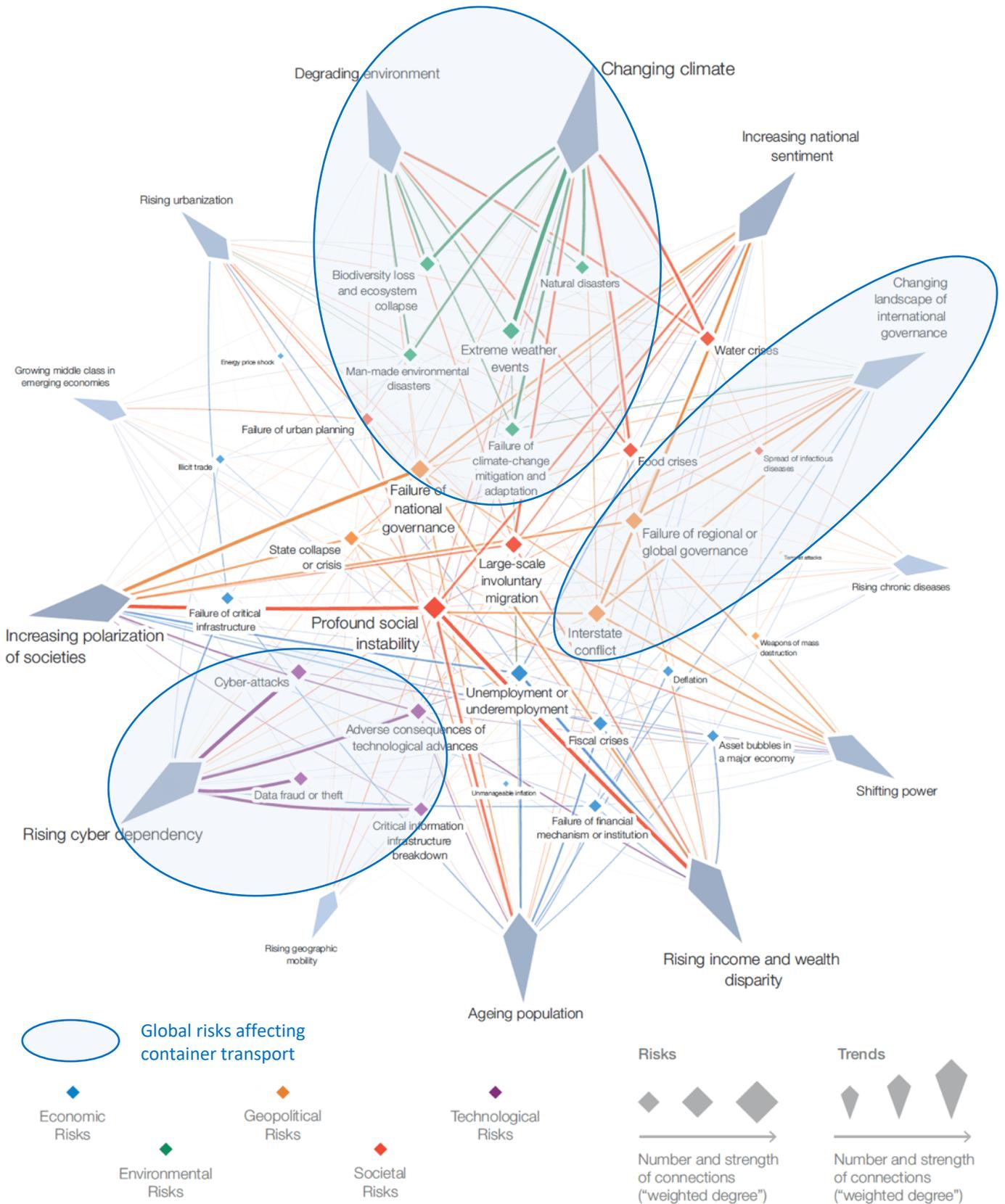


Fig. 1.1. The risks and trends interconnections map 2019

Source: own modification based on WEF (2019), p. 6.

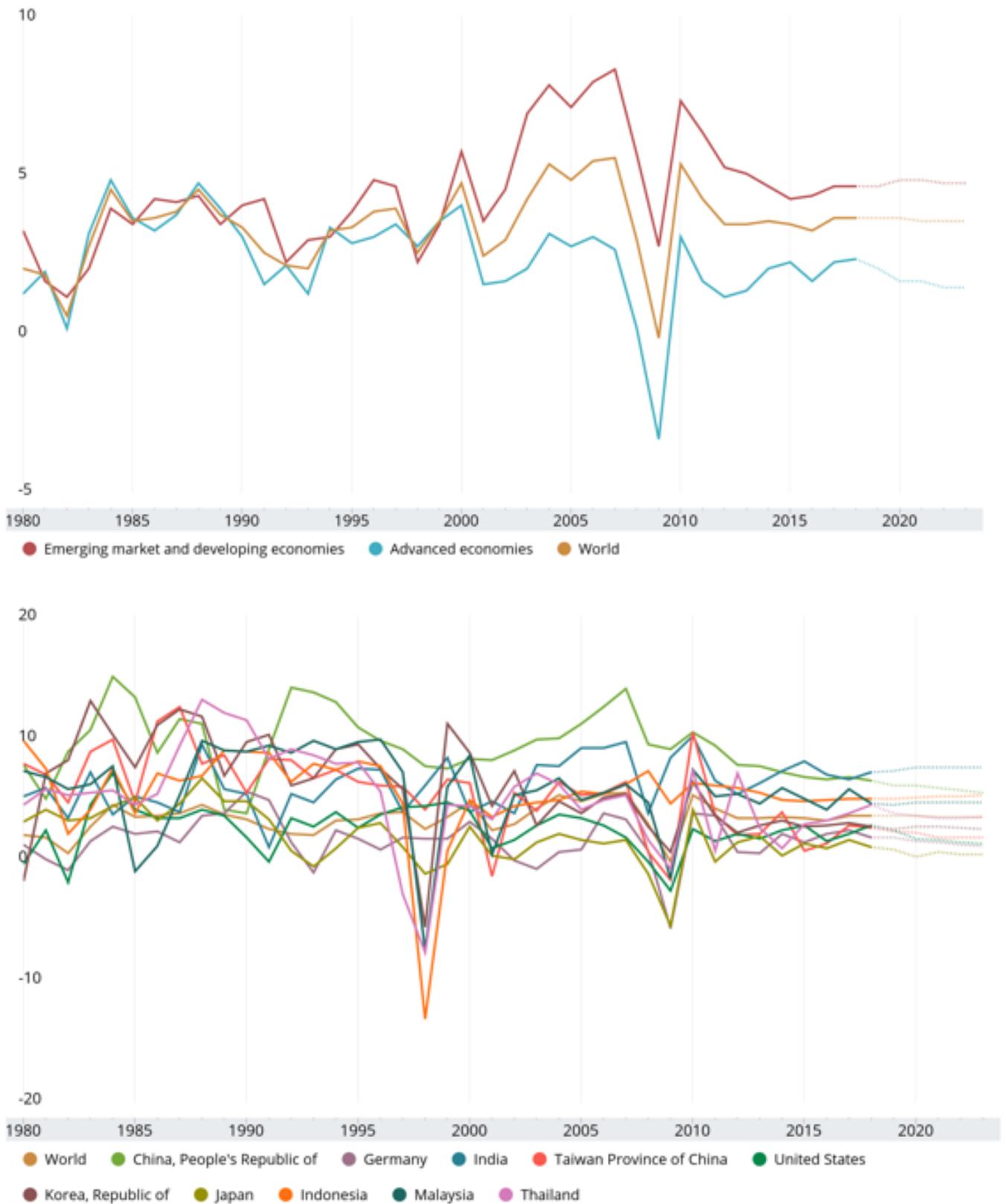
Environmental risks continue to dominate the results of the 2019 Global Risks Perception Survey and include: extreme weather, failure of climate-change mitigation and adaptation, and natural disasters. In addition, technology continues to play a profound role in shaping the global risks landscape. Concerns about data fraud and cyber-attacks are prominent again in this Survey, which also highlighted a number of other technological vulnerabilities (WEF, 2019).

Urbanization as a demographic megatrend leads towards the development of megacities, mega-regions and mega-corridors connecting two major cities or mega-regions (for example, Guangzhou – Shenzhen – Hong Kong). The United Nations estimates that by 2050 more than 60% of the global population will be living in cities. According to Euromonitor International 2018 White Paper, global demographics are always shifting, but the population tidal wave in the coming decades will completely reshape the global economy. In 2017, there were 33 megacities, each with a population of 10 million or more. Developing nations boasted 26 megacities compared to seven in developed countries. The Asia-Pacific region contains their highest concentration: 19 megacities, including six in China and four in India, although the impact of aging populations is likely to slow future expansion of key east Asian powerhouses such as Shanghai, Beijing and Seoul. Currently, Tokyo is the world's most populous city, but Jakarta is predicted to reach 35.6 million people by 2030 to become the biggest megacity of all. Six new megacities – Luanda, Dar es Salaam, Baghdad, Chennai, Bogota and Chicago – are expected to emerge by 2030, bringing the global total to 39. The fastest population growth is to be seen in African cities in the coming years. But while the populations of newer megacities are growing faster, the biggest cities in the developed world remain far more affluent. Of the newcomers, Dar es Salaam and Chennai show by far the largest projected percentage growth in GDP (WEF, 2018).

1.2. MAIN MACROECONOMIC TRENDS AND FORECASTS

The last decade has been punctuated by a series of broad-based economic crises and negative shocks, starting with the global financial crisis of 2008-2009, followed by the European sovereign debt crisis of 2010-2012 and the global commodity price realignments of 2014-2016. As these crises and the persistent headwinds that accompanied them subside, the world economy has strengthened, offering greater scope to reorient policy towards longer-term issues that are holding back progress along the economic, social and environmental dimensions of sustainable development. In 2017, global economic growth is estimated to have reached 3%, a significant acceleration compared to growth of 2.4% in 2016, and the highest rate of global growth recorded since. The recent acceleration in world gross product growth stems predominantly from firmer growth in several developed economies, although East and South Asia remain the world's most dynamic regions (UN, 2018, p. VII).

The International Monetary Fund (IMF) projects a global growth at 3.7% for 2018-2019. Advanced economies are expected to expand by 2.1% in 2019 and 1.7% in 2020. In the Euro area, the growth rate is forecast at 1.9% in 2019. Growth in emerging markets and developing economies is forecast to remain steady at 4.7% in 2018-2019, and to rise modestly over the medium-term perspective. In China, growth is projected to moderate from 6.9% in 2017 to 6.6% in 2018 and 6.2% in 2019. India's growth is expected to increase to 7.3% in 2018 and 7.4% in 2019. In the ASEAN-5 (Indonesia, Malaysia, Philippines, Thailand, Vietnam), growth is expected to be 5.2% in 2019 (IMF, 2018).



©IMF, 2018, Source: World Economic Outlook (October 2018)

Fig. 1.2. Real GDP growth by regions and countries (percent change)

Source: IMF Data Mapper, October 2018.

The Conference Board Global Economic Outlook 2018 forecasts that the global economy will continue expanding at rate higher than 3% in early 2019, but the growth is showing signs of peaking, especially in the Euro Area and emerging markets. China’s economic uncertainty in 2018 will play into a longer-term slowdown, and growth projections beyond 2019 critically depend on China’s ability to shift towards more qualitative growth sources driven by human capital and productivity improvements (Figure 1.3). India is forecast to grow by 5.9% between 2019-2023 and 5.5% in the following five years and remains one of the best-performing major economies (The Conference Board, 2018a). This is also confirmed by the research released by Standard Chartered Bank at the beginning of 2019. It estimates that seven of the world’s ten largest economies by GDP measured in purchasing power parity (PPP) could be the present emerging markets (Figure 1.4). By 2030, GDP generated jointly by Asian economies will account for roughly 35% of global GDP, up from 28% last year and 20% in 2010. India's rise would also reflect Asia's becoming the dominant economic region of the planet as the size of its output starts to match the size of its population.

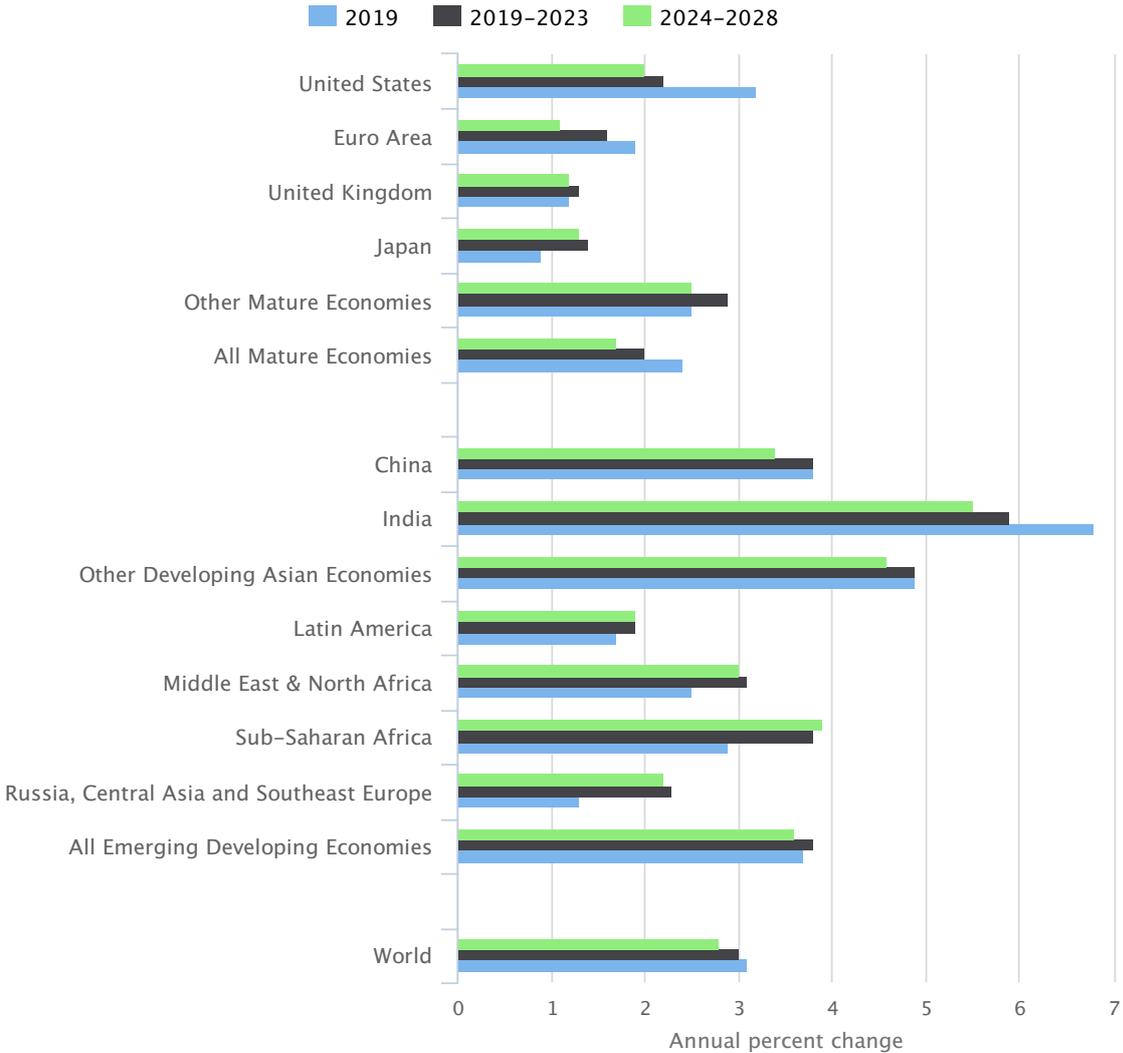


Fig. 1.3. GDP growth forecasts by regions in 2019-2028 (percent change)
 Source: The Conference Board (2018b).

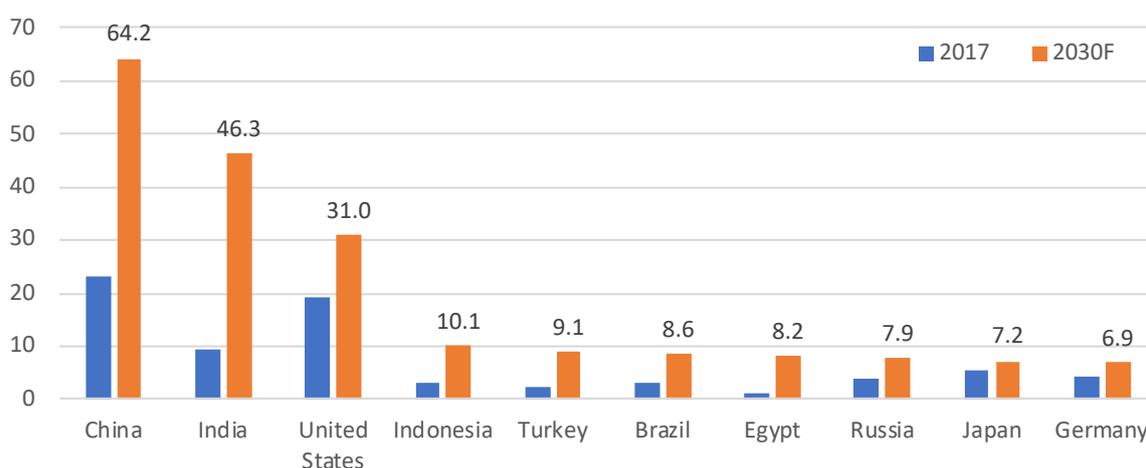


Fig. 1.4. World's largest economies in 2030 (GDP by PPP, trillion USD)

Source: own elaboration based on IMF data (2017) and Standard Chartered Bank forecast as of January 2019.

The biggest economy in Europe, Germany, is predicted to grow by 1.7% in 2019-2023 and only by 1.2% in 2024-2028. Poland is projected to grow by 3.6% in 2019, but in the long run will drop to 1.7% as private consumption growth cools, due to the negative effect of rising inflation on real disposable income and the limited room for further employment gains. Together, Europe's economies are expected to expand by 1.9% on average in 2019, down from 2.1% in 2018 and a 10-year high of 2.4% in 2017 (see [Table 1.2](#)). The slowdown is mostly the result of weaker global trade in the short-term perspective. Following the European Commission Autumn 2018 Economic Forecast, the same pattern is expected for EU-27, with growth forecast at 2.0% in 2019 and 1.9% in 2020. In the longer perspective, supply-side factors such as labour, capital and productivity will push down growth rates towards 1.4% in the next decade (Economic and Financial Affairs, 2018).

Table 1.2. GDP growth forecasts by selected countries and areas in 2019-2028 (percent change)

Group of countries/Country	Previous period 2013-2017	Estimate 2018	Forecast 2019	Project 2019-2023	Trend 2024-2028
World	3.1	3.2	3.1	3.0	2.8
All mature economies	2.1	2.4	2.4	2.0	1.7
Europe	1.7	2.1	1.9	1.6	1.2
of which Euro Area	1.4	2.0	1.9	1.6	1.1
France	1.4	1.5	1.6	1.6	1.3
Germany	1.8	1.9	1.9	1.7	1.7
Netherlands	1.8	3.0	2.5	1.8	1.7
Poland	3.3	4.7	3.6	1.7	1.7
Japan	1.5	1.1	0.9	1.4	1.3
South Korea	3.0	2.6	2.6	3.4	2.6
USA	2.4	3.1	3.2	2.2	2.0
All emerging markets and developing economies	4.0	3.8	3.7	3.8	3.6
China	5.1	4.1	3.8	3.8	3.4
India	7.0	7.2	6.8	5.9	5.5
Russia	0.3	1.6	1.3	0.6	0.5

Source: own elaboration based on data The Conference Board (2018b).

According to the European Financial Congress (EFC)'s forecasts,² the GDP growth rate in **Poland** is expected to decline from 4.5% in 2018 to below 3% in 2021 (**Figure 1.5**). Individual consumption will continue to be a major GDP growth driver, which will be fostered by very low unemployment (below 4%) and fast-growing wages (6-7% annually). However, one should not expect consumption growth to remain at the present level (4-5% annually) and it will probably drop to approx. 3% in 2021. In addition to macroeconomic forecasts, a survey among the experts of the EFC summarised the threats to the economic situation and the stability of the financial system in Poland by 2021.³ Among them, the economic downturn is at the forefront of Poland's main trading partners, primarily in the euro area, and the supply barrier on the labour market (**Figure 1.6**).

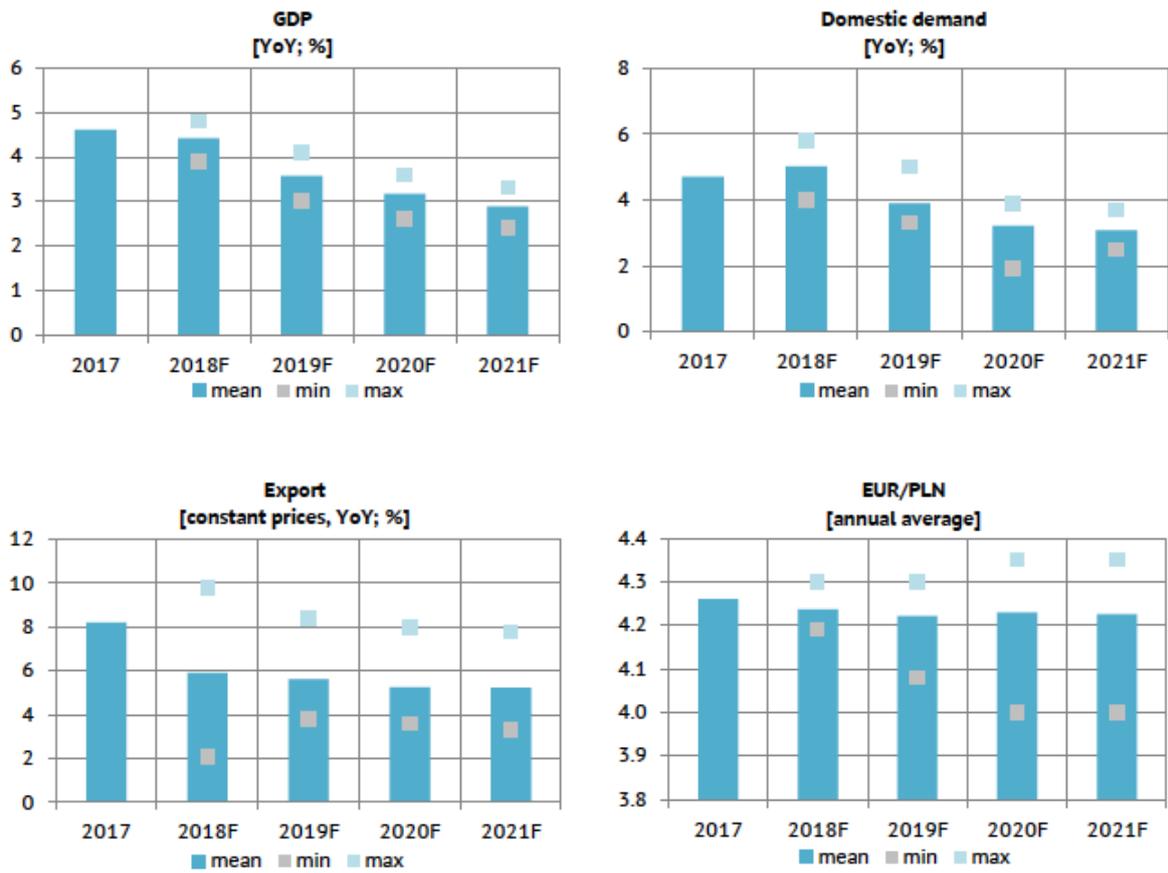
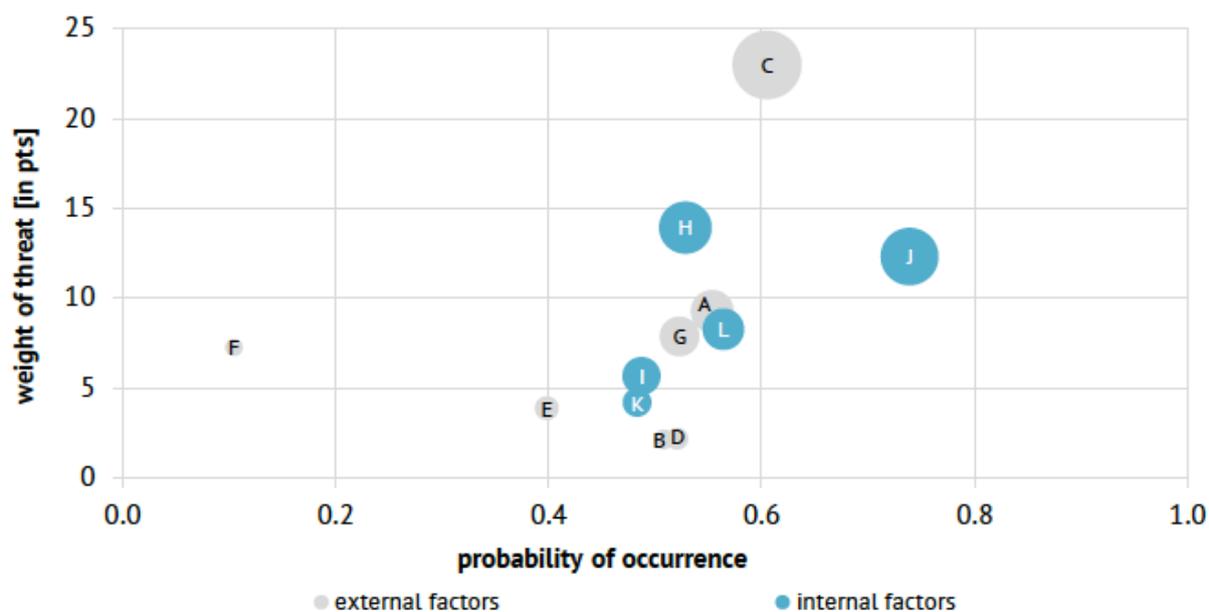


Fig. 1.5. Forecasts of selected macroeconomic indicators of Poland’s economy for 2018-2021

Source: EFC (2018), p. 3.

² Starting 2018, the EFC is preparing macroeconomic forecasts for Poland. The forecasts are published in June and December each year. They are prepared by EFC experts, chief economists from the largest banks, regulatory bodies, consulting firms, as well as representatives of the academia. The EFC forecasts pay attention to both quantitative aspects as well as qualitative and behavioural factors.

³ The experts’ opinions are grouped into homogeneous classes. They are then presented to all the experts participating in the project. The experts are asked to distribute the total of 100 points among particular groups of answers depending on how important they consider the threats and recommendations to be. The experts are also asked to assess how likely the threats are to materialize.



Note: the size of the circle represents the sum of the products of factor weight multiplied by factor probability of occurrence as assigned the experts.

- A Protectionism and international restrictions
- B Economic downturn in the USA
- C Economic downturn suffered by Poland's main trading partners
- D Economic downturn in China
- E Italian crisis and new disruptions in markets leading do debt crises in the Eurozone
- F Disintegration of the Eurozone
- G Correction and increase in volatility in global financial markets resulting in capital outflow and depreciation of currencies in emerging economies (including Poland)
- H Excessive growth of imbalances resulting from procyclical fiscal and monetary policy in Poland
- I Reduction of EU funding for Poland resulting from the EU rule-of-law procedure
- J Supply barrier in the labour market (limited availability of skilled labour; unfavourable demographic structure and insufficient labour migration)
- K Continued wage growth exceeding growth in labour productivity
- L Uncertainty with regard to economic policy resulting in private investment slowdown

Fig. 1.6. Major threats to Poland's economy in 2018-2021

Source: EFC (2018), p. 5.

1.3. INTERNATIONAL MERCHANDISE TRADE TRENDS

1.3.1. The Gross Trade Approach

Merchandise Trade Volume, Growth Dynamics and Geographical Structure

Global trade recorded its highest growth rate in six years in 2017, both in terms of volume and value. Merchandise trade volume grew by 4.7% (the average of exports and imports), marking the first annual increase in excess of 3.0% since 2011. The value of merchandise exports rose by 11%, to USD 17,730 billion (including significant re-exports or imports for re-exports), while commercial services exports increased by 8% to USD 5,280 billion. Significantly, the ratio of trade growth to GDP growth returned to its historic average of 1.5, far above the 1.0 ratio recorded in the years following the 2008 financial crisis (WTO, 2018a, p. 28). In 2018, global exports are nowcast to reach a record high of USD 19,600 billion.

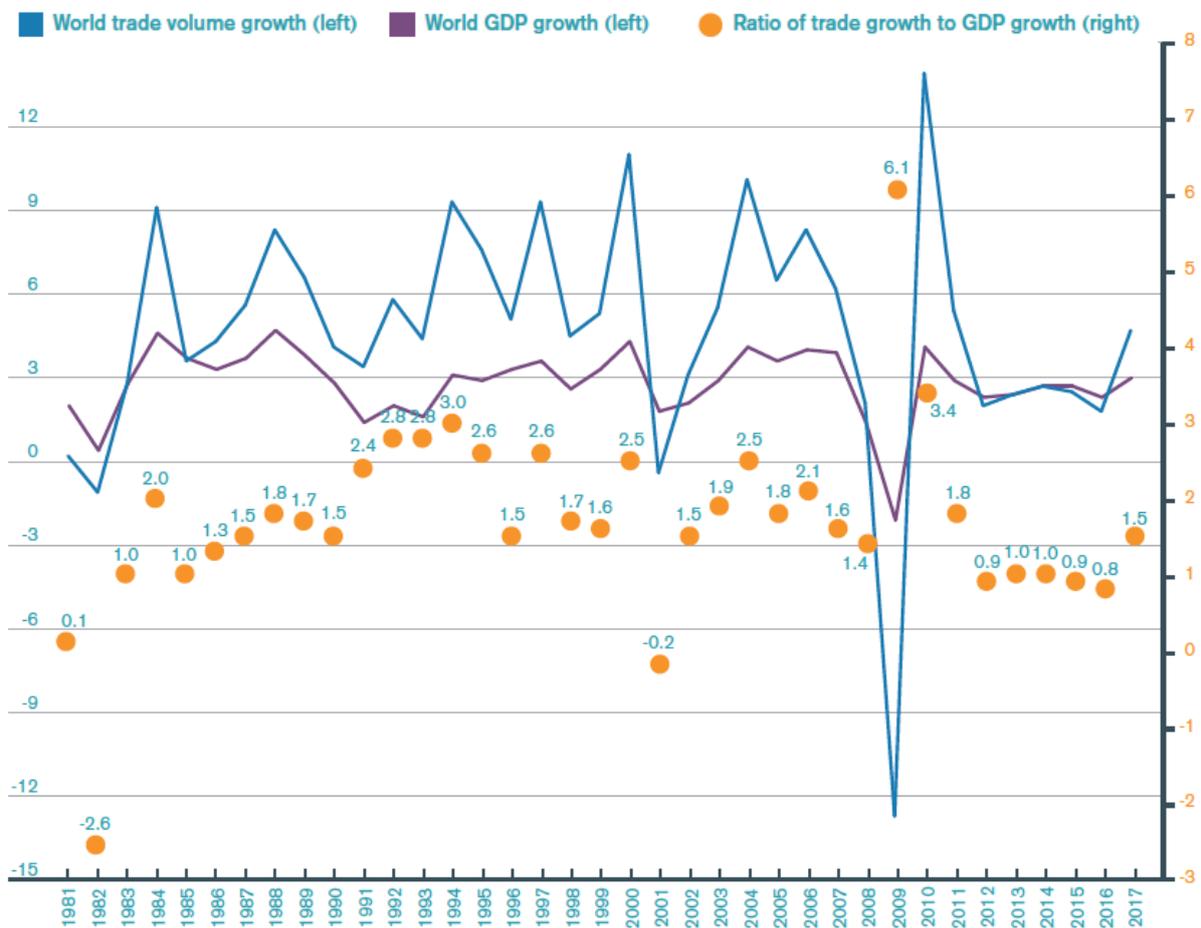


Fig. 1.7. World merchandise trade volume and world real GDP growth (annual percentage change and ratio)

Source: WTO (2018a), p. 29.

WTO reports that all regions expect the Middle East recorded merchandise trade volume growth in 2017. The increase in the growth was driven by rising import demand across regions but most notably in Asia which recorded the highest increase of 8.1% (Figure 1.8). The largest gains were reached on the import side in developing and emerging economies, where trade growth surged to 7.2% in 2017

from 1.9% in 2016. Merchandise exports grew by 3.5% in developed economies and by 5.7% in developing and emerging economies. European trade flows continued to rise at a moderate pace, with growth of 3.5% for exports and 2.5% for imports in 2017. Meanwhile, the EU-28 exports and imports (excluding intra-EU trade) rebounded strongly, with growth of 10% and 11% respectively, accounting for 34% of the total world trade.

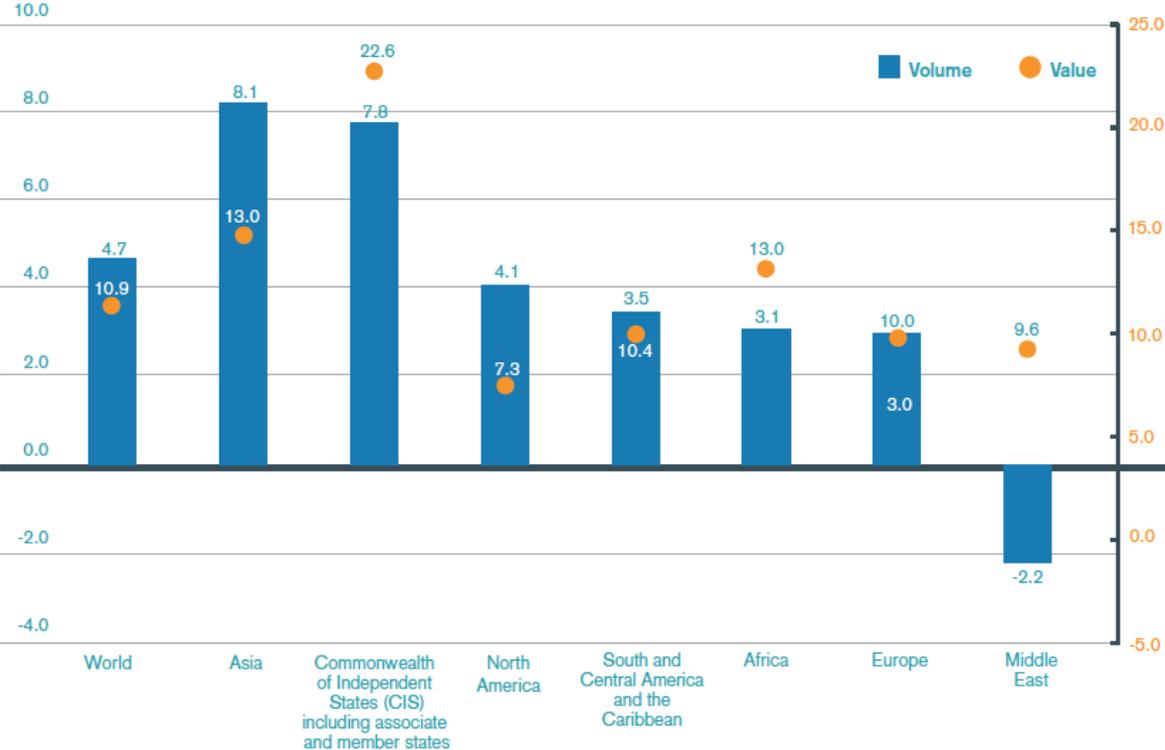


Fig. 1.8. Merchandise trade growth by regions in 2017 (annual percentage change)

Source: WTO-UNCTAD estimates. WTO (2018a), p. 12.

Among the main exporting economies, particularly strong increases were recorded for 2017 in South Korea (16%) and the Netherlands (14%). The world’s top-three exporters, China, USA and Germany, all experienced high growth rates under 7%, and accounted for merchandise exports totaling almost USD 5,300 billion (Figure 1.9). China remained the largest exporter of goods (USD 2,263 billion) and the United States the largest importer in 2017 (USD 2,410 billion), even if the European Union is considered as a single trader, with USD 2,122 billion in exports and USD 2,097 billion in imports (excluding intra-EU trade). The combined merchandise exports of China, South Korea and Hong Kong (China) amounted to almost USD 3,400 billion. In case of Hong Kong, USD 532 billion of 550 billion was reexports.

Europe’s most powerful economy, Germany shipped USD 1,448 billion worth of goods around the globe in 2017 and remained the third-largest exporter and importer of goods globally. The second biggest EU’s exporter and the fifth worldwide was the Netherlands (USD 652 billion). Collectively, the top-five world traders account for more than one-third of world trade, recording 38% of world exports and imports.

According to the Boeing forecast (2018), trade will grow faster than global GDP, at 3.4% on average annually for the next 20 years.

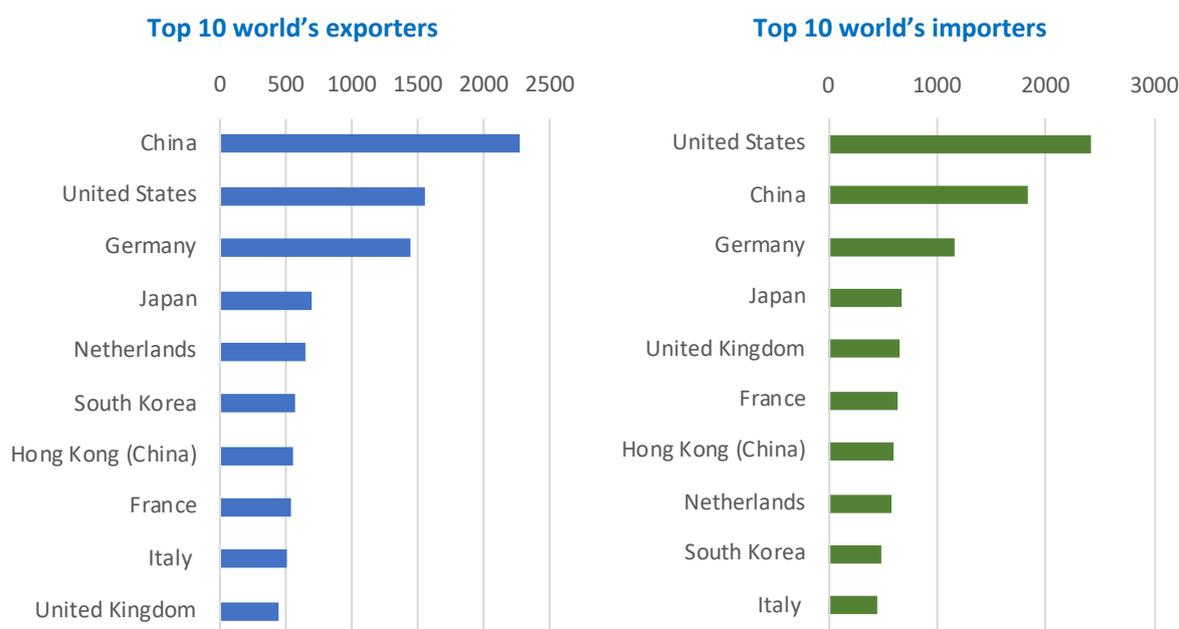


Fig. 1.9. Leading exporters and importers in world merchandise trade in 2017 (billion USD)

Source: own elaboration based on WTO-UNCTAD data.

The world's largest bilateral flows of merchandise trade run between China and the United States of America, and between their respective neighbouring economies (Figure 1.10). In 2017, goods worth USD 526 billion were imported by the United States from China. Goods worth USD 154 billion were shipped in the opposite direction. China's trade with Hong Kong Special Administrative Region (SAR), Japan, Taiwan, Province of China, and South Korea totalled USD 1,100 billion. The United States' trade with Mexico and Canada was worth almost the same amount (USD 1,000 billion). At a continental level, intra-regional trade was most pronounced in Europe. In 2017, 68% of all European exports were shipped to trading partners on the same continent. In Asia, this rate was 59% (UNCTAD, 2018a, p. 20).



Fig. 1.10. Main world import flows, 2017 (billion USD)

Source: UNCTAD (2018a), p. 20.

The European Union remains the most dynamic regional trade agreement, accounting for a third of world exports in 2017. Exports totalled USD 5,900 billion, up by 10%. This was fuelled by a strong growth in internal and external demand. Intra-EU trade flows account for 64% of EU total trade (Figure 1.11).

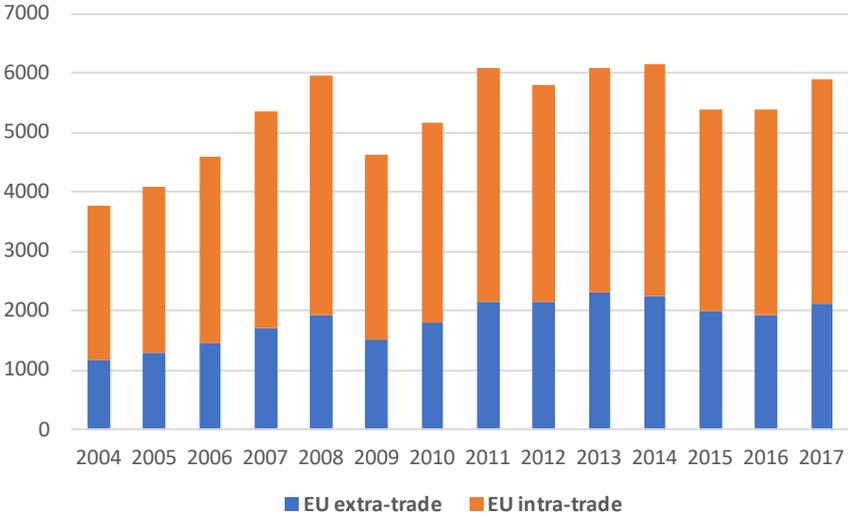


Fig. 1.11. EU-28 extra- and intra-trade (billion USD)

Source: own elaboration based on UNCTADstat data.

China is the EU's second-biggest trading partner following the United States and the EU is China's biggest trading partner (Figure 1.12). The total value of EU-28 exports to China has grown 3.7 times in last fifteen years (Figure 1.13). Germany shipped 44% value of EU's goods to China in 2017 (Figure 1.14) equalling 20% of China's import.

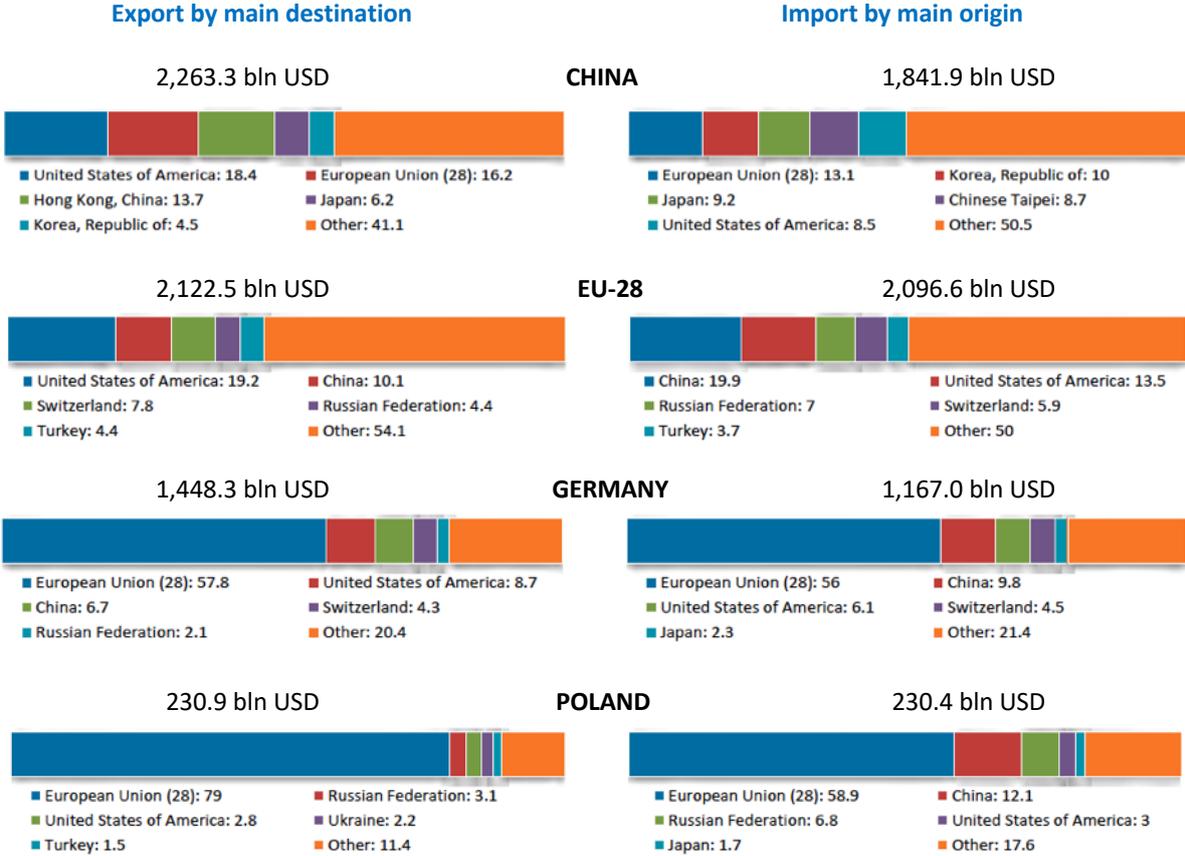


Fig. 1.12. Main trade partners of selected countries, 2016-2017 (%)

Source: own elaboration based on: WTO (2018b).

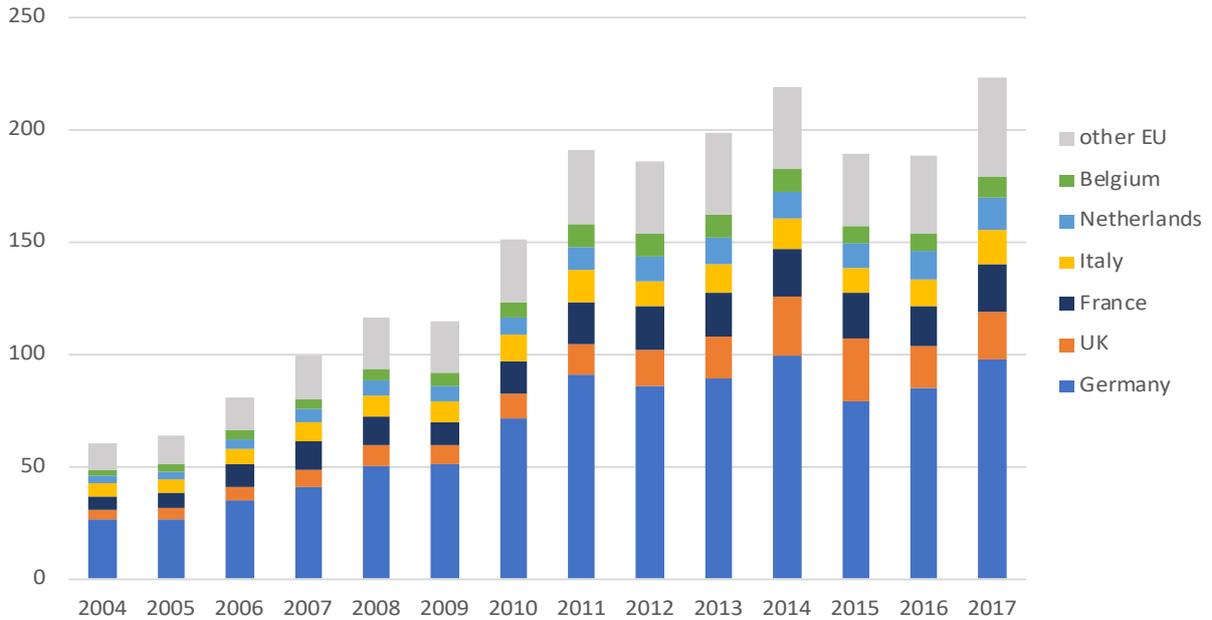


Fig. 1.13. EU-countries exports to China in 2004-2017 (billion USD)

Source: own elaboration based on UNCTADstat data.

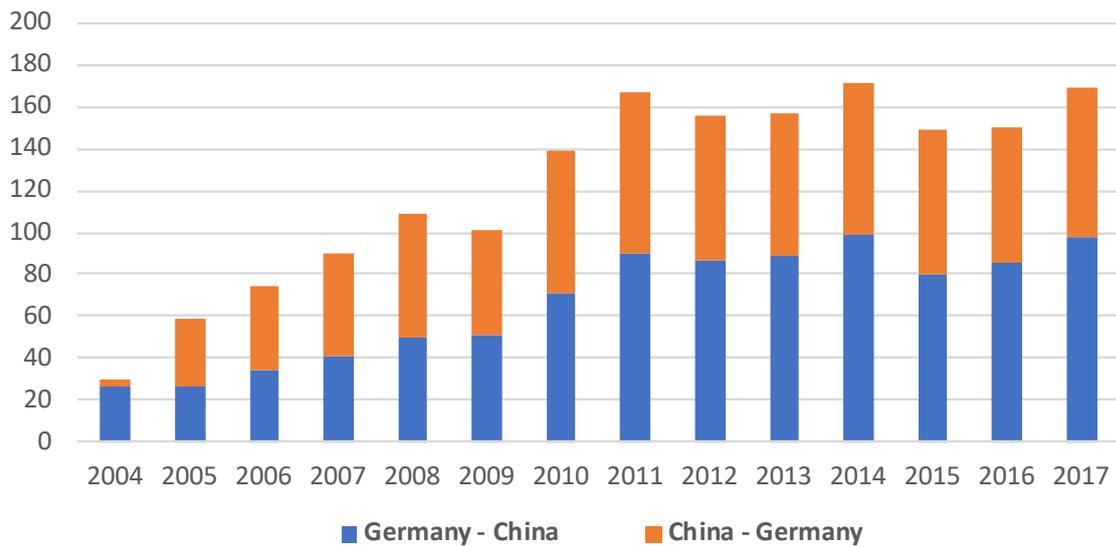


Fig. 1.14. Bilateral trade between Germany and China in 2004-2017 (billion USD)

Source: own elaboration based on UNCTADstat data.

Currently, the largest demand for freight transport is generated by trade turnovers between Germany and Eastern China (especially provinces near Beijing). The largest center of online trading is concentrated in the provinces around Guangzhou. Also, the central and western provinces show the largest growth rates of exports (Kosoy, 2017).

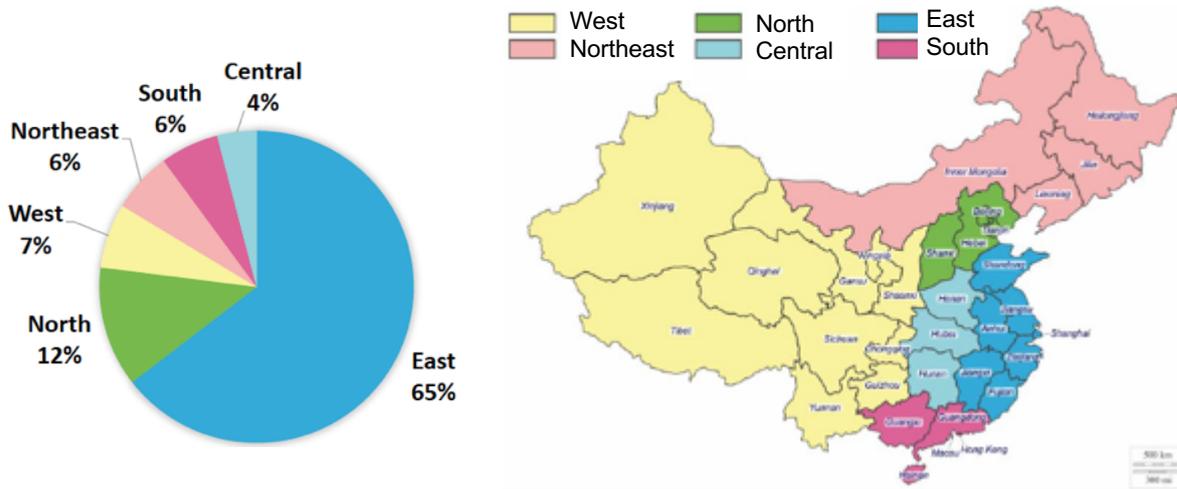


Fig. 1.15. The share of the macro regions of China in trade with EU (2016)

Source: V. Kosoy (2017), p. 5; based on National Bureau of Statistics of China.

According to the forecasts of Russian Infrastructure Economics Center (IEC), by 2030, the EU – China trade levels are expected to reach just under 150 million tons and EUR 843 billion, up by 38% and 72%, respectively compared to 2016. In case of crisis, mutual turnover is expected to be 30% lower. In the event of accelerated technologic progress, trade will increase by 10% (compared to the baseline scenario). Exports in tons from the EU to China will exceed exports from China to the EU by 2020. The value gap between exports from the EU to China and exports from China to the EU will gradually close.

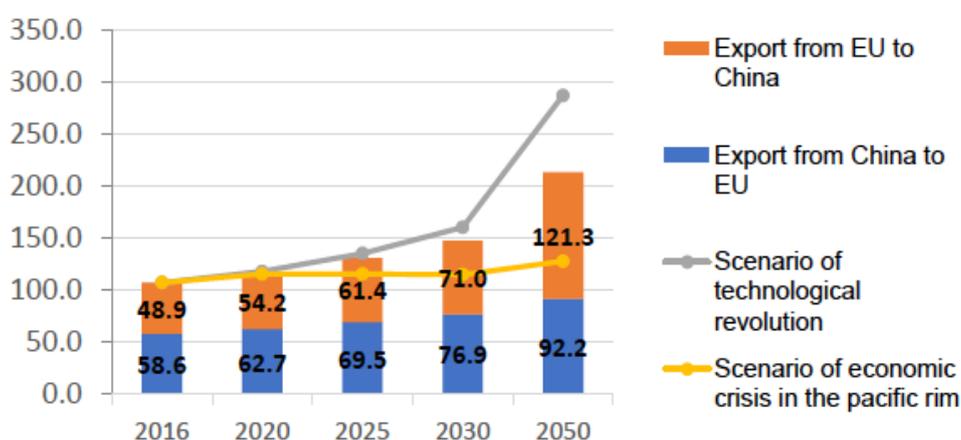


Fig. 1.16. EU – China trading scenarios (thousands of tons)

Source: Kosoy (2017).

In 2017, Poland exported USD 231 billion worth of goods (up by 14%) and ranked 8th largest EU trader and 22nd globally. Poland’s main export (79%) and import (59%) partners are EU countries. Germany with 27% share is a key market for Polish goods (Figure 1.17).

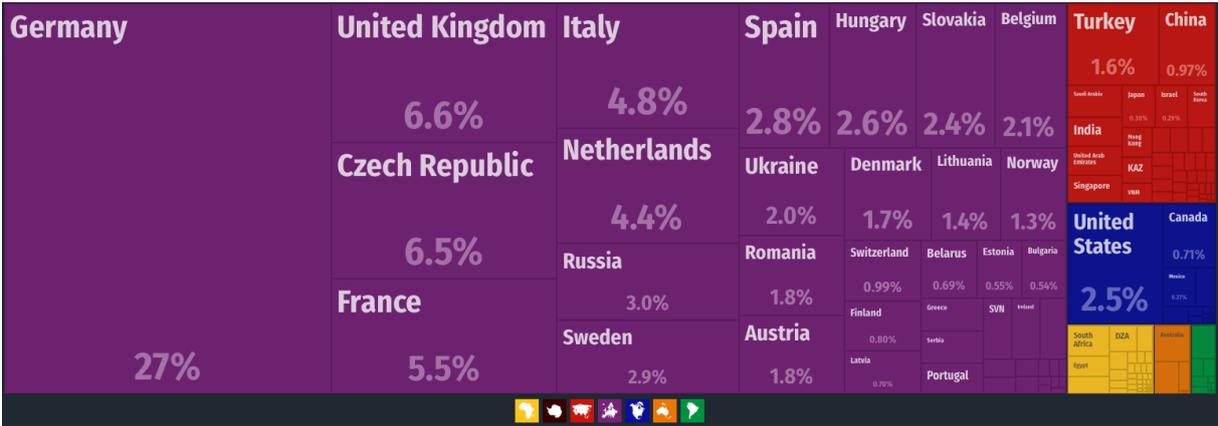


Fig. 1.17. Poland’s export destinations (%)

Source: The Observatory of Economic Complexity, <https://atlas.media.mit.edu>.

Poland is China’s biggest trade partner in Central and Eastern Europe and China is second-biggest exporter to Poland overall, accounting for 12% of its imports to Poland. In 2017, mutual trade turnover amounted to USD 20.2 billion.⁴ However, trade exchange between Poland and China is characterized by a significant imbalance: Poland imports from China goods worth almost 8 times higher than the value of Polish exports to China. Even though from 2004 to 2017 the total value of Polish exports to China increased more than 4 times, this increase failed to match the pace of growth of Chinese imports to Poland. In 2017 the value of exports from Poland to China stood at 1% of total Polish exports, which places China as 21st biggest export destination for Poland. Meanwhile, for China Poland is the 25th export destination in the world (accounting for 0.9% of total export value).

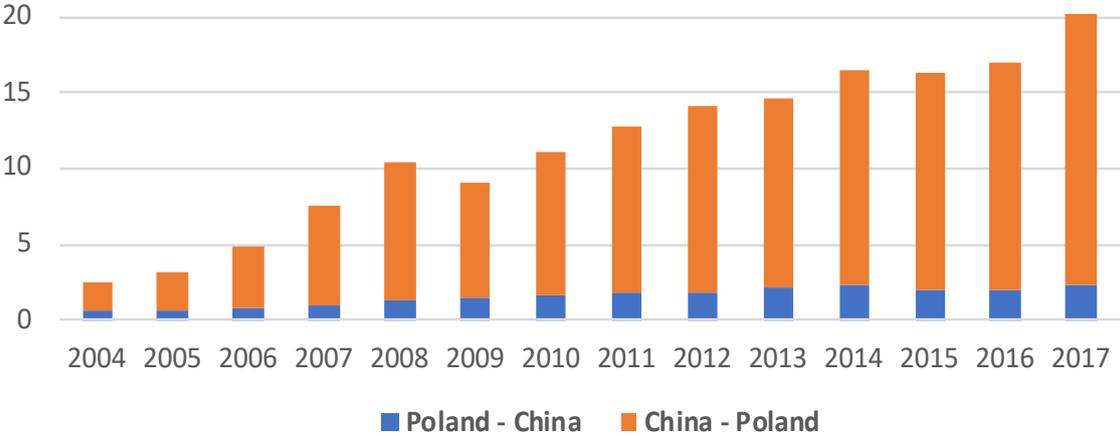


Fig. 1.18. Bilateral trade between Poland and China in 2004-2017 (billion USD)

Source: own elaboration based on UNCTADstat data.

⁴ According to Polish Central Statistical Office (GUS) Poland-China turnover has reached USD 29.5 billion. The basic factors affecting the differences are such phenomena as exports and imports asymmetry and mirror statistic. Polish imports by country of origin amounted to USD 27.2 billion, while Polish imports by country of consignment only USD 16.3 billion. Chinese exports which is used in this analysis was USD 17.9 billion.

Poland is expected to continue gaining export share in its key markets. Consequently, in the context of slower world trade dynamics, Poland's exports are projected to continue rising between 2019-2020, though at a slower pace. This, coupled with strong domestic demand, in particular the investment recovery, is set to translate into higher import demand. As a result, the contribution of net exports to GDP growth is expected to turn slightly negative in 2019 and 2020, after which it is forecast to show a marginally positive trend in 2018 (Economic and Financial Affairs, 2018, p. 126).

Main Commodity Groups

EU's main import from China includes: machinery and equipment, footwear and clothing, and industrial and consumer goods. EU's main export to China is: machinery and equipment, transport equipment (motor vehicles, aircrafts), and chemicals. EU's top 5 imports and exports accounted for 80% and 77% of the overall value of its global shipment respectively (**Table 1.3**).

Table 1.3. EU trade with China in 2017 – Top 5 commodity groups

Imports			Exports		
HS* section code, commodities	million euro	%	HS* section code, commodities	million euro	%
XVI Machinery and appliances	186,865	49.9	XVI Machinery and appliances	61,088	30.8
XI Textiles and textile articles	37,376	10.0	XVII Transport equipment	45,873	23.1
XX Miscellaneous manufactured goods	34,713	9.3	VI Products of the chemical or allied industries	20,370	10.3
XV Base metals and articles thereof	23,698	6.3	XVIII Optical and photographic instruments	12,902	6.5
VI Products of the chemical or allied industries	16,358	4.4	XV Base metals and articles thereof	12,570	6.3
Total of Top 5	299,010	79.9	Total of Top 5	152,803	77.0

* Harmonised System of Trade Classification.

Source: own elaboration based on Eurostat database.

Polish export to China is still dominated by copper and copper products (about 27% of all export), although their value is falling (**Table 1.4**). Meanwhile, the main import category is electrical machinery and equipment (one-third of total imports). A major change in 2017 to the composition of Polish industrial export was the 15%-increase in HS Chapter 84 products (machinery and mechanical appliances and parts thereof), as well as Chapter 44 (wood and wood products). Although export of Polish agri-food products is a growing trend, its share in the overall export volume was still negligible.

Table 1.4. Poland trade with China in 2017 – Top 10 commodities

Imports			Exports		
HS code and commodities	million USD	%	HS code and commodities	million USD	%
'85 Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image, parts and accessories of such articles	8,820.2	32.6	'74 Copper and articles thereof	616.7	26.8
'84 Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	5,098.8	18.9	'84 Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	334.6	14.5
'62 Apparel and clothing accessories; not knitted or crocheted	1,559.0	5.8	'85 Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image, parts and accessories of such articles	277.5	12.0
'95 Toys, games and sports requisites; parts and accessories thereof	1,156.9	4.3	'94 Furniture; lamps and lighting fittings	160.8	7.0
'94 Furniture; lamps and lighting fittings	1,071.2	4.0	40' Rubber and articles thereof	108.5	4.7
'61 Apparel and clothing accessories; knitted or crocheted	856.8	3.2	87' Vehicles; other than railway or tramway rolling stock, and parts and accessories thereof	108.3	4.7
'90 Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories	719.2	2.7	'04 Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	54.1	2.3
'64 Footwear; gaiters and the like; parts of such articles	692.3	2.6	'73 Iron or steel articles	41.1	1.8
'73 Iron or steel articles	623.0	2.3	'44 Wood and wood products, charcoal	35.1	1.5
'39 Plastics and articles thereof	617.4	2.3	90' Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories	31.2	1.4
Total of Top 10	20,597.5	78.5	Total of Top 5	1,768.0	76.7

Source: own elaboration based on Economic Section of the Embassy of the Republic of Poland in Beijing, using data from Central Statistical Office of Poland (GUS). Data from National Bureau of Statistics of China (NBS) is different.

1.3.2. The Trade in Value Added Approach

According to OECD (2018), 70% of international trade is of production in global value chains (GVCs), where services, raw materials, parts and components are exchanged across countries before being assembled into final products that are shipped to consumers all over the world. In case of Poland, over half of exports is GVC-based.

As a convention, the value of merchandise leaving a customs territory equals the country's gross exports only if the country contributes to complete value chain, as opposed to the cases of value chains built up by links contributed by different countries, where conventional statistics tend to overrate the gross export values of the countries releasing the end product, while underrating the respective figures for countries contributing goods and services still to be finalised abroad. From the GVC point of view, gross export less the cost of import linked to it yields the actual domestic value added in gross exports (Kuźniar, 2017, p. 49-66). Figures showing the volumes of trade in value added (TiVA) are verified by OECD and WTO and based on input-output country and industry tables.

The World Bank Policy Research Working Paper from May 2018 describes the production and trade linkages between a selected group of economies belonging to the Belt and Road Initiative (BRI) within six economic corridors.⁵ The main finding is that trade integration among Belt and Road Economies has largely increased: intraregional exports went from 30.6% in 1995 to 43.3% in 2015. **Figure 1.19** and **Figure 1.20** visualize the value added networks prepared by Boffa (2018) using TiVA database. Each node on these graphs represents a country. The size of nodes represents the number of countries for which the source of value added was among the three most important partners. The thickness of the edges represents the strength of the link. More central countries are at the center of the graph, while less connected ones are the periphery. Following the findings of the network analysis, at the global level, the most important source of activities/inputs/services for producing exports in 2010 were Germany, USA and China. At the same time Germany and China are the most central economies, attracting value added from most neighbors. For B&R economies there are two gravitational centers, China and Russia, and some very well-connected countries such as Poland, Malaysia and Singapore.

In case of destination of value added China occupies a central position and is tightly linked with most countries in the network, however the foreign value added content of China's export declined by 9.6 percentage points between 2005 and 2015, from 26.3% to 16.6%. In 2015, China's most important trading partners were the US (25%), followed by Japan (8.1%), India (3.7%), the UK (3.5%) and Korea (3.5%), while for imports – the US (14.9%), Japan (9%), Korea (7.2%), Germany (5.3%) and Taiwan (4.9%). By commodities, the shares ranged from ICT and electronics (55.3%), and textiles and apparel (50.8%) at higher end, to food and beverages (7.8%) at lower end. In case of exports there were: coke and refined petroleum products (35%), ICT and electronics (30.5%), electrical equipment (18.8%) (OECD, 2018).

⁵ The China – Mongolia – Russia Economic Corridor; the New Eurasian Land Bridge; the China – Central Asia – West Asia Economic Corridor; the China – Indochina Peninsula Economic Corridor; the China-Pakistan Economic Corridor; and the Bangladesh – China – India – Myanmar. Together, 66 economies from 66 countries were analysed.

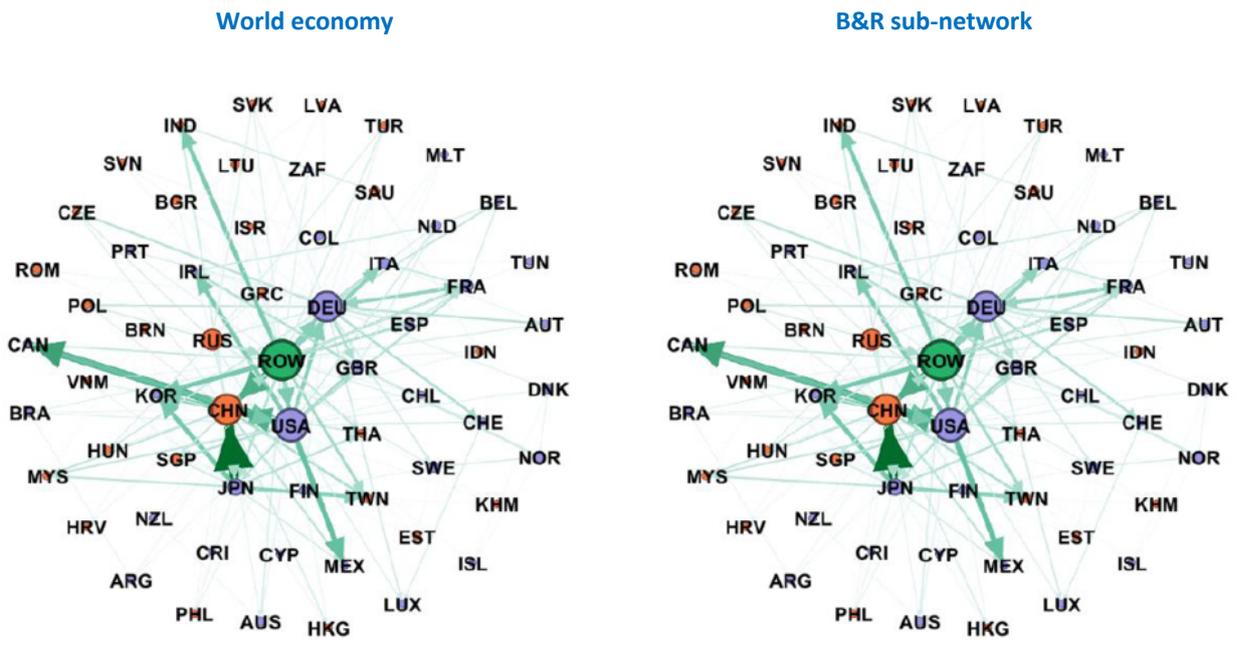


Fig. 1.19. Origin of value added in gross exports in 2010

Source: Boffa (2018), p. 28-29.

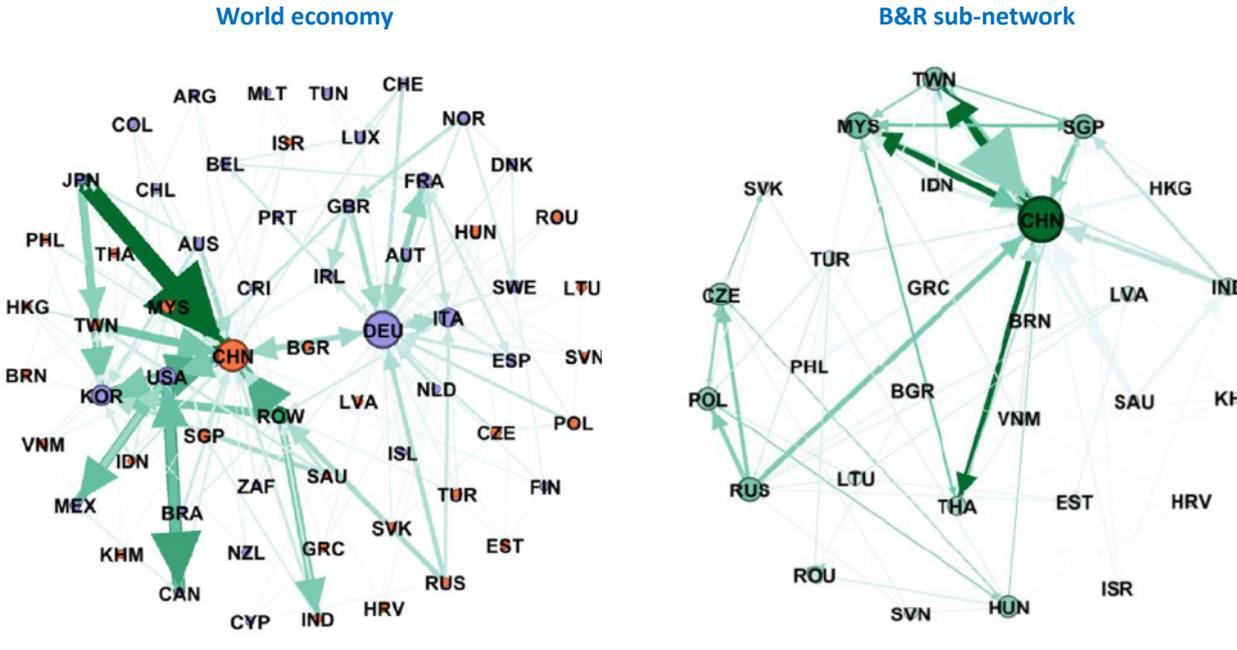


Fig. 1.20. Destination of value added in gross exports in 2010

Source: Boffa (2018), p. 30.

2. GLOBAL CONTAINER TRANSPORT MARKET

2.1. CONTAINERISED SEABORNE TRADE AND LINER SHIPPING

International seaborne trade gathered momentum in 2017, with volumes expanding by 4%. This was the fastest growth in the last five years. UNCTAD estimates world seaborne trade volumes at 10.7 billion tons in 2017 (UNCTAD, 2018b, p. 4). Major dry bulk commodities – coal, iron ore and grain – accounted for 42% of total dry cargo shipments, which were estimated at 7.6 billion tons in 2017. Containerised trade represented 24% of the total. Its global volumes reached 148 million TEUs in 2017 increasing by 6.4%, the fastest rate since 2011.

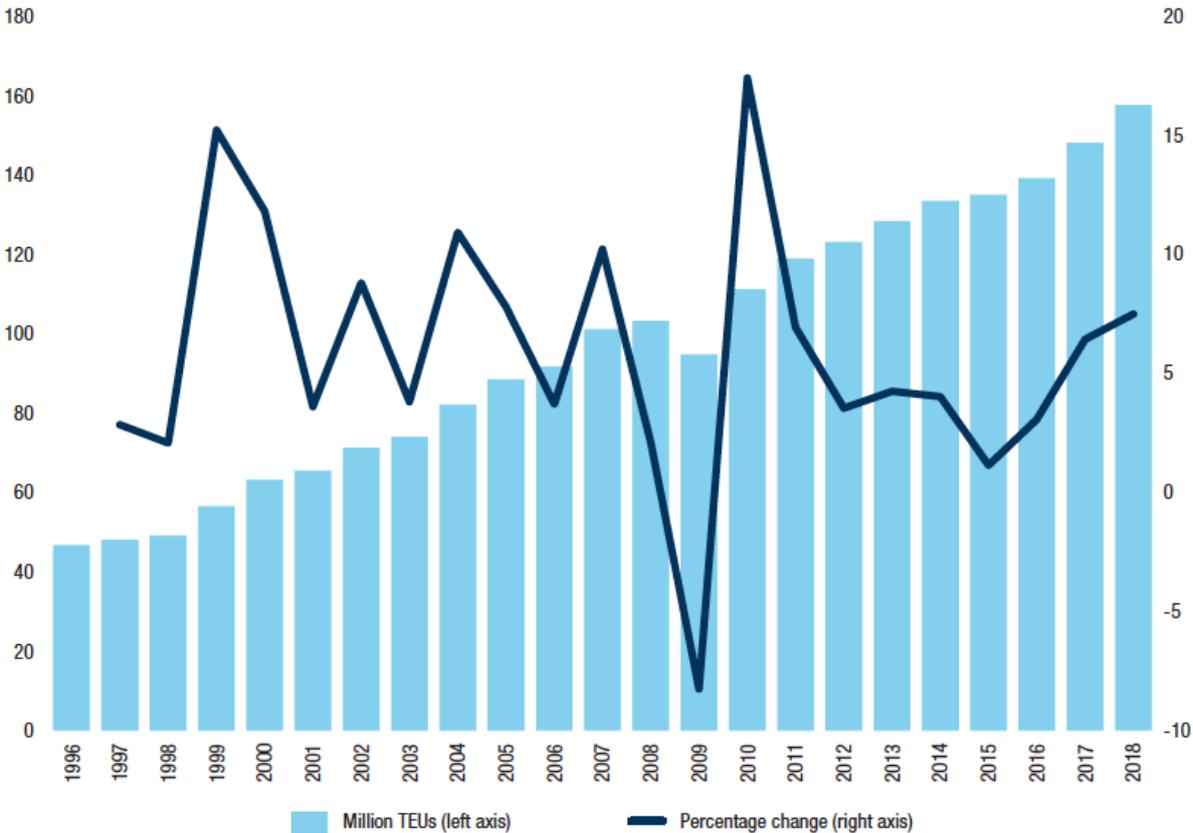


Fig. 2.1. Global containerised trade in 1996-2018 (million TEUs and percentage change)

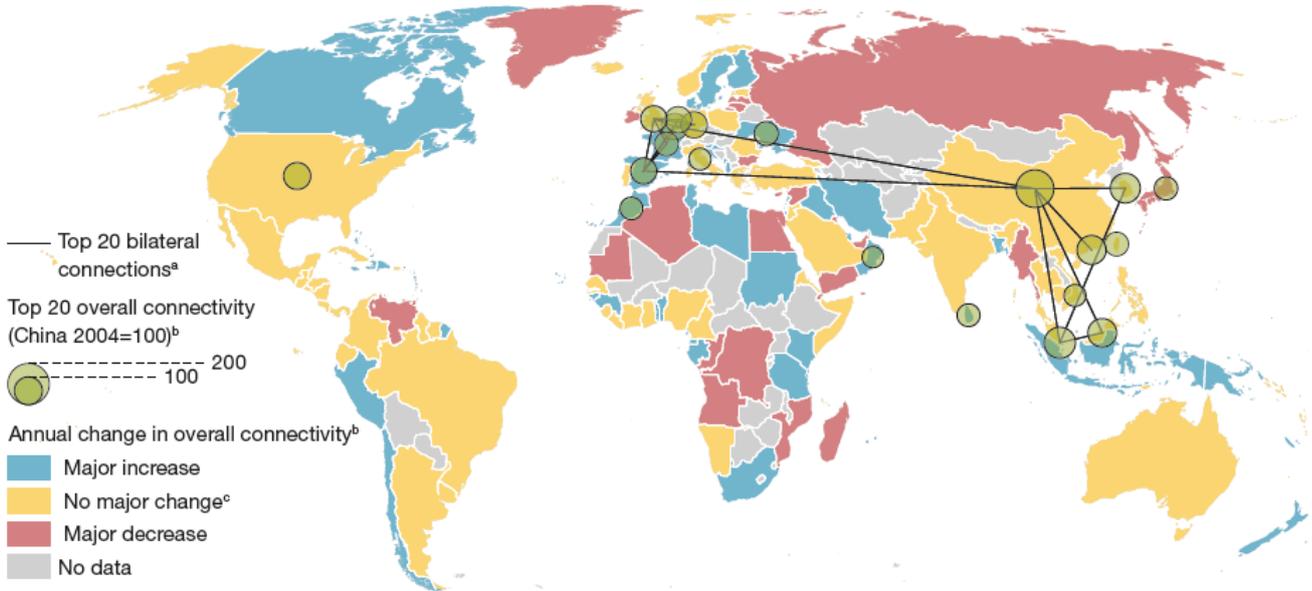
Source: UNCTAD (2018b), p. 13.

The vast majority of liner shipping⁶ cargo is containerised. As reported by HIS Global Insight and World Trade Service, containerised cargo trade is mostly dominated by countries in East Asia. Liner exports are also highly concentrated, with the top ten exporting nations accounting for nearly two-thirds of the total liner export value, and Greater China (including mainland China, Hong Kong SAR and Taiwan, China) account for 28% of the value of liner exports and 30% of the global volume of containerised exports. The top four EU exporters and importers of containerised cargo (Germany, Italy, the Netherlands and Spain) rank within the top 20 globally. On both the export and import side, EU's liner

⁶ Liner shipping services are provided as regular commercial services by carriers to shippers on fixed routes between specified ports according to time-tables and prices advertised well in advance.

trade is dominated by Germany, reaching for over 20% of EU liner exports and 17% of EU-27 liner imports in 2014; Poland served 2% and 3.5% respectively (worldshipping.org).

The UNCTAD **Liner Shipping Connectivity Index (LSCI)** provides an indicator of a country’s position within the global liner shipping network. Liner shipping connectivity is closely related to trade costs and trade competitiveness. It is calculated from data on the world’s container ship deployment: the number of ships, their container carrying capacity, the number of services and companies, and the size of the largest ship (UNCTAD, 2018a, p. 80). In 2017, the economy best connected to the global liner shipping network (as measured by the LSCI of 187.8) was China followed by Singapore (133.9), South Korea (118.8), Hong Kong SAR (113.5), Malaysia (109.9), the Netherlands (98.0), Germany (97.1), the US (96.7), the UK (95.6), and Belgium (91.1) (UNCTAD, 2018b, p. 34). For the best-connected economies, connectivity has not risen much further in recent years (**Figure 2.2**).



^a As indicated by the LSBCI.
^b As indicated by the LSCI.
^c Change of less than 5 per cent compared to the value in the previous year.

Fig. 2.2. Liner shipping connectivity in 2017

Source: UNCTAD (2018a), p. 80.

In turn, the **Liner Shipping Bilateral Connectivity Index (LSBCI)** is calculated based on five components that also take into account the number of transshipments required to trade as well as the number of options available to trade with only one transshipment. Most Top-20 bilateral connections are within Europe (including the Netherlands – the UK, the Netherlands – Belgium, the UK – Belgium, Germany – the Netherlands) and within Eastern and South-Eastern Asia (China – South Korea). However, China is relatively well connected with Netherlands, Belgium and Spain (UNCTAD, 2018a, p. 80).

Trade between an origin group of countries and a destination group of countries is referred to as a trade route. In mid-2018, as per Drewry’s data, about 500 liner shipping services globally help reach 156 million TEU, of which 17 million TEU on routes from East Asia to Northern Europe and Mediterranean (**Table 2.1**).

Table 2.1. Containerised trade on major East – West trade routes in 2014-2018

Year	Trans-Pacific		Asia – Europe		Transatlantic	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
	East Asia – North America	North America – East Asia	Northern Europe and Mediterranean to East Asia	East Asia to Northern Europe and Mediterranean	North America to Northern Europe and Mediterranean	Northern Europe and Mediterranean to North America
million TEU						
2014	15.8	7.4	6.8	15.2	2.8	3.9
2015	16.8	7.2	6.8	14.9	2.7	4.1
2016	17.7	7.7	7.1	15.3	2.7	4.2
2017	18.7	7.9	7.6	16.4	3.0	4.6
2018*	19.5	8.1	7.8	16.9	3.2	4.9
percentage annual change						
2014-2015	6.6	-2.9	0.2	-2.3	-2.4	5.6
2015-2016	5.4	7.3	3.8	2.7	0.5	2.8
2016-2017	5.6	2.1	6.9	7.1	8.0	8.3
2017-2018*	4.1	3.0	3.2	3.3	7.3	7.1

* Forecast.

Source: UNCTAD (2018b), p. 13.

World seaborne trade continues to be largely determined by developments in the world economy and trade. Although the relationship between economic output and merchandise trade seems to be shifting, with an observed decline in the growth ratio of trade to GDP over recent years, demand for maritime transport services remains heavily dependent on the performance of the world economy (UNCTAD, 2017, p. 3). In line with projected economic growth and based on the income elasticity of seaborne trade, UNCTAD expects world seaborne trade will expand at a compound annual growth of 3.8% during 2018-2023. It is expected that containerised shipments will record the fastest growth of 6% (Table 2.2).

Table 2.2. Seaborne trade growth forecasts (percent change)

Source	Forecast period	Seaborne trade	Containerised trade
Lloyd's List Intelligence	2017-2026	3.1	4.6
UNCTAD	2018-2023	3.8	6.0

Source: UNCTAD (2018b), p. 16.

A specific feature of container shipping significantly affecting the functioning of this sector are **global alliances**. They consist of a number of agreements between container lines (carriers) on operational matters with global coverage on sharing vessels and slots on these vessels. The aim of such alliances is to achieve economies of scale and wider service coverage. The three global alliances – 2M, Ocean and THE Alliance – that are operational since April 2017 regroup the eight largest container carriers of the world. They represent around 80% of overall container trade and operate around 95% of the total ship capacity on East-West trade routes.

In 2018, the top four container carriers accounted for 60% of the global container shipping market. Three leading European carriers (Maersk, MSC, and CMA CGM) have 46% of world carrying capacity. Most of the other top 30 carriers are from Asia. The market share of the biggest carrier Maersk (19%) is larger than the market share of any global liner alliance before 2012, signifying the different character of current alliances. Global liner carriers have chosen their separate paths toward success

and the competition landscape in the industry is likely to change in accordance with the most successful of these strategies (worldmaritimeneews.com, 2018a).

Table 2.3. Global alliances in container shipping (June 2018)

Global carrier rank	Carrier	Number of ships	Total carrying capacity (TEUs)	Market share of carrier (%)	Alliance	Global market share of alliance (%)	Market share of alliance on Asia-Europe routes (%)
1	Maersk	700	3,879,439	19	2M	31	34 (with HMM)
2	MSC	473	3,118,108	15			
3	Cosco-OOCL	575	2,662,477	12	Ocean Alliance	29	35
4	CMA CGM	476	2,554,264	12			
7	Evergreen	200	1,110,708	5			
5	Hapag-Lloyd	217	1,550,874	7	THE Alliance	17	27
6	ONE	228	1,536,312	7			
8	Yang Ming	100	609,749	3			

Source: own elaboration based on data: UNCTAD (2018b), p. 32 and OECD/ITF (2018), p. 14.

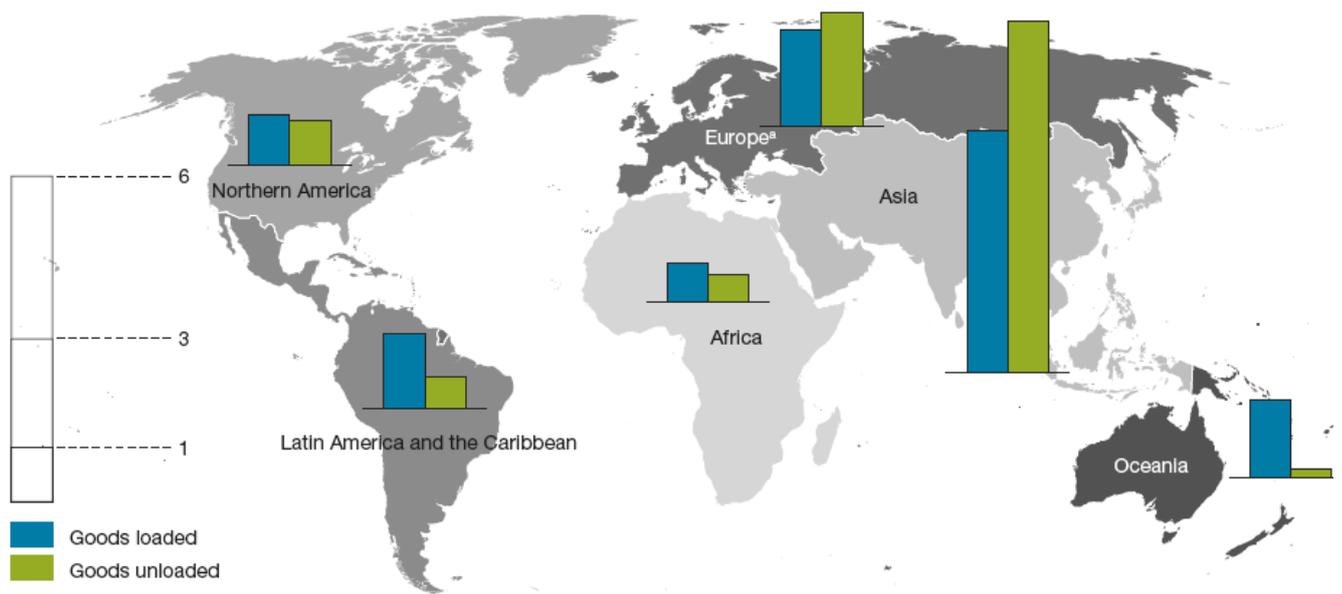
The impacts of alliances on maritime transport deployment as well as on the transport system as a whole are identified in the latest OECD/ITF report (2018, p. 7). One major feature is that they force barriers on entry to East-West trade: only the largest carries would be able to compete on price for Asia-Europe services outside an alliance structure. Moreover, alliances have proved to be inherently unstable: considering that all major carriers are in alliances, changes in one alliance can have an impact on the whole sector. They contribute to concentration of port networks and bigger cargo shifts from one port to another when alliances change port networks. Within ports, the buying power of the alliance carriers can create destructive competition between terminal operators and other port service providers such as towage companies. The result can be declining rates for port services, carriers requesting additional public infrastructure, and vertical integration by carriers, in particular in terminal operations. Consequently, the market share of carrier-dominated terminal operators has increased from 18% in 2001 to 38% in 2017. This could raise competition concerns if dedicated terminals exclude other carriers and if carriers' terminal investments raise entry costs that make container shipping a less competitive market (OECD/ITF, 2018, p. 7-8).

2.2. CONTAINER SEAPORTS

2.2.1. Global container port throughput

Seaports are key players in international trade and logistics and critical nodes in global supply chains. Following the UNCTAD, 10.7 billion tons of goods were loaded in seaports worldwide in 2017.⁷ Asia was the largest trading region with 4.4 billion tons of goods loaded, and 6.5 billion tons unloaded. The other regions registered less than half of these volumes. The top 20 global ports included only three ports outside Asia: the ports of Hedland, Rotterdam and South Louisiana.

⁷ Goods loaded for international shipment are assumed to be exports, while goods unloaded from ships are assumed to be import. Cabotage and transshipments are not included.



^a Incl. the Russian Federation and the French overseas departments.

Fig. 2.3. Goods loaded and unloaded by continents in 2017 (billions of tons)

Source: UNCTAD (2018a), p. 72.

World container port throughput grew by 6% between 2016 and 2017 to 753 million TEU of containers, of which 61% were handled in seaports in developing economies in Asia and Oceania (UNCTAD, 2018a, p. 81). Almost 240 million TEU were recorded in China, including Hong Kong, China and Taiwan Province of China. This represents almost half of all port volumes handled in the region. Outside Asia, three European ports, Rotterdam (13.6 million TEU), Antwerp (10.5 million TEU) and Hamburg (9.6 million TEU), are among the top 20 global ports. Developed economies accounted for one-fourth of global containerised port throughput. Reflecting to a large extent the recovery in the EU in 2017, volumes handled in European ports increased by 6.6%. With volumes reaching nearly 120 million TEU, Europe accounted for 16% of global container port throughput (UNCTAD, 2018a, p. 72).

Container port activity tends to be concentrated in major ports and the so-called multi-port gateway regions. Together, the world's leading twenty container terminals (**Figure 2.4**) handled an estimated 337 million TEU in 2017, accounting for 45% of the world's total. Total transshipments in two largest ports, Shanghai (40.2 million TEU) and Singapore (33.7 million TEU), are comparable to the volume jointly served by top 15 European ports (**Figure 2.5**). In Europe, the leading northern ports reload twice as much as the southern ones. The three leading European ports (Rotterdam, Antwerp and Hamburg) are significantly ahead of the rest.

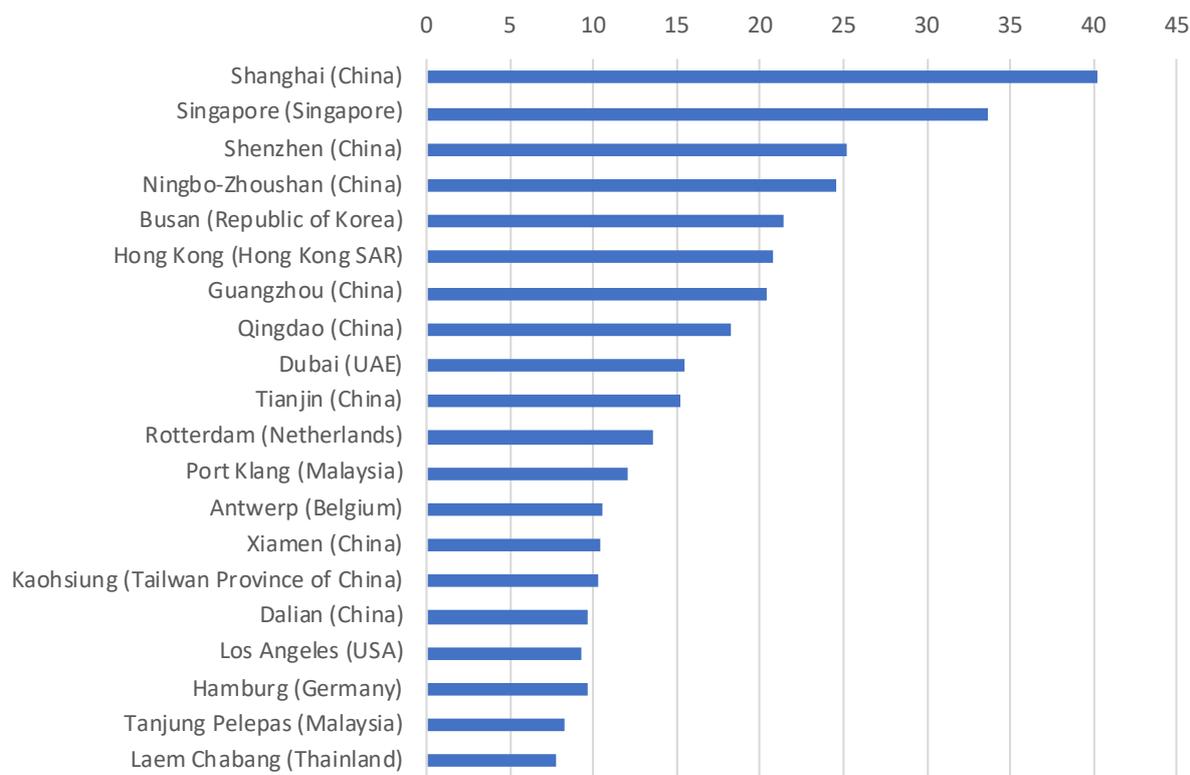


Fig. 2.4. Throughput in top 20 global container ports in 2017 (millions of TEU)

Source: own elaboration based on UNCTAD (2018b), p. 73.

According to Drewry, the global container ports' throughput is forecast to grow by 5.5% annually in 2019-2023 reaching almost one billion TEU. Consolidation in container shipping can lead to five dominant container terminal operators in 2020 (COSCO-OOCL, APM-Group TCB, PSA International, Hutchison Port Holdings and DP World). The average utilisation of ports' capacity across almost all regions of the world is forecast to increase significantly from 68% in 2017 to around 80% by 2022, the lowest proportion ever, following several years of underinvestment, particularly in greenfield projects. The key factors influencing investment in new projects are lower returns on investments and increasing risks from both the industrial and geopolitical perspectives (worldmaritimeneews.com, 2018b).

2.2.2. Trends in the main European seaports and regions

The top 15 European ports recorded a growth of 4.2% in 2017 as well as brought a double-digit growth for Barcelona, Genoa, Le Havre, Rotterdam, Piraeus and Sines, while Mediterranean Gioia Tauro and Algeciras saw a sharp decline in container volumes. According to PortEconomics analysis, the top 15 ports combined saw almost 20% increase in container traffic compared to pre-crisis year 2007. One of two ports which still remain below the 2007 figures was the main German port, Hamburg (Notteboom, 2018).

South European ports with a substantial transshipment focus show strongest growth. Genoa is back at the top of the Italian ports and ranked as 6th in the Mediterranean region. Piraeus and Sines remain the most notable newcomers. When China's COSCO Shipping Corporation took over the Greek container port of Piraeus in 2008, fewer than 900,000 TEU passed through its facilities. In 2017, the

throughput reached 4.1 million TEU. Cosco continues to invest in Piraeus with the PPA in the port infrastructure and aims to make Piraeus the top container port in the Mediterranean by the end of 2019. Piraeus shows significant strength in the Balkans' hinterland.

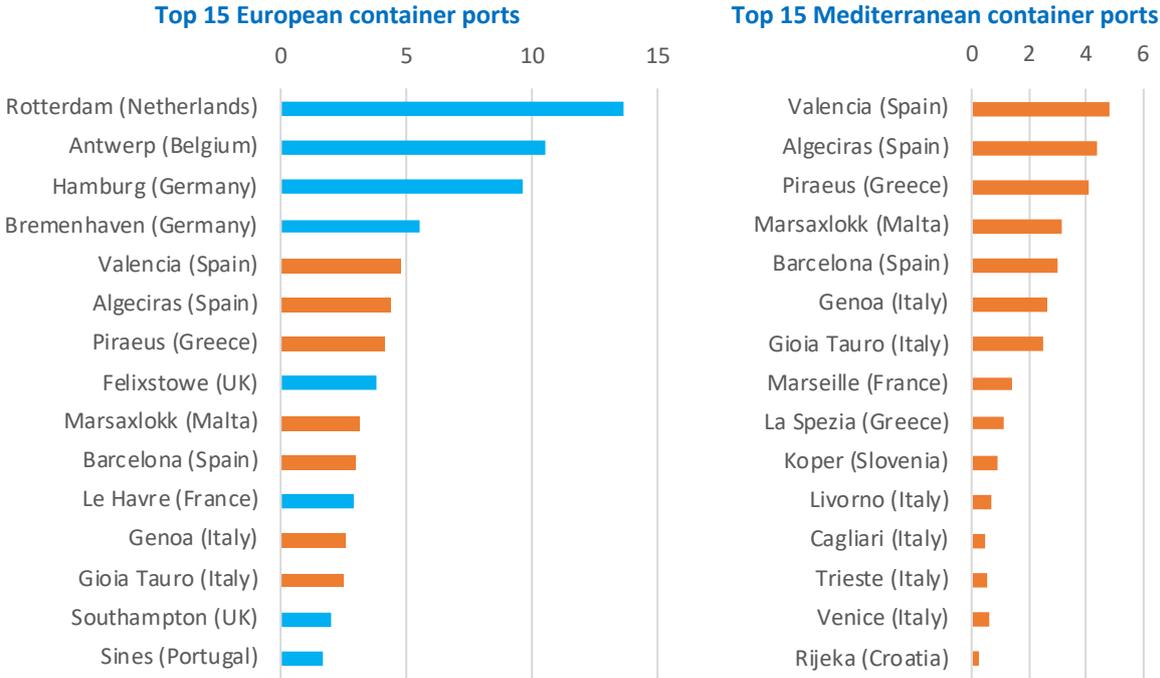


Fig. 2.5. Throughput in top European container ports in 2017 (millions of TEU)

Source: own elaboration based on PortEconomics and Actia Forum data.

The top 15 ports with 30.5 million TEU concentrate two-thirds of the total container flows in the Mediterranean region. Centrally to this analysis, the south-eastern ports act both as a transshipment region and as a final destination of Europe and Far East trade routes. The largest ports have a dominant function as transshipment hubs (Marsaxlokk, or Gioia Tauro with more than 80% transshipment traffic) or a combination of both such as Piraeus (Grifoll, Karlis, Ortego, 2018, p. 6). An example of a port whose transshipment activities are less than 1% is Koper, Slovenia. Its container throughput reached 912 million TEU in 2017, which ranks it as the 10th largest container port in the Mediterranean and the 1st in the Adriatic. As reported in the 2017 Drewry study, Kopper has more competitive transit time and cost of 40-foot container delivery from Shanghai to Munich than other European ports such as: Trieste, Rijeka, Rotterdam, Hamburg, and Antwerp. Koper is the first port in Adriatic serving both 2M Alliance and Ocean Alliance calls from Asia to Europe.



Fig. 2.6. Ocean Alliance's calls to Port of Koper

Source: Luka Koper.

The year 2017 turned out to be lucrative for Baltic container ports. In the 10 largest container ports in the Baltic Sea Region, 7.7 million TEU were handled, an almost 9% increase. Among the ports that recorded double-digit tempo of growth were: Port of St. Petersburg (+10%), Port of Gdansk (+22%), Port of Gdynia (+11%), Port of Aarhus (+12%) and Port of Riga (+16%). The first position is invariably occupied by Port St. Petersburg, thanks to the cooperation with container line Sea Connect. The second largest port in the Baltic Sea, Gdańsk, with container handling with 1.6 million TEU and 22% of growth and moving closer to the European top 15 list (Actia Forum, 2018). DCT Gdansk was the first terminal that attracted direct calls from Asia to the Baltic Sea and is today the destination for the largest vessels in the world operating by the 2M and OCEAN Alliances and departing from China, South Korea and other Asian countries (Figure 2.8). This process initiated a split of the most important shipping trade-lane in the world, Asia – Europe, into Asia – North West Europe and Asia – the Baltic Sea region.



Fig. 2.7. Throughput in top 10 Baltic container ports in 2017 (millions of TEU)

Source: own elaboration based on ports' data.

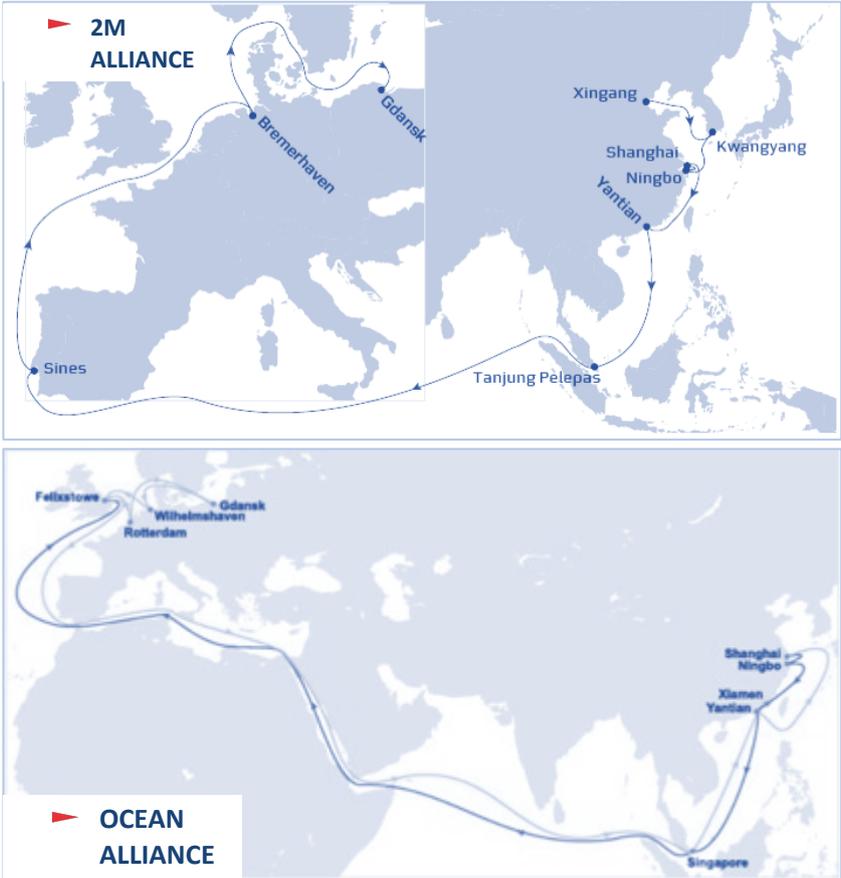


Fig. 2.8. Liner alliances' calls to DCT Gdansk

Source: DCT Gdansk.

The Black Sea container terminals of Ukraine, Romania, Russia, Georgia and Bulgaria handled 2 million TEU in 2017 (excluding empty containers and transshipment). The total growth achieved by these five countries was 12.7%; the highest growth was achieved by Russia and Georgia – 22% and 18%. At the same time, Ukraine, Bulgaria and Romania achieved 9%, 8% and 7.6% growth of laden container turnover respectively. Thus, the share of laden volume handled by each country in 2017 distributed as follows: Ukraine – 29% (3 percentage points less than in 2012), Russia (the Black Sea) – 27%, Romania – 24%, Georgia – 11% (4 percentage points less compared to 2012), Bulgaria – 9% Ukraine remains a leader in the Black Sea region with 724 thousand TEU in 2017 (Figure 2.9), however its container turnover only reached the 2012 level, after a two-year drop in transshipment. In order to return to the volume of the pre-crisis 2008 (1,254 million TEU), several more years will be required (Рыженкова, 2018). The five biggest container terminals in this region were: DPW (Constanta, Romania), APMT Poti (Georgia), NUTEP (Novorossiysk, Russia), CTO Ukraine (Odessa), moved from the second to the fourth place, and NLE (Novorossiysk, Russia). As for the leading carriers of the region, MAERSK and MSC still were the leaders with 45% total market share, followed by ARKAS, COSCO and CMA CGM. All these carriers controlled 74% of this market (portnews.ru, 2018).



Fig. 2.9. Black Sea container ports’ throughput in 2017 by countries (million laden TEU and %)

Source: own elaboration based on SeaNews data.

Seaports compete in hinterland traffic if they serve the same trading partners in seaborne trade and act as inland gateways for the overlapping hinterland. Since the ports of Gdańsk, Hamburg, and Koper are relatively well linked with China, all three compete with each other in the Central European hinterland that covers Austria, Switzerland, the Czech Republic, Slovakia, the southern part of Germany, as well as Poland and Slovenia (Biermann, Wedemeier, 2016, p. 9). However, the main hinterland are areas located up to 500 km from each port.



Fig. 2.10. Container ports' hinterland in Central and Eastern Europe

Source: own elaboration.

2.3. DEVELOPMENT OF SEAPORTS CONTAINER CAPACITY AND THEIR HINTERLAND CONNECTIVITY

2.3.1. Polish seaports

In 2017, the leading Polish seaports (Gdańsk, Gdynia and Szczecin-Świnoujście) handled 87.3 million tons, of which 17.1 million tons of containerised cargo (nearly 2.4 million TEU). More than 70% of this turnover originated in or departed to the European countries, including Germany, Russia, Belgium, Lithuania and the UK, and another 29% were from Asia, mainly China and Malaysia. The main cargo groups are: coal and lignite, crude petroleum and natural gas (26%); coke and refined petroleum products (11%), metal ores and other mining products and quarry products (10%), as well as mixed goods transported together (10%) and unidentifiable goods (18%).

Transit traffic makes up about 15% of total Polish seaports' turnover. Their two important land-to-sea transit countries are Russia (1.3 million tons) and the Czech Republic (0.5 million tons), while in sea-to-land transit dominates cargo to the Czech Republic (1.2 million tons), Slovakia (0.6 million tons) and Germany (0.5 million tons). Large containers have a share of 60% in the total transit cargo group.

Two-thirds of total Polish seaports' containerised cargo is handled by DCT Gdańsk.

The Port of Gdańsk – Deep Sea Container Terminal (DCT)

Since its opening in 2007, DCT Gdansk has become Poland’s largest and fastest growing container facility, and the only deep-water terminal (17 m depth) in the Baltic Sea Region with direct ocean vessel calls from the Far East. The terminal handles Polish import, export, transit and transshipment containerised cargo. In 2018, DCT Gdansk handled 1.9 million TEU, 21% more than in 2017, with direct calls by the largest ships afloat: 2M Alliance with 20,500 TEU capacity ships on trade route between South Korea – China – Gdańsk, and OCEAN Alliance with 21,500 TEU capacity ships on trade route from China – Gdańsk. Transshipments accounts for one-third of the total DCT’s throughput.

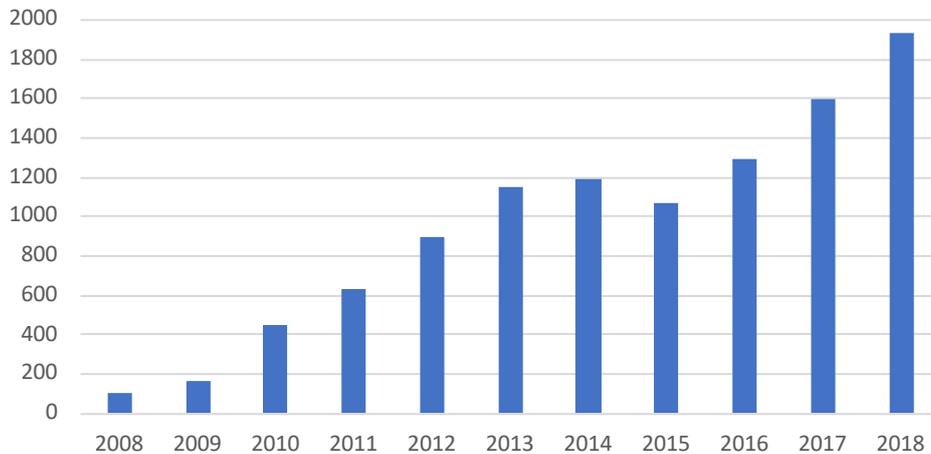


Fig. 2.11. Container throughput in DCT Gdańsk in 2008-2018 (thousand TEU)

Source: DCT Gdańsk.

2017 saw the full operational readiness of the second terminal (T2), which doubled the available capacity. As of January 2019, annual throughput capacity of the terminal is 3,250 million TEU. For further development, T2B investment program was launched in 2018. The next key development will be to significantly increase rail capability with rail-sidings being extended to 750 m and the number of sidings increased from 4 to 6; total siding capacity will expand by 80% to 4.5 km.

Rail transport served about 35% of DCT hinterland cargo. **Figure 2.12** presents a simulation of areas that could be served by trains in a 72-h roundtrip. Although it stretches as far as Hanover in the west, Budapest in the south and Polotsk in the east, the actual hinterland range, in which DCT could be competitive in freight transport, is shifted to the east and includes Belarus, southern Ukrainian regions and Western Russia – countries with a lower economic potential than Poland’s western and southern neighbours.

A part of Russian transit and Belarusian export could be transported via DCT instead of the eastern Baltic Sea seaports (Kaliningrad, Klaipeda, or Riga) if Poland offered the necessary infrastructure and quoted favourable service charges.

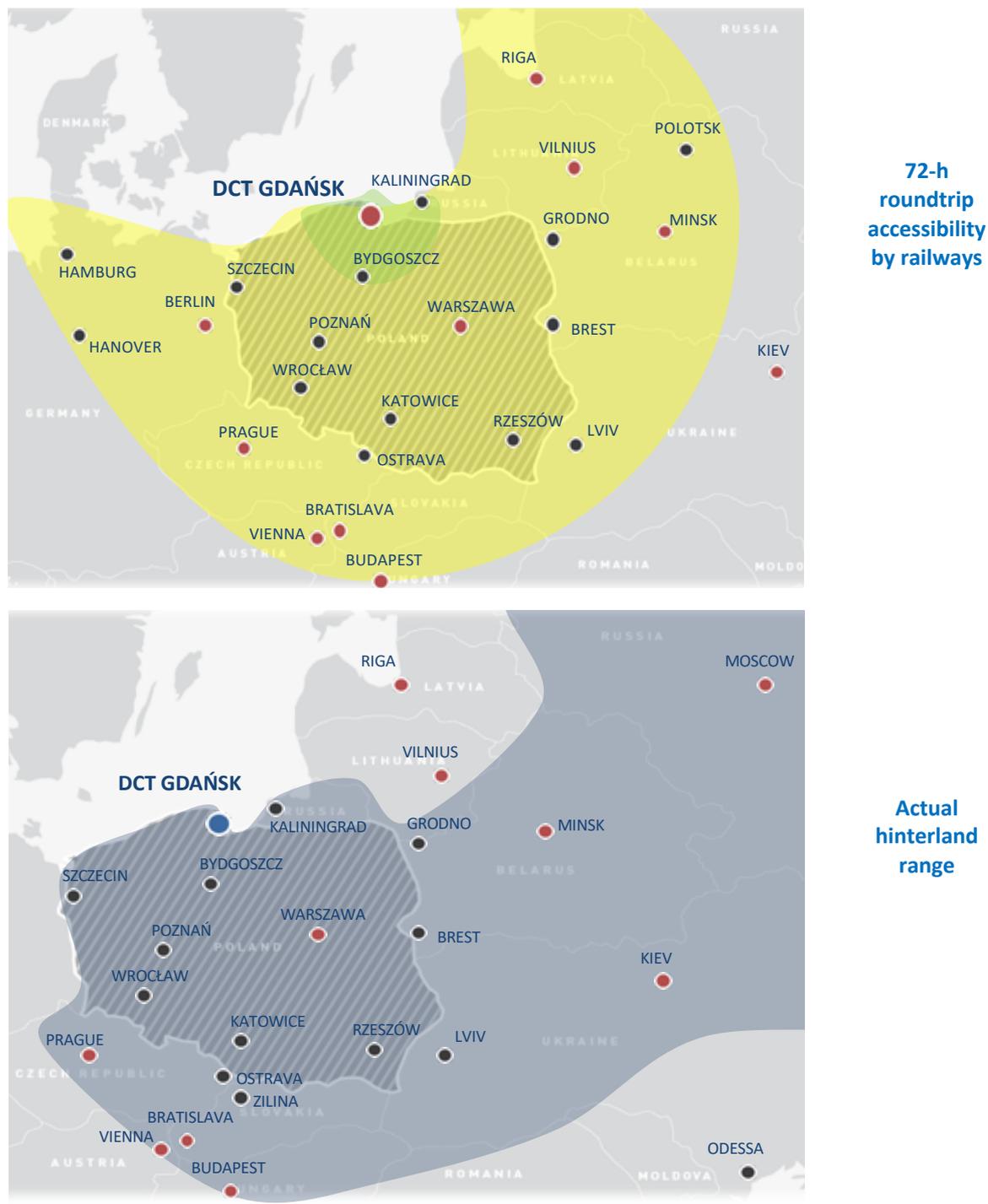


Fig. 2.12. DCT Gdańsk railway accessibility (simulation) vs. competitive hinterland

Source: DCT Gdańsk (2015).

In 2017, DCT terminal served 100-120 trains weekly. The destinations with the highest frequency were: Poznań, Kutno, Wrocław, Gliwice, Warsaw, Sławków. The following projects are expected to be completed by 2020 that will improve the accessibility of the Port of Gdańsk by rail transport: improvement of railway infrastructure within the railway stations Gdańsk Port Północny, Gdańsk Zaspą Towarową and Gdańsk Kanał Kaszubski, development of a local control centre between Gdańsk Port Północny and Gdańsk Kanał Kaszubski, as well as electrification of railway line 965.

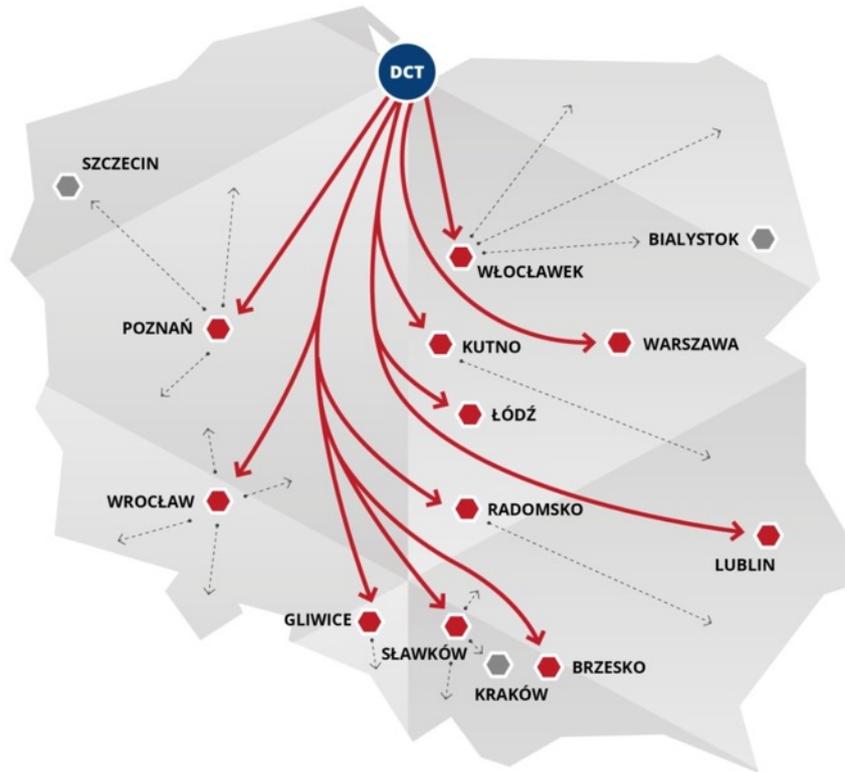


Fig. 2.13. DCT Gdańsk hinterland container train connections

Source: DCT Gdańsk (2018).

The Port of Gdynia

The Port of Gdynia is the third biggest container-handling port in the Baltic Sea with a throughput of 803.9 thousand TEU in 2018. Two container terminals in the Port of Gdynia (Baltic Container Terminal and Gdynia Container Terminal) mostly serve the same domestic rail hinterland destinations as well as Gdańsk: Poznan, Silesia, Mazovia and Central Poland. In addition, they offer a small number of intermodal connections with terminals abroad, such as Prague and Budapest (MGMiŻŚ, 2018, p. 29). The share of rail transport in hinterland traffic is about 26%.

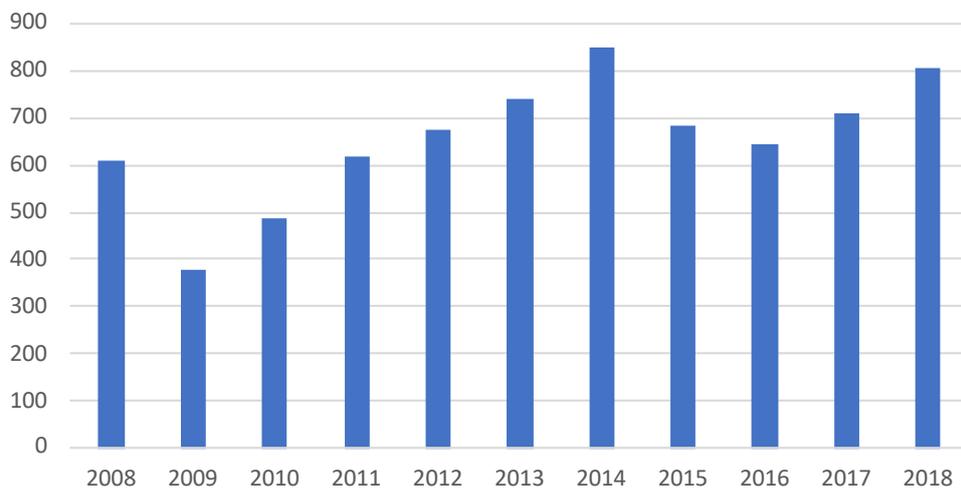


Fig. 2.14. Container throughput in Gdynia in 2008-2018 (thousand TEU)

Source: The Port of Gdynia.

For the Port of Gdynia, core investment is dredging of port basins and port canals and also widening of turning basin. This will allow larger vessels to enter the port. The implementation of the investment is very important, especially for container market. Also, a number of projects dedicated to the facilitation of intermodal transport are planned for the coming years, including:

- the construction of a container terminal with a handling capacity of 2 million TEU by 2026 (with a possibility to extend to another 0.5 million TEU) as a part of the Outer Port project which will have a quay with a length of 2,500 m and a width of 700 m;

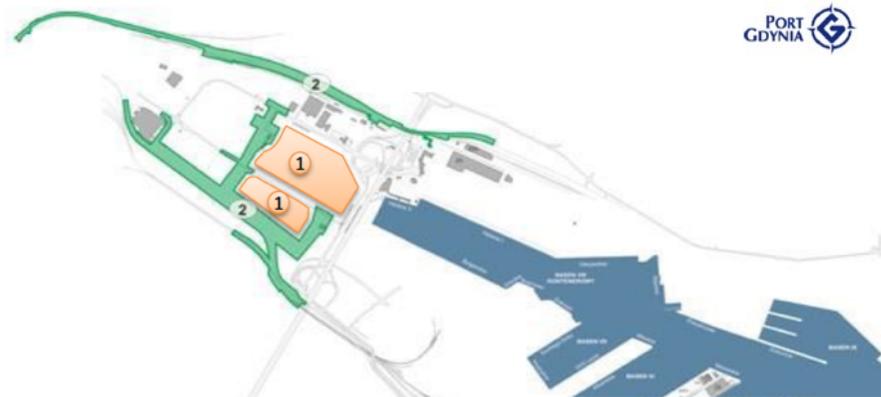


- the improvement of rail access to the port, including Gdynia Port railway station and railway line 201 between Nowa Wieś Wielka – Gdynia Port upgrading (by 2023);



- works inside the port area to increase the throughput capacity of the rail infrastructure are expected to be implemented between 2021 and 2027; other modernisation works are also

planned, including the rebuilding and electrification of railway tracks within the Western part of the port (in green) and building of intermodal terminal (in orange) (planned for completion by 2020);



- the development of Kosakowo Logistic Valley as a transport, forwarding and logistics services hub. Although a declaration of cooperation was signed by six relevant local governments in 2010, followed by the publishing of 'Strategy for the sustainable development of functional area Logistic Valley 2020 with perspective until 2050' in 2014, the planned works have not been commenced, as of January 2019.



The Port of Szczecin – Świnoujście

The container turnover grew up from 63 to 94 thousand TEU between 2008-2017, however the role of the Port of Szczecin-Świnoujście in container handling remains marginal. Construction of the new container terminal in Świnoujście for 1.5 million TEU as well as upgrading port infrastructure and developing intermodal transport connections are planned until 2023.

Train length and freight speed limitation are currently affecting railway accessibility to the ports. Modernisation works are planned to increase the axle load to 221 kN/axis for the main existing line tracks and stations and up to 245 kN for the rebuilt and newly built sections. The reconstruction of the railway viaduct on line 990, the electrification of railway lines 990 and 996 and the removal of bottlenecks at Szczecin Port Centralny and Świnoujście stations are also foreseen. All the above initiatives are expected to be completed by 2020 (cost of EUR 144 million) (EC, 2018, p. 46).

Forecasts for Polish seaports

The overall container throughput of Polish seaports increased significantly between 2008-2017: by 300% in terms of tonnage and 280% in TEU. Estimations for the next decade are still positive, while different studies expect different rates of growth. The Ministry of Marine Economy and Inland Navigation’s *Programme for the Development of Polish Sea Ports until 2020* estimates container throughput not to exceed 27.3 million tons (3.3 million TEU) until 2020 with no estimate available for 2030 (MGMiŻŚ, 2018). Meanwhile, Matczak’s study forecasts a double-digit annual growth rate until 2020, which may reach the favorable 66 million tons (7 million TEU), and after 2020 its decline to the growth rate of 3-5% year-to-year. This estimation predicts the maximum handling of about 8.6 million TEU in 2028, however considering the volume of current investments in Polish seaports’ capacity, this forecast seems to be overestimated by about 25%.

Table 2.4. Container throughput forecast for Polish seaports

Container throughput	2008	2013	2017	2020F MGiMiŻŚ*	2020F Matczak**	2028F Matczak**
Thousand tons	5,610	13,060	17,149	22,365 – 27,335	35,700 – 66,300	55,900 – 81,300
Thousand TEU	859	1,969	2,385	2,697 – 3,341	3,803 – 7,055	5,948 – 8,645

Source: * MGiMiŻŚ (2018), p. 73; ** Matczak (2017), professor at Gdynia Maritime University.

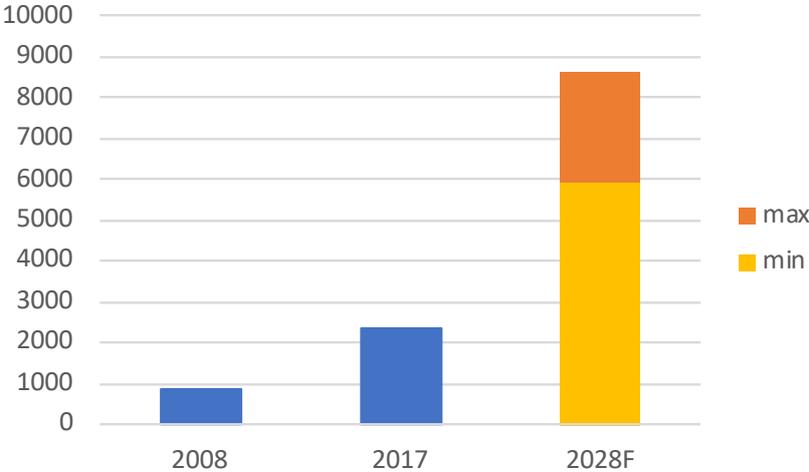


Fig. 2.15. Container throughput forecast for Polish seaports (thousand TEU)

Source: own elaboration based on Matczak’s forecasts (2017).

2.3.2. Other selected seaports

The North Sea: The Port of Hamburg

The port has four container terminals (HHLA Container Terminal Burchardkai, HHLA Container Terminal Tollerort, HHLA Container Terminal Altenwerder and Eurogate) and eight multi-purpose terminals that serve container shipments. Its overall annual handling capacity is about 12 million TEU, of which 73% is in operation. Due to limited space of the port area, its capacity could be increased mainly by upgrading existing infrastructure and suprastructure, as well as increasing productivity at the terminals implementing smart solutions.

The overall container throughput in Hamburg dropped from 10.2 million TEU in 2014 to 8.7 million TEU in 2018. Its main trade partner is Asia, including 2.6 million TEU handled with Chinese ports. Other important trade partners are: Russia, Singapore, Finland, Sweden, the UK, South Korea, Malaysia, Poland, the UAE.

Hinterland traffic (5.6 million TEU in 2017 and 5.4 million TEU in 2018) is served by about 63% of the port throughput. Traditionally, Hamburg has a strong hinterland position in the German federal states of Bavaria and Baden-Wurttemberg, as well as in such Central and Eastern European countries as Poland or the Czech Republic (Biermann, Teuber, Wedemeier, 2015, p. 78-89). Hamburg’s comparative advantage (in relation to the Gdańsk and Koper) lies with rail transport, while Hamburg reaches the regions with the highest GDP (Biermann, Wedemeier, 2016, p. 12).

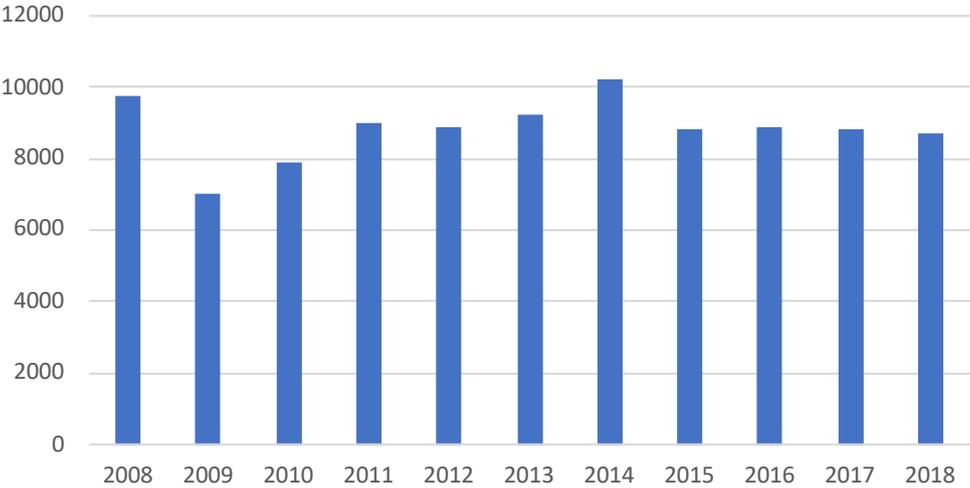


Fig. 2.16. Container throughput in Hamburg in 2008-2018 (thousand TEU)

Source: Port of Hamburg Marketing (2019).

In 2017, by rail were transported 2.3 million TEU (42%) of hinterland traffic. The share of rail increased in 2018 to 45%. Every week, port of Hamburg launches 2,100 container train connections, of which more than 1,000 are international (Figure 2.17). The most frequent connections in Europe are with rail hubs in the Czech Republic, Austria, Italy, Poland and Slovakia.

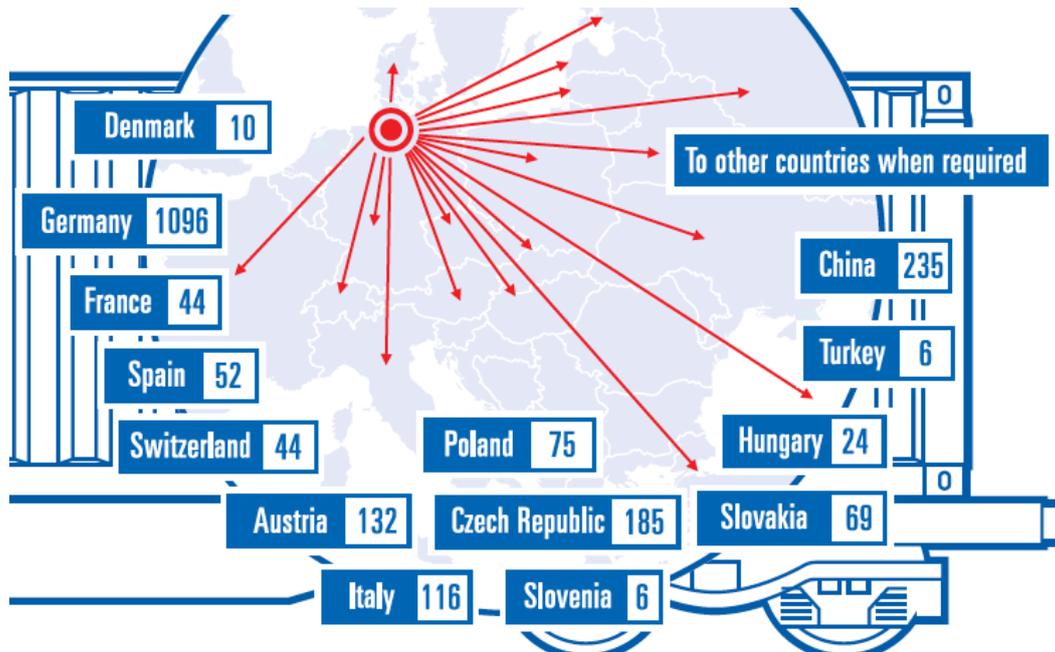


Fig. 2.17. Hamburg port's hinterland container train connections

Source: Port of Hamburg Marketing (2018).

The Adriatic Sea: The Port of Koper

In 2018 a total of 24 million tons of cargo was handled in the port of Koper, a 3% increase from 2017. Containers continued with a steady 8% growth, reaching almost one million TEU. The port operator, Luka Koper, will strive to increase the container throughput further. In accordance with the new business strategy of Luka Koper, the container terminal will be able to handle at least 1.3 million TEU annually starting from 2021. With the ongoing optimisation of operational and infrastructure processes this capacity can be increased to 1.5 million TEU.

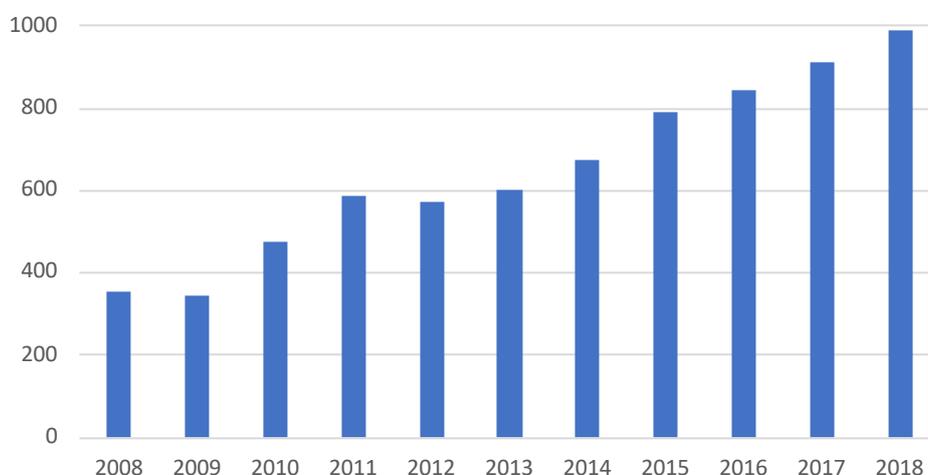


Fig. 2.18. Container throughput in Koper in 2008-2018 (thousand TEU)

Source: Luka Koper (2019).

Koper's main maritime trading partner for the last years has been Egypt expected to become the 7th biggest world's economy by 2030. In 2017, Koper's hinterland traffic to and from Austria amounted to about 29% of the port's total hinterland traffic, followed by Hungary (22%), Slovenia (16%), and the Czech Republic (8%). The share of Polish containers varies within approx. 2.5%.



Fig. 2.19. Port of Koper hinterland container train connections

Source: Luka Koper presentation (2018).

Rail transport with a 53% share in hinterland traffic plays a significant role for the port development. Since construction of the second railway line from the port of Koper was completed in 2017, its capacity increased from 90 to 125 container trains per week. The routes with the highest frequency are: Koper – Dunajská Streda – Koper with antennas to Kosice, Krems an der Donau, Ceska Trebova (14 trains weekly), Koper – Budapest Csepel (roundtrip, 12 trains weekly), Koper – Graz (10 trains weekly), Koper – Budapest BILK, Koper – via Ostrava (CZ Terminal Senov) – Southern Poland, Linz – Koper (7 trains weekly).

Figure 2.20 shows a comparison of the shares of railways in overall hinterland transport for the seaports of: Hamburg, Gdansk and Koper.

Digital tools delivered to clients by the seaports of Hamburg and Koper via their websites should be adopted as best practices by the Polish seaports (**Annex 2**).

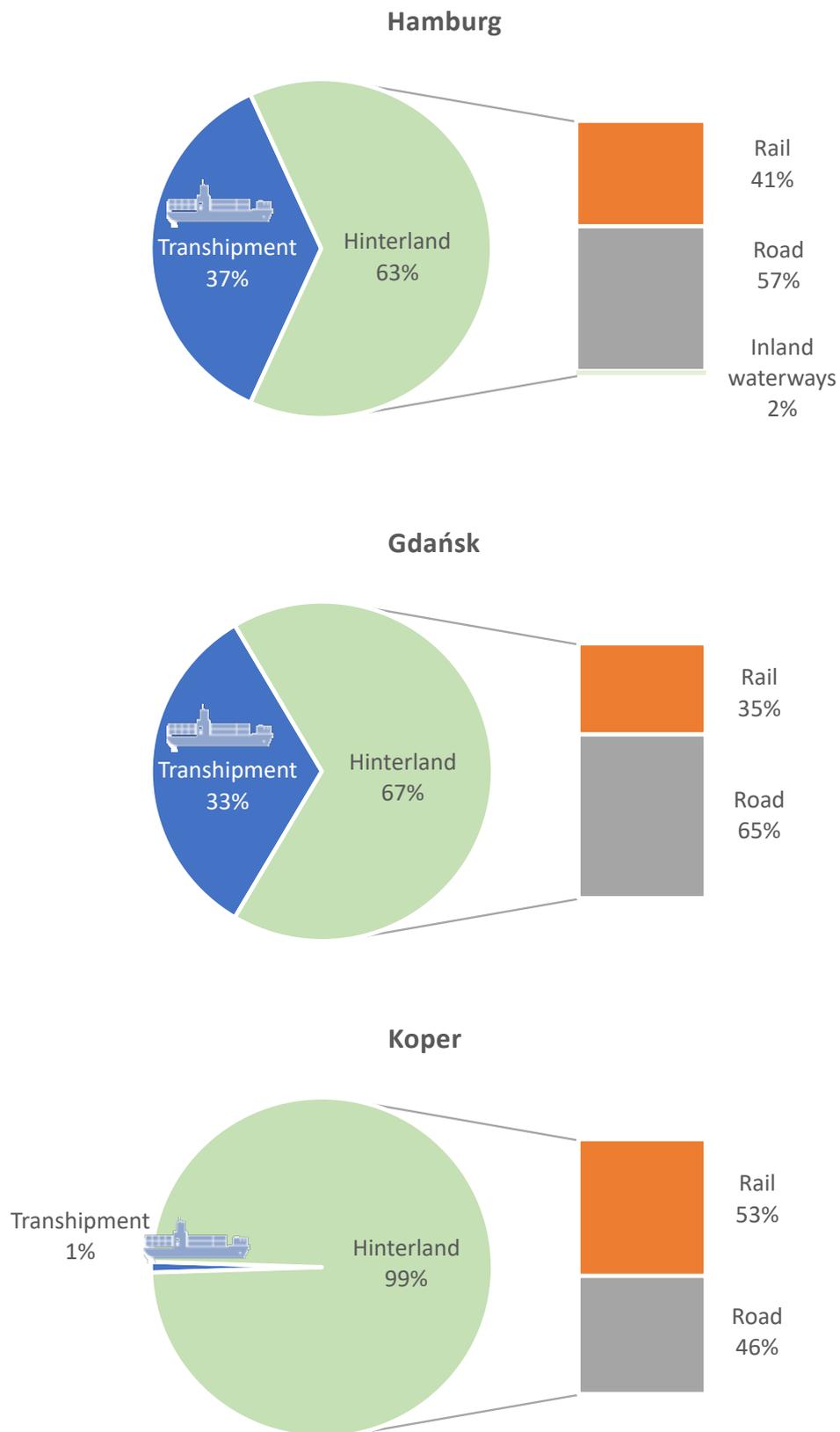


Fig. 2.20. Modal split in container hinterland traffic of Hamburg, Gdańsk and Koper seaports (2017, %)

Source: own elaboration based on seaport authorities' data.

The Black Sea: investment plans

Among new investment projects, which may affect hinterland container traffic structure in mid- and long-term perspective, construction of the Deep Sea Port of Anaklia and new terminals in the Port of Yuzhny on the Black Sea are mentioned.

In Georgia, a construction of new Anaklia Deep Sea Port started in December 2017. Set to open in 2020, the port will be built in 9 phases, with an aggregate investment of USD 2.5 billion. Anaklia Port's depth will be 16 meters which enables to berth vessels up to 10,000 TEU Panamax and Post-Panamax vessels. As predicted, in 2021 the port will be able to handle 600,000 TEU. **Figure 2.21** shows possible hinterland connections of this seaport.



Fig. 2.21. Anaklia's hinterland expected potential

Source: Anaklia (2018).

The main Ukrainian seaport is Yuzhny, located 30 km east of Odessa⁸. In 2017, Yuzhny handled 42 million tons of cargo, equalling about one-third of total Ukrainian seaports throughput, but only 10% of containerised cargo (70,100 TEU). Yuzhny's development plan, approved in December 2017, provides for the implementation of 23 investment projects until 2038, including an increase of container capacity to 350,000 TEU by 2028 and 870,000 TEU by 2038. An important factor that stimulates the growth of handling containerised cargo in the ports of Ukraine is the launch of container train connections to different regions of Ukraine. The Liski Transport Service Center (a division of Ukrzaliznytsia public railway company), the Maersk Line, and TIS Container Terminal Ltd. (the main agent of the Maersk Line in Ukraine) launched the first regular container train service from Kyiv to the Yuzhny port in January 2018. The train operates weekly on the route Chornomorska station (TIS, Yuzhny Port) – Kyiv-Liski station – Chornomorska station. The travel time of the container train is 19 hours.

In spite of the above initiatives, these seaports do not pose a threat to the competitiveness of Polish ports, because of insufficient solid trade relations and hinterland connections.

⁸ Two Odessa seaport's terminals (CTO and Bruklin-Kiev Port) are accounting for almost 72% of Ukrainian container handling.

3. EURASIAN LAND TRANSPORT CORRIDORS

3.1. MAIN RAIL CORRIDORS LINKING ASIA AND EUROPE

The contemporary Chinese initiative of the New Silk Road of 2013 in fact draws upon initiatives of the mid-1990s. It was then a highlight of the International Symposium on Economic Development of the Regions along Euro-Asia Continental Bridge which was held in Beijing in 1996, one of the first international forums addressing Euro-Asian transport issues. Ever since, the New Silk Road as an economic corridor has been part of China's geo-political strategy.

The main transport corridors connecting Europe with the far east of Asia were proposed by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). In April 1996, Commission Resolution No. 52/9 on Intra-Asia and Asia-Europe land bridge was adopted, supporting the development of intra-continental Asian transport infrastructure as well as of routes between Europe and Asia. Also, the intergovernmental agreement on the Trans-Asian Railway Network entered into force on 11 June 2009. This network now comprises 117,500 km of railway lines serving 28 member-countries. The UNESCAP promotes the development of the Trans-Asian Railway network as part of its overall goal to develop an international, integrated, intermodal transport and logistics system for the region.

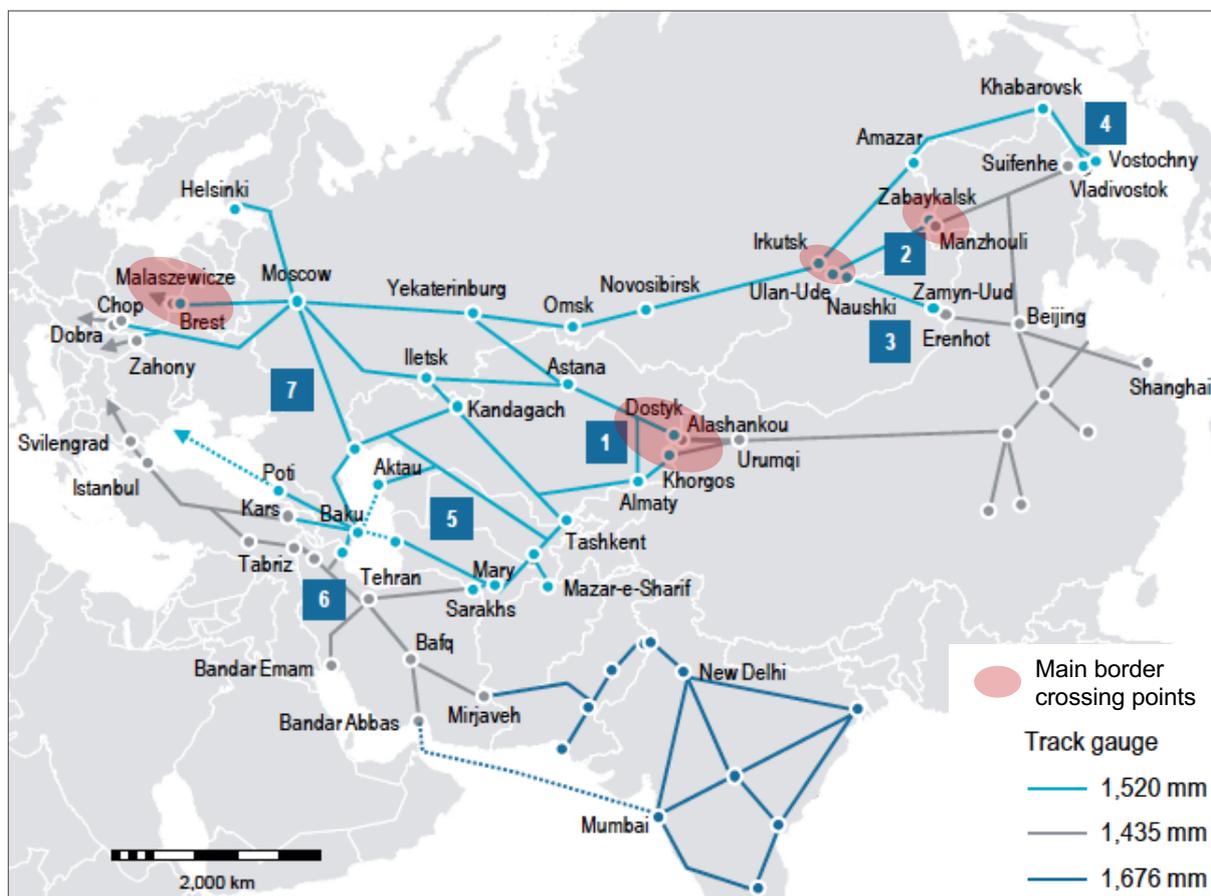
In 1997, the Organisation for Cooperation of Railways (OSJD) proposed 13 Eurasian rail corridors, while the Second International Euro-Asian Conference on Transport held in September 2000 in Saint Petersburg defined four **Trans-Eurasian Land Transport Corridors (TELTC)** interconnecting two continents (**Figure 3.1**):

1. **The Northern Corridor (Trans-Siberian)**: Europe – Russia – South Korea – Japan, with two branches: Russia – Kazakhstan – China and Russia – Mongolia – China (**Central Corridor**).
2. **Transport Corridor Europe – Caucasus – Asia (TRACECA)**, Eastern Europe – Black Sea – Caucasus – Caspian Sea – Central Asia.
3. **The Southern Corridor**: Southern-Eastern Europe – Turkey – Iran, with two branches: Central Asia – China and – Southern Asia – Southern-Eastern Asia/Southern China
4. **The North-South Transport Corridor (NOSTRAC)**: Southern Europe – Russia, with two branches: Caucasus – Persian Gulf and Central Asia – Persian Gulf.

The Trans-Siberian Railway with a transit time ranging from 12 to 18 days along a 10,000 km route remains the fastest and most reliable route for rail container transport. The UIC Study on Eurasian Corridors (2017) confirms (**Figure 3.2** and **Table 3.1**), that although a number of other initiatives aimed to intensify rail transport have been undertaken in recent decades, the most exploited ones are rail routes within the Central Corridor (via Kazakhstan) and Northern Corridor (via Russia). According to RZD, the capacity of the Trans-Siberian Railway will amount to 180 million tons in 2023 (1.5 times more than in 2018).



Fig. 3.1. Trans-Eurasian Land Corridors
Source: EDB (2018a).



Note: Conical projection to minimize visual distortion of distances; numbering based on route usage for Eurasian rail freight transport.

Fig. 3.2. Main Eurasian rail routes and border crossing points

Source: own modification based on UIC (2017) map.

Table 3.1. A comparison analysis of main rail routes within the Eurasian corridors

	Route via	Corridor	Length/ Transit time*	Capacity/ Limitations
1	Alashankou/Dostyk or Khorgos (Kazakhstan)	Central	10,000 km 16-17 days	High reliability, good infrastructure Sufficient capacities, new Khorogos Eastern Gate
2	Manzhouli/Zabaykalsk (Russia)	Northern	11,000 km 17-18 days	High reliability, good infrastructure High volume but limited free capacity in Zabaykalsk
3	Erenhot/Zamyn-Uud (Mongolia)	Northern	10,500 km 18-19 days	Alternative to route 2, additional border crossings Poor infrastructure in Mongolia, limited capacity
4	Suifenhe/Vostochny (Russia)	Northern	11,500 km 18-19 days	Suitable route for traffic from South Korea High reliability, good infrastructure
5	Dostyk or Khorgos/Baku	Southern	12,000 km 19-23 days	Alternative to traffic to Southern Europe Two times Ro-Ro shipping, limited capacity
6	Khorgos/Tashkent/Tehran	North-South	12,500 km hardly used	Poor infrastructure, route upgrade required Limited capacity
7	Tehran/Baku/Moscow	North-South	13,500 km hardly used	Suitable route for traffic from India to Europe Poor infrastructure, route upgrade required

* Fast-speed rail services can archive better transit times.

Source: own modification based on UIC (2017).

Germany, China's the biggest trade partner within the EU-countries, has led the development of intercontinental railway connections in recent years. In 1973, the first Deutsche Bahn's container crossed the Trans-Siberian Railway. In 2008, a test freight train from Beijing reached Hamburg, and the first container train from Xiangtang followed in October of the same year. In the opposite direction, a freight train from Hamburg arrived in Wujiashan, a city in the central Chinese province of Hubei, in March 2011. Since then, DB has offered regular train services between Germany and China. In 2018, about 235 weekly container train services were offered to/from 27 Chinese cities to the Port of Hamburg (25% more than in 2017).

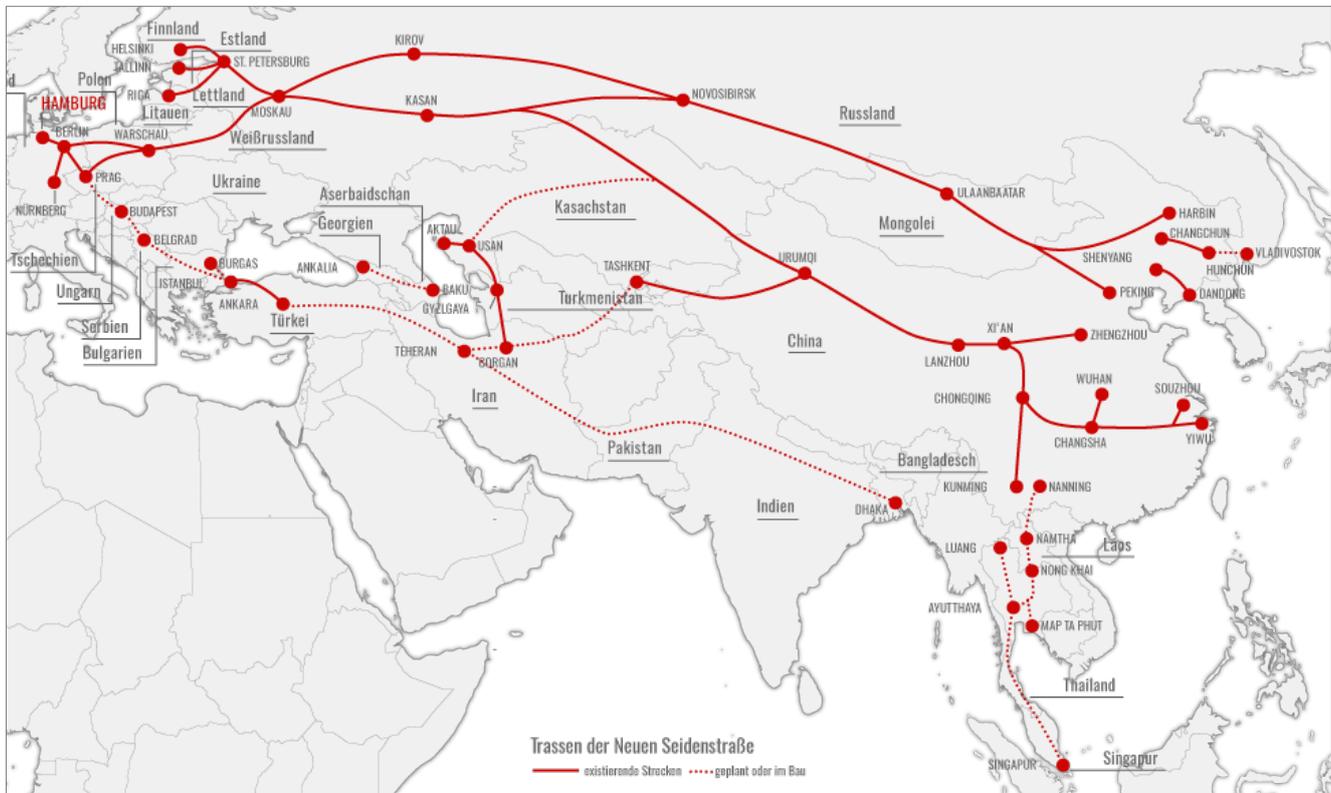


Fig. 3.3. Hamburg's railway connections with China

Source: Port of Hamburg (2018).

Also, Duisburg, the largest inland port worldwide, which handled more than 4.1 million TEU in 2017, has been running freight trains between Duisburg and the biggest Chinese cities of Chengdu, Chongqing and Urumqi since 2011. Currently, about 30 freight trains travel weekly between Duisport and various Chinese destinations (Figure 3.4). Following the Centre for Eastern Studies report, around 25% of trains between the EU and China, carrying 75% of the value of goods, are transhipped in Duisburg (Jakóbowski, Popławski, Kaczmarski, 2018). All of this cargo is carried via Poland.

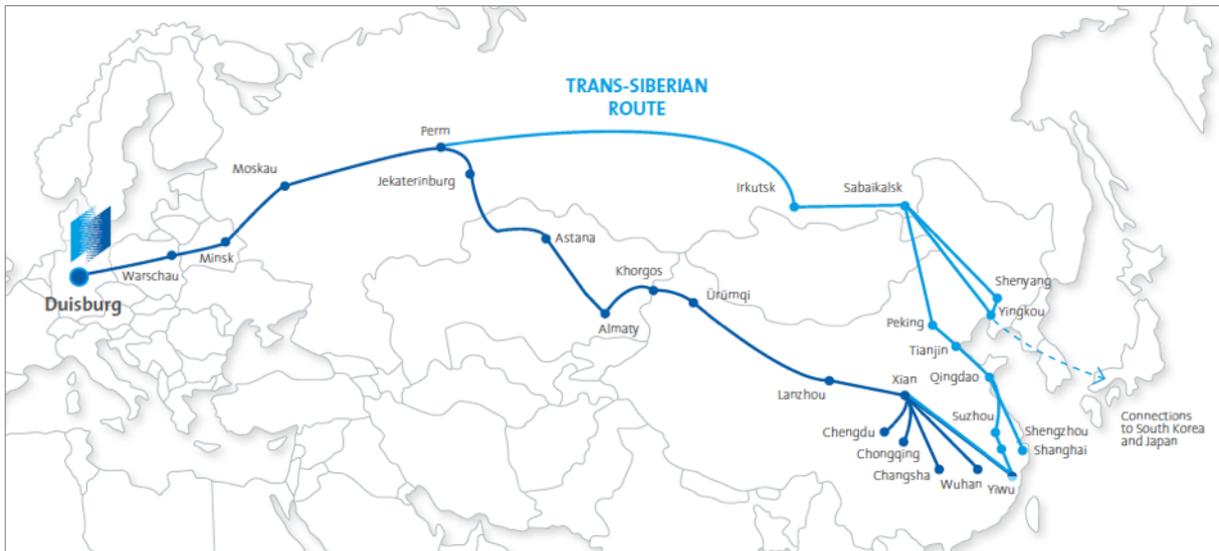


Fig. 3.4. Duisport's railway connections

Source: Duisport (2018).

3.2. RAIL CONTAINER TRANSPORT BETWEEN CHINA AND EUROPE

3.2.1. Current trends

The trade flows between Europe and Asia are handled primarily by maritime transport. About 91% of cargo from China to the EU-28 measured by their volume and about of 96% in the opposite direction was transported by sea in 2017 (see [Table 3.2](#)). In case of value of goods also air transport plays an important role (26% and 34% respectively). Railways carried only 1.4% of cargo by volume (816,000 tons) and 2.5% by value (EUR 8.9 billion) from China – Europe, and 1.0% (562,000 tons) and 3.2% (EUR 6 billion) in the opposite direction, respectively. Although rail transport in Poland faces a fiercer competition from road transport, the share of railways is a slightly higher than an average for the EU-28.

Table 3.2. Modal split of trade flows between the EU and China in 2017

Country	China – Europe				Europe – China			
	sea	air	road	rail	sea	air	road	rail
share calculated by weight (in tons), %								
EU-28	91.4	2.2	5.0	1.4	96.0	1.6	1.4	1.0
Germany	94.8	3.1	0.2	1.9	92.2	4.4	0.0	3.4
Poland	87.5	1.5	7.3	3.7	88.2	1.3	8.7	1.8
share calculated by value (in euro), %								
EU-28	63.1	26.1	8.3	2.5	61.1	33.6	2.1	3.2
Germany	62.8	32.0	0.8	4.4	63.0	31.1	0.0	5.9
Poland	66.2	13.5	14.1	6.2	68.0	21.8	7.0	3.2

Source: own elaboration based on Eurostat database.

The volume of rail container transport between China and Europe has been analysed using the Belarusian Railway's (BCh) statistics, containing complete data of this traffic. In 2011-2018, the number of moved containers from 2,500 to 324,700 TEU ([Figure 3.4](#)). Container trains run between 50 cities in China and 40 cities in Europe. The main destinations in Europe, besides mentioned above Hamburg and Duisburg, are also: Nuremberg, Łódź, Małaszewicze, Tilburg, while in China they are: Zhengzhou (Henan Province), Wuhan (Hubei), Hefei (Anhui), Chengdu (Sichuan), Urumqi (Xinjiang Uygur Autonomous Region of China), Lanzhou (Gansu Province), Yiwu (Zhejiang), Chongqing, Tianjin (Jiangsu Province), Xian (Shaanxi), Shenzhen (Guangdong).

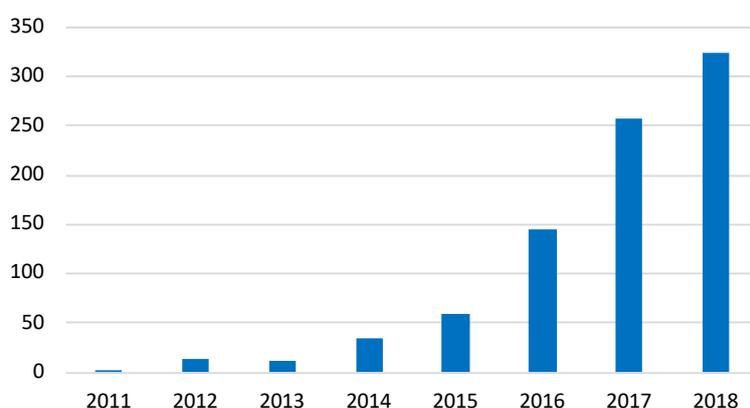


Fig. 3.4. Container traffic between China – Europe – China in 2011-2018 (thousand TEU)

Source: own elaboration based on BCh data.

In 2018, almost 77% of container traffic between China and Europe was across the Central Corridor (China – Kazakhstan – Russia – Belarus – EU), mainly via Alashankou/Dostyk crossing on the Chinese-Kazakh border (200 thousand TEU) (Figure 3.6). A significant increase was recorded on another border crossing, Khorgos/Altynkol, which commenced operation between in 2012 on the state border between China and Kazakhstan. In April 2018 container trains from Łódź to Chengdu were operated for the first time via Altynkol station. Consequently, Altynkol overtook Zabaykalsk on Chinese-Russian border, which handled almost 100% of the transit between China and Europe in 2010, and Naushki on Mongolian-Russian border, which both recorded a decrease in traffic.

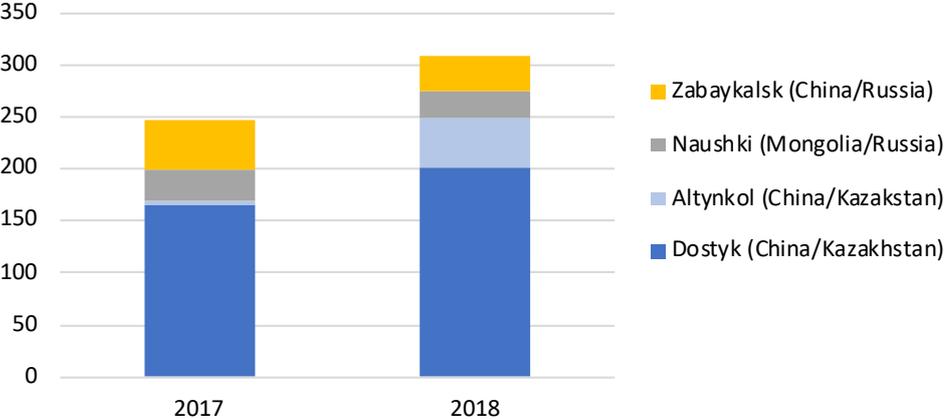


Fig. 3.6. China – Europe – China container traffic by border crossings (thousand TEU)

Source: own elaboration based BCH data.

Kazakhstan is committed to becoming the main logistic hub in Eurasia (Figure 3.7) benefiting from rising transit volumes. Aimed to strengthen its capabilities as a transit corridor, significant investments have been made in transport infrastructure, including 2,500 km of new railway lines in past 15 years, as well as in Khorgos Eastern Gate, a dry port on the Eastern border with China.



Fig. 3.7. Kazakhstan’s container connections development plan

Source: Embassy of the Republic of Kazakhstan in the Republic of Poland (2018).

About 88% of the freight traffic across the Polish-Belarusian border stations is westbound. The container traffic is more balanced: only 5% more trains went from China to Europe than in opposite direction in 2018 (Figure 3.8). About 95% of this traffic is handled by Brest (BY)/Małaszewicze-Terespol (PL) border crossing. Due to delays at Malaszewicze in 2017, the operators and forwarders became interested in alternative routes. As a result, 59 more trains crossed Bruzgi (BY)/Kuźnica (PL) in 2018 (a year earlier it was only 5 trains) and 2 trains – Svislacz (BY)/Siemianówka (PL) border crossing. Also, 98 trains between China – Kaliningrad – China bypassed Poland.

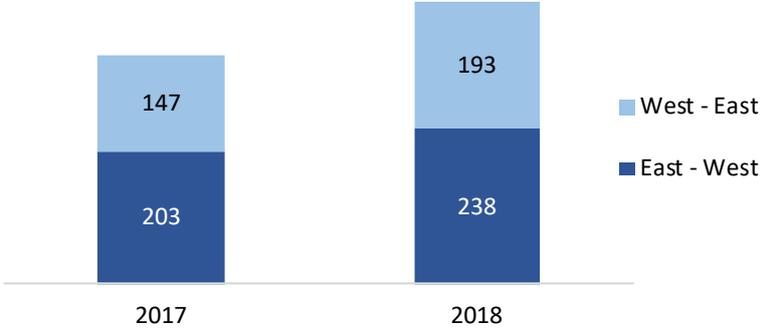


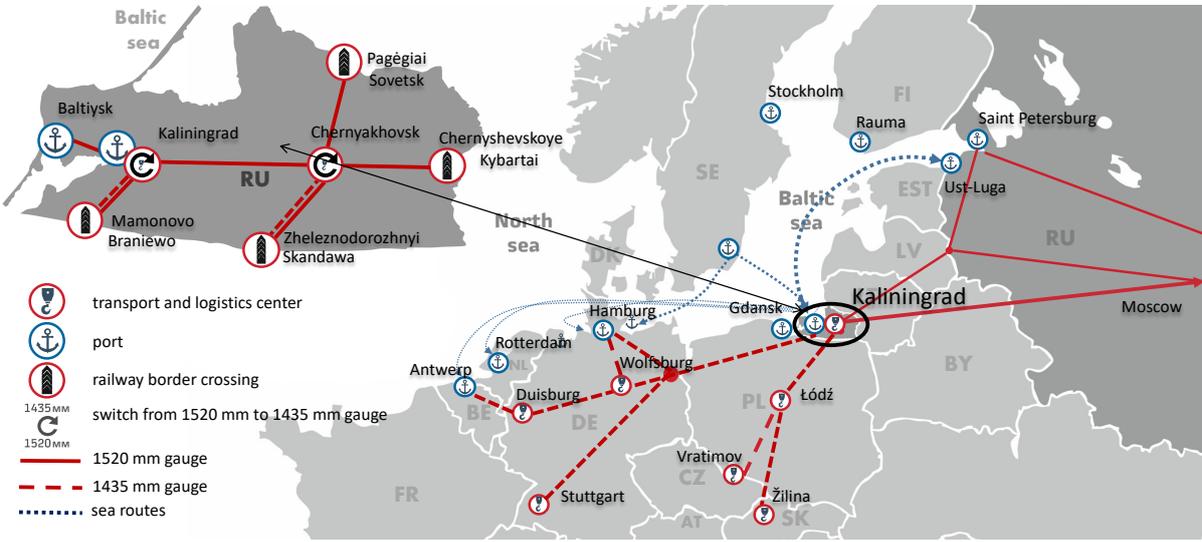
Fig. 3.8. Container traffic via Polish-Belarusian railway border crossing by directions (thousand TEU)

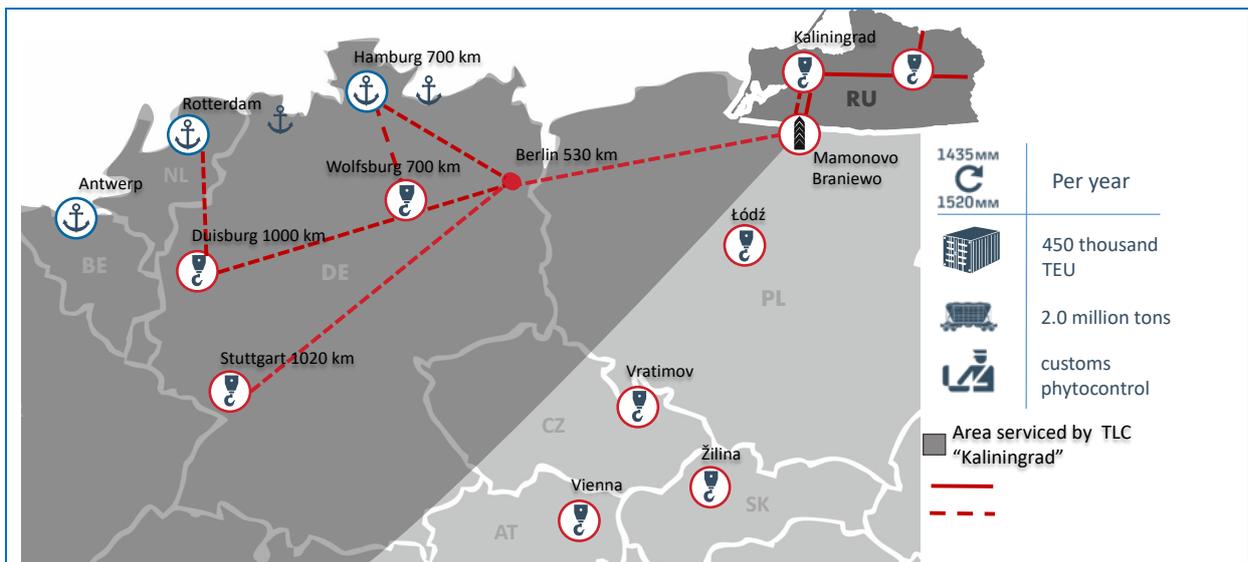
Source: own elaboration based on BCh data.

Box 3.1. The transit potential of Kaliningrad

JSC United Transport and Logistics Company Eurasian Rail Alliance (UTLC EPA), a joint venture of railway undertakings in Russia, Kazakhstan and Belarus, provides a transit service for container traffic between China and Europe. In the years 2015-2018 it facilitated an over-fivefold increase, reaching 280,600 TEU, as well as a significant reduction in journey time and increased speed.

Kaliningrad is expected to be a new multimodal & logistics hub of the UTLC ERA services just outside the EU border.





Source: Golomolzin (2018).

In 2017, the Russian RZD Logistics and the German DB Cargo signed a cooperation agreement on container transport of 100,000 TEU annually via seaports in the Kaliningrad region to the seaport of Rostock. In 2018, in total, 276,430 TEUs were handled in the seaport of Kaliningrad. A new deep seaport with a capacity of 3 million TEU is expected to be built near Yantarnyj. However, experts point out that transit flows through Kaliningrad are highly dependent on geopolitical factors. For example, for China – EU traffic, an additional customs clearance and re-loading to vessel is requested, as compared with land corridors, which affects costs and transit time.

3.2.2. Forecasts for East-West-East rail traffic

In recent years, forecasts have been published regarding the potential of container rail transport between Asia and Europe. The results of studies carried out by UIC (2017), Steer Davies Gleave (2018), and EDB Centre for Integration Studies (2018a, 2018b) are presented below. The comparison of the forecast results shows the differences that arise, dependent on the time horizon and methodology applied.

UIC/Roland Berger study (UIC, 2017)

The analysis based on 2016 data encompasses 38 countries in Europe and Asia: the 28 countries of the European Union as well as Japan, South Korea, China, Mongolia and Kazakhstan. South Asia (India, Pakistan, Bangladesh), Iran and Turkey are treated separately as long-term upside potential. Belarus, Russia and Ukraine are considered as transit countries. The total traffic potential between the 28 European and five Asian countries is forecast to reach 25.6 million TEU in 2027 for sea, air and rail transport combined, compared to 11.1 million TEU in 2016. This implies a CAGR of 8% between 2016 and 2027 for the overall potential volume. The imbalance of westbound and eastbound traffic flows will decrease slightly to 59% westbound and 41% eastbound in 2027. **For 2027, total rail potential of around 636,000 TEU is forecast**, with a significant amount coming from a shift from sea transport (Figure 3.8), which equates to 21 trains per day in 2027 (calculation based on 82 TEU per train), including existing rail volumes increasing over time and a shift from sea to rail and assuming a forecast growth in sea transport. A small potential shift from air freight is also considered likely. The

extrapolated forecast for the period until 2030 shows a total rail cargo volume of approximately 810,000 TEU.

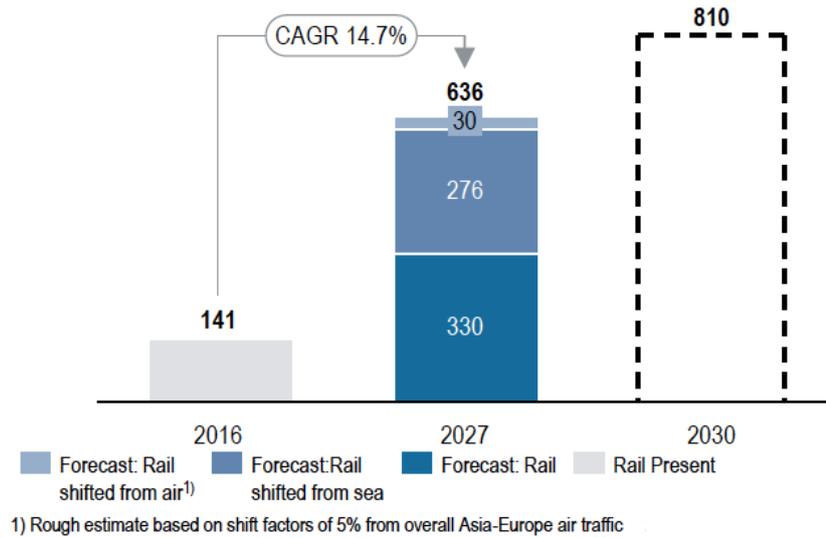


Fig. 3.9. Rail container transport Asia – Europe within the UIC’s base forecast by 2027 (thousand TEU)

Source: UIC/Roland Berger (2017).

As reported by UIC, the Northern Corridor with 617,000 TEU remains dominant in Eurasian rail traffic. The Southern routes’ share of the traffic potential for 2027 is projected to reach 19,000 TEU, corresponding to about 3% of rail traffic between Europe and Asia.

In addition to the *base case* forecast, two further scenarios have been developed. The *best case* forecast shows 742,000 TEU in 2027 (CAGR 16.3%) based on a strong trade volume development and an increase in time-sensitive goods, stable subsidies, investments in infrastructure, an increase in sea freight rates and the approval of transport of hazardous goods by railways. In the *worst case* scenario, 437,000 TEU are forecast for 2027 (CAGR 10.8%) based on the slow development of trade volumes, a decrease in time-sensitive goods, an end to subsidies from China, low sea freight rates, insufficient investments in infrastructure and no shift from air transport.

Research for TRAN Committee (Steer Davies Gleave, 2018)

The research commissioned for the European Parliaments’ Transport and Tourism Committee by Steer Davies Gleave in 2018 estimates that the trade between the Far East and the EU will grow by another 80% between 2016 and 2040, equivalent to an average annual growth of 2.5%. This means that the total two-way traffic will reach around 40 million TEU in 2040. Meanwhile, rail routes will only be able to accommodate the transfer of **3 million TEU from maritime and air transport**.

The study estimates the extent to which cargo travelling by sea or air in 2016 might in future transfer to rail as a result of new and improved rail services. The scale and nature of freight flows in the area covered by BRI was analysed using the World Cargo Database (WCD) owned by MDS Transmodal. The several assumptions about the level of service that different modes would offer between the Far East and Europe were made. Additionally, the value of different commodities currently travelling between the Far East and Europe by sea and by air was examined, taking into account the value of a faster transit. It was estimated that, if cargo sent by sea had a value higher than EUR 85,000 per TEU, it would be more cost-effective for shippers to send it by rail. Therefore, of the two-way sea freight of 40 million

TEU (including empty return containers) in 2040, around 2.5 million TEU could transfer to rail at this price. It was also observed that, if cargo sent by air had a value under EUR 550 per kilogram, it would be more cost-effective to send it by rail. In practice, the average value of air cargo through European airports is currently approximately EUR 200 per kilogram. This suggests that rail could be an attractive alternative to air if rail capacity was available between suitable end points with an acceptable overall transit time.

The study estimates that around 50% of the forecast two-way air freight by 2040 could transfer to rail, resulting in a further 0.5 million TEU of rail freight 750-metre long container train able to carry around 100 TEU, or 90 TEU with a 90% load factor. An operation with one train per day each way, on 300 days of the year could therefore effect a two-way volume of around 54,000 TEU per year. A two-way volume of an additional 3 million TEU shifted to rail from maritime and air transport would therefore require around 50-60 trains each way per day, or around 2-3 trains per hour.

Containers carried by rail, would primarily be those previously shipped to North Sea ports, and would travel from Moscow through Brest and Warsaw to Berlin. Containers carried by sea would first pass or call at ports in Southeast Europe, such as Athens/Piraeus in Greece, where they could in principle be transferred to rail for travel further north. However, most freight of sufficiently high value to justify the additional costs of rail across the Balkans would already have switched to overland rail travel across Asia. It would therefore be more cost-effective for the remaining containers at Athens/Piraeus to continue by sea to ports in the north Adriatic Sea, such as Venice and Trieste in Italy, Koper in Slovenia and Rijeka in Croatia.

Various rail routes from the Far East to the EU have been cost-assessed for the future. The findings are that, with shipping times to the North Sea up to one week longer than to the Mediterranean Sea, rail would be most attractive for transport to Europe north of the Alps, including to EU Member States bordering the North Sea and the Baltic Sea.

For rail to carry such flows would require additional capacity not only on the TEN-T network, and on the wider EU rail network, but also in Belarus, Russia, Kazakhstan and China. At present, the principal flows of rail freight on these routes are between China and Russia, within Russia itself, and between Russia and the EU. The current capacity of the rail route through Kazakhstan is around 25 million tons per year and the current capacity of the Trans-Siberian route is estimated to reach around 100 million tons per year. Of the 16.5 million tons per year between China and Kazakhstan, less than 1 million tons is intended for further transport to/from the EU. A flow of 3 million TEU, or around 21 million tons, between China and the EU would add only around 2% to the total rail freight carried within Russia. By 2040, services will use a range of routes to reach their destinations:

- south via Katowice in Poland to Hungary and Austria, Slovakia and the Czech Republic, and onwards to southern Germany, Switzerland and France;
- southwest via Łódź and Wrocław in Poland to Germany;
- west, as at present, via Poznań (Poland) to Germany, and onwards to the Netherlands, Belgium, the United Kingdom and Ireland, and via Hamburg to Denmark and Sweden;
- northeast along Rail Baltica to Lithuania, Latvia, Estonia and Finland.

EDB assessment (EDB Centre for Integration Studies, 2018a)

According to the study prepared by the Eurasian Development Bank, the preservation and expansion of transport subsidies by Chinese provinces is the key driver of continued container traffic growth between China and the EU via the Eurasian Economic Union (EAEU).⁹ The growth of railway container traffic between China and the EU in 2011–2017 from 7,000 FEU¹⁰ (14,000 TEU) to 131,000 FEU (262,000 TEU) was achieved at a railway freight rate of USD 4,800 – 6,000 per FEU (subsidised in about 40%). Subsidy-driven reduction of China – Europe railway container freight rates by 30–50% resulted in a 19-fold increase of container traffic.

Container traffic increase from 200-250 thousand FEU in 2020 to 500,000 FEU by 2030 may be subject to a further reduction of the through freight rate by USD 1,500 per FEU (from USD 5,500 per FEU to USD 4,000 per FEU). According to EDB calculations, the maximum **additional container traffic** that can be attracted to EAEU railway networks is estimated at 2.7 million FEU (**5.4 million TEU**), including West – East traffic of 0.325 million FEU (0.650 million TEU) and East – West traffic of 2.375 million FEU (4.750 million TEU) (**Figure 3.10**). With balanced container loads (containers travelling both ways fully loaded with optimal cargoes, no empty containers), additional container traffic that could be attracted by EAEU railway networks can be estimated at 1-1.1 million TEU, while total freight traffic along the axis (including existing traffic) could be as high as 1.3 million TEU.

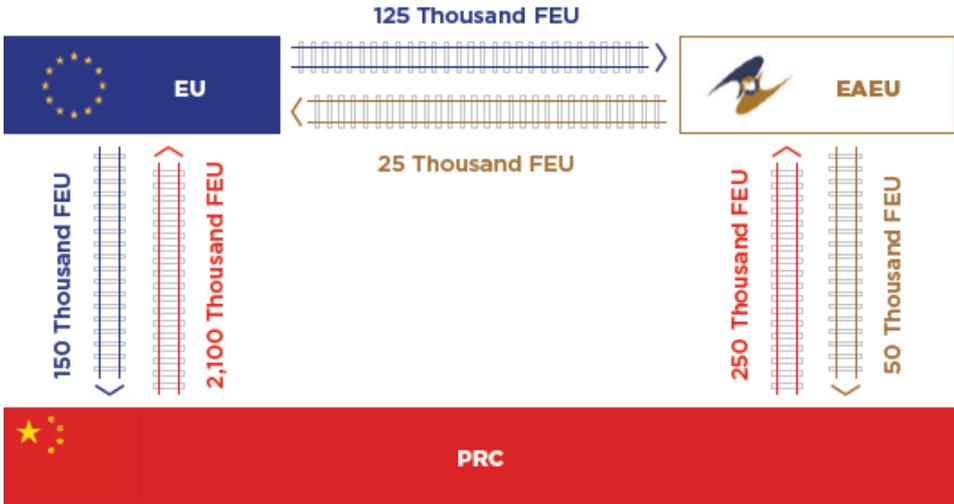


Fig. 3.10. Rail container transport between China and the EU within the EDB’s forecast by 2030

Source: EDB Centre for Integration Studies (2018a), p. 12.

Besides the tariff barriers, a number of non-tariff barriers are identified in another EDB study (2018b), including infrastructural barriers (transport and logistical infrastructure) border/customs-related barriers and administrative/legal barriers. It is underlined that a critical infrastructural restriction is imposed on the future growth of trans-Eurasian transit by the inferior transport and processing capacity of Polish railways, including crossing points at the Polish-Belarusian border.

⁹ Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia.

¹⁰ Forty-Foot Equivalent Unit.

3.3. CONTAINER CARGOES SWITCHABLE TO RAILWAYS

According to the Coordinating Council on Trans-Siberian Transport International Association (CCTT), electronic products were usually transported from China to Europe by railways in recent years, whereas there was an increasing interest to move automotive components, cars, pharmaceuticals, chemicals and food (including frozen foods) from Europe to China. Around 100 types of commodities were identified in the UNECE-UNESCAP Euro-Asian Transport Links project (EATL) as suitable for delivery by inland transport between Europe and Asia. It includes high value and small volume goods, especially such that may be containerised. Those are typically goods for which air transport would be too expensive, while maritime transport would be too slow (UN, 2019, pp. 17-21).

Table 3.3. The commodities suitable for rail transport between Europe and Asia

Commodities	Sea-to-rail shift	Air-to-rail shift
Pharmaceuticals		
Electronic products, IT products		
Fashion products, footwear, automotive parts, tires, specific construction materials, timber and wood, chemicals, fertilizers, machinery, large electrical goods (refrigerators and washing machines), pipes, selected agricultural produce		

Source: own elaboration based on UN (2019), p. 21.

These findings are mostly confirmed by another study prepared by EDB Centre for Integration Studies (2018a): almost all international cargoes (with the exception of oversized, self-propelled and towed machines, such as those used for mining, road construction, railway machinery, buses and lorries) are containerisable cargoes. Based on a comprehensive analysis of the commodity structure of Eurasian freight traffic between critical country pairs, subject to unit values and physical volumes of international cargoes, a list of cargoes that are attractive for the reorientation from maritime transport to railway transport has been prepared by EDB's experts.

Table 3.4 Cargoes in containers that could be shifted from maritime to rail transport

FEACN Commodity Group	Commodities
30	Pharmaceuticals
33	Perfumery and cosmetics
42	Leather
43	Fur
50	Silk
51	Wool
61	Knitted goods
62	Clothes
64	Footwear
65	Headwear
75	Nickel
84 (excl. 8429,8430)	Engineering products
85	Electric equipment and radio electronic devices
90	Tools
91	Watches
95	Toys and sports equipment
97	Works of art

Source: EDB Centre for Integration Studies (2018a), p. 29.

3.4. TEN-T CORE CORRIDORS

3.4.1. TEN-T and rail corridors development

July 2016 marked 20 years since the decision No. 1692 of the European Parliament and the Council adopting Community Guidelines for the development of the Trans-European Transport Network (TEN-T). The Guidelines were subsequently revised in 2004 and 2011/13, and the network now includes, among others, 70,000 kilometers of railway lines. At the same time, 10 Pan-European corridors were an extension of the TEN-T to Central and Eastern Europe.

From the outset, the TEN-T Guidelines comprised priority projects: those of particular relevance or significant size. The projects were to demonstrate European added value and address support to EU's cross-border projects. The TEN-T network concept was originally developed top-down by the European Commission and further elaborated by a high-level expert group. In 2011, the European Commission assessed progress on the 14 Essen projects and the 30 priority projects set up in 2004. It was concluded that progress had been too slow most often impeded by national policies.

In the 20 years of its evolution, the TEN-T concept has consistently combined key projects and a major corridor-based development (Figure 3.11). Meanwhile, the Pan-European corridors have transformed into a new generation of railway corridors including RailNetEurope (RNE), European Rail Traffic Management System (ERTMS), and Rail Freight Corridors (RFCs).

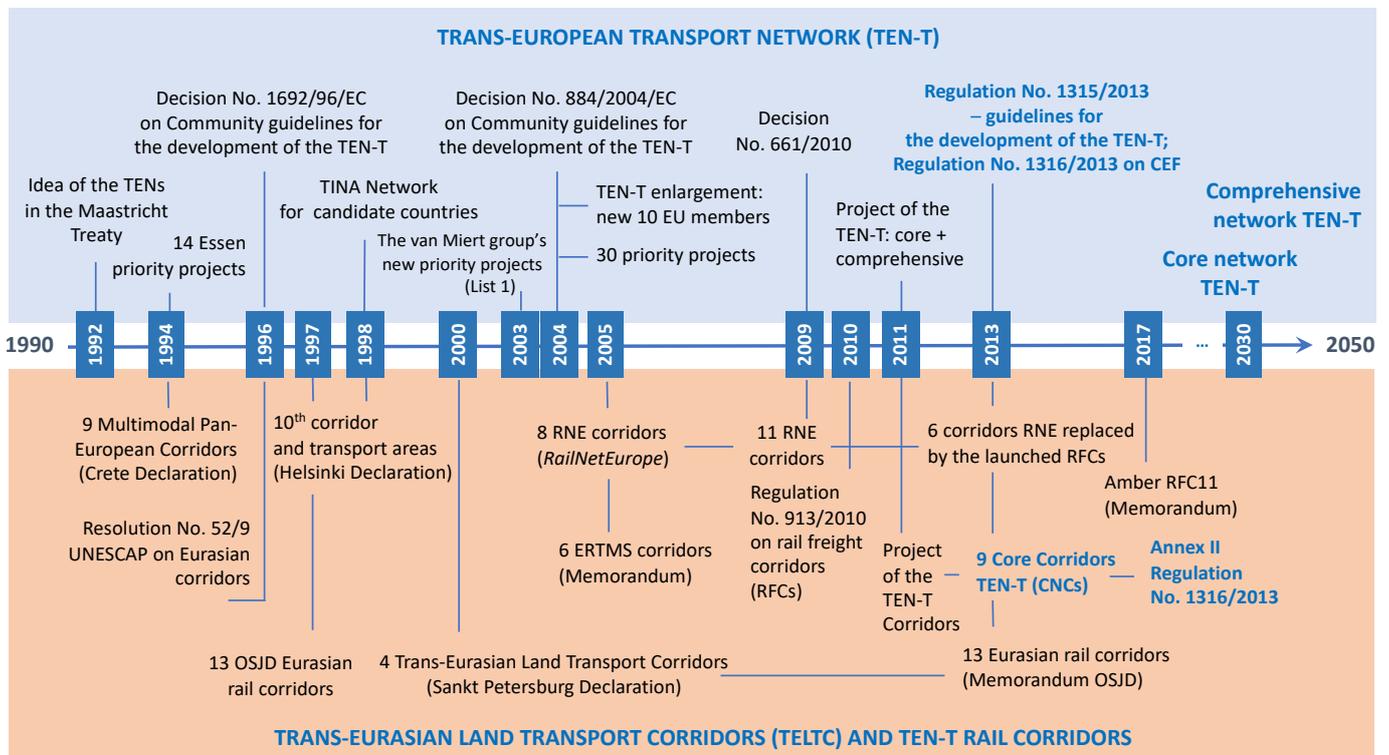


Fig. 3.10. Milestones in the TEN-T and rail corridors development

Source: own elaboration.

Throughout its lifespan, the TEN-T network has been repeatedly adjusted for the Community's changing transport and economic needs and priorities. The revision of the TEN-T Guidelines proposed

by the European Commission in autumn 2011 and eventually approved in 2013 was intended to overcome some fundamental shortcomings of TEN-T planning and implementation.

The revised TEN-T concept introduces a distinction into the Core Network and the Comprehensive Network. The priority projects now form integral parts of core network corridors, as the policy focus shifts away from a disconnected set of projects to a more integrated approach. Measures scheduled for completion by 2030 again are to involve a corridor-based approach, which is expected to facilitate the development of the core network. The nine **Core Network Corridors (CNCs)** that have been defined constitute a framework for coordinated infrastructure development for the TEN-T Core Network. This is supported with extended funding instruments summarized in the Connecting Europe Facility (CEF).

The new approach also recognizes that some infrastructure projects of common interest might need to link with, and pass through, neighbouring and the-EU pre-accession countries and other third countries. A big challenge is to ensure technical and organizational coherence between their networks. As of January 2019, the interconnecting point between Eurasian Corridors and the European Freight Corridors for most railway routes is the border-crossing area of Terespol-Małaszewicze/Brest (RFC8 and North Sea – Baltic Core Corridor).

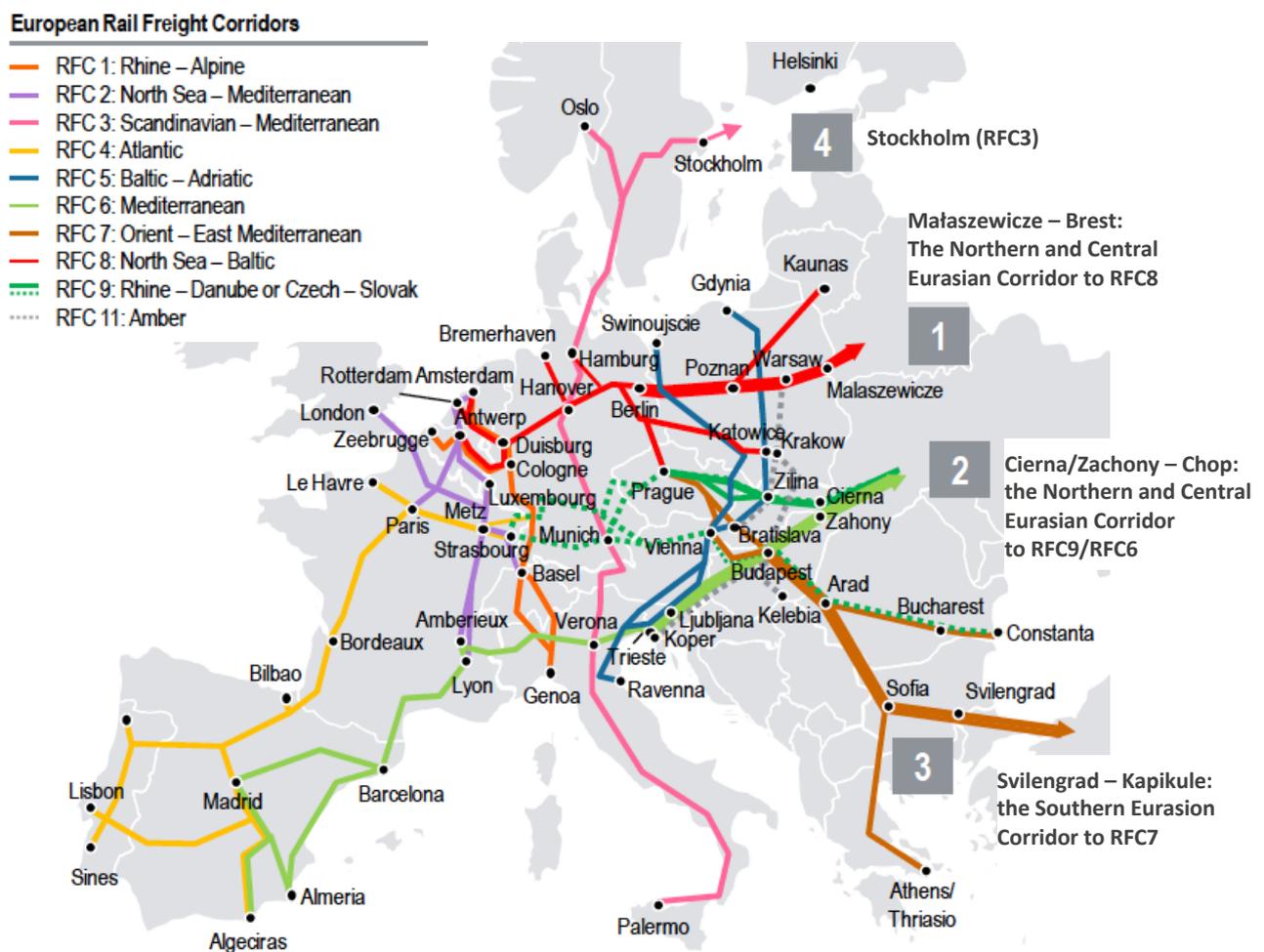


Fig. 3.12. Interconnection points between Trans-Eurasian Land Transport Corridors and Rail Freight Corridors in Europe

Source: own modification based on UIC (2017).

The North Sea – Baltic Core Corridor (NSB) connects east and west of Europe, via the Netherlands, Belgium, Germany, Poland and three Baltic States, while the Baltic – Adriatic Core Corridor (BAC), links the Polish ports with the ports of the Adriatic Sea Poland, the Czech Republic, Slovakia, Austria, Slovenia, and Italy.

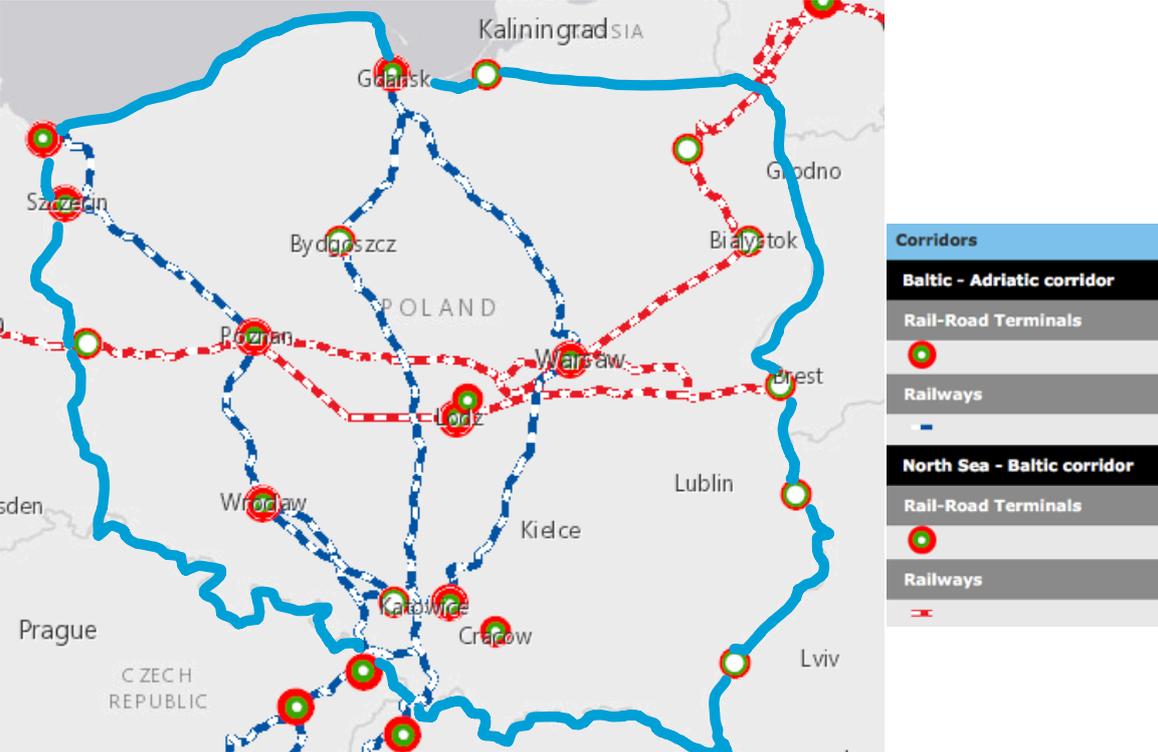


Fig. 3.13. The North Sea – Baltic and the Baltic – Adriatic Core Corridors in Poland

Source: TENtec, EC, DG MOVE (2018).

Furthermore, representatives of the ministries responsible for transport in Poland, Slovakia, Hungary and Slovenia signed a Memorandum of Understanding on the establishment of the Executive Board of the Amber Rail Freight Corridor (as RFC11) at Brussels on 5 December 2017. The axis links important industrial centres and intermodal terminals to the Adriatic Sea and the Balkan States. If the European Commission accept this proposal, a possible route for the corridor could be: Koper – Ljubljana – /Zalaszentiván – Sopron/Csorna –/(Hungarian-Serbian border) – Kelebia – Budapest –/ Komárom – Leopoldov/Rajka – Bratislava – Žilina – Katowice/Kraków – Warsaw/Łuków – Terespol – (Polish-Belarusian border). One of its most important components in Poland will be the construction of a new rail line in Małopolskie voivodeship which has been planned for decades and is known as Podłęże – Piekietko. The nearly 60 km-long stretch is supposed to run from Podłęże via Szczyrzyc to Tymbark/Mszana Dolna, where it will connect with the existing Chabówka-Nowy Sącz line in order to reach the border with Slovakia via Muszyna.

3.4.2. Forecast for North – South – North traffic

The Baltic – Adriatic Core Corridor study provides data on intensity of rail transport along this corridor. **Figure K** shows that in 2014 the total traffic flows were below the critical level, set in the corridor analysis at 150 trains per track daily for a double-track line. Based on the analysis, the current track capacity will be sufficient to accommodate train traffic growth along the corridor in the do-nothing scenario (2030T). This is also generally true for the work plan scenario, where the train volumes will increase further compared to the current situation (+60% on average along the corridor, but with growth mainly concentrated on the new or upgraded sections). However, local capacity issues would need to be appropriately managed – both in the detailed definition of the investments or in the management of the available capacity. These issues are considered to be mainly concentrated in urban agglomerations including Warsaw and Katowice in Poland. In addition, high traffic flows are expected to occur in the Austrian section between Werndorf and Wiener Neustadt, as the recent availability of the two Alpine crossings. It is therefore only in the case of a more significant shift of transport demand towards the rail mode (such as the one depicted in the 2030RP scenario) that capacity could limit the effective growth of the rail mode and the smooth flows of long-distance transport. This is in particular the case of some single-track sections along the corridor, but potentially also for other high traffic double-track sections. However, in case this scenario comes true, capacity to accommodate this additional demand might be provided not only with additional investments on the corridor, but also with the improvement of the Comprehensive Network, which can provide alternative routes to the main Baltic-Adriatic Core Corridor. Such additional demand for capacity would need to be fully analysed in due time should the traffic develop in line with the higher future projections (EC, 2018b, p. 25).

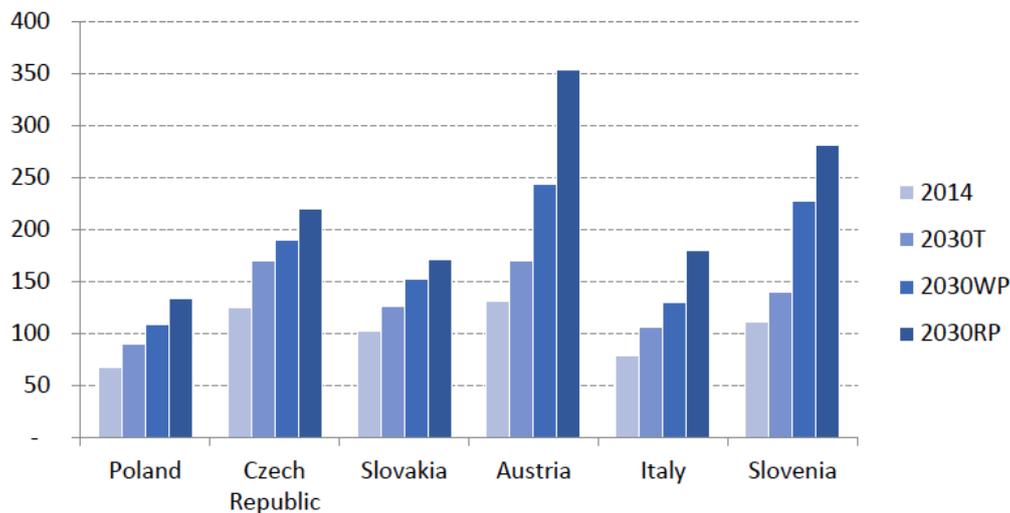


Fig. 3.14. Traffic forecast scenarios for BAC (average trains per day)

Source: EC (2018b), p. 25.

4. RAILWAY INFRASTRUCTURE DEVELOPMENT IN POLAND

4.1. MAIN CHARACTERISTICS OF PKP PLK'S RAILWAY NETWORK

PKP Polskie Linie Kolejowe S.A. (PKP PLK) is the manager of the national railway infrastructure of 18,513 km of railway lines (35,967 km of tracks), including 27,120 km of route tracks and main principal tracks at stations and 8,847 km of station tracks. The usage of the infrastructure in 2017 is described below following PKP PLK's annual report (2018, pp. 13-14):

- 92 railway operators, including 18 offering passenger services (of which 11 are regular scheduled services), 71 freight services and 3 passenger and freight services;
- a total of 2,480,019 train journeys were operated, including on the basis the PKP PLK's Annual Timetable – 1,663,785 train journeys (67%) and of the Individual Timetable – 816,215 train journeys (33%);
- operational performance of 235.18 million train-km was achieved, including 158.53 million train-km in passenger services (67%) and 76.65 million train-km in freight services (33%);
- 153,603 journeys of international trains took place, of which 81,139 for freight traffic: journeys across German border accounted for 40% of international rides, the Czech border – 35%, Belarusian border – 14%, Ukrainian border – 4% (6,786), Slovakian border – 3% (5,144), Russian border – 2% and Lithuanian border – 1%; international transport services in cross-border traffic were performed by 50 operators;
- four key border crossings were used for freight traffic: Kunowice (Poland – Germany) – about 1,450 trains, Zebrzydowice (Poland – the Czech Republic) – almost 1,400 trains, Terespol (Poland – Belarus) and Chałupki (Poland – the Czech Republic) – about 1,200 trains each.

According to PKP PLK, as of 31 December 2017, the length of railway line tracks in a good technical condition was lower than 60% of the total track length, while 26% were rated as satisfactory (i.e. with lower operational parameters) and a further 16% – as unsatisfactory (with significantly lower operational parameters). The Polish railway market regulatory authority, UTK (Office of Railway Transport) monitors the sections with the limited capacity (UTK, 2016).

Figure 4.1. shows railway lines used for intermodal transport. Current limitations of the rail capacity, speed and axle load (excluding those undergoing upgrade works) reported by railway and intermodal operators to UTK in 2017 are listed in **Annex 1**.¹¹ The data highlight the large scale of local technical limitations to the railway network. In addition, a number of railway stations with limited capacity (the number of tracks and train length) are:

- on main lines: Dąbrowa Górnicza Towarowa, Jarocin, Legnica, Katowice Muchowiec, Kędzierzyn Koźle, Rudziniec Gliwicki, Warszawa Główna Towarowa, Olesno Śląskie, Jaworzyna Śląska, Kłodzko Główna, Stryków, Stara Wieś, Kamieniec Żąbkowicki, Strzelin, Rogoźnica, Imbramowice, Świdnica Przedmieście, Gliwice Łabędy;
- within the seaport areas: Gdańsk Port Północny, Gdańsk Zaspą Towarowa, Gdynia Port GPA;
- on the state borders: Małaszewicze Południowe, Chałupki, Braniewo, Zebrzydowice;

¹¹ The list does not include the all limitations, but only those reported by the operators to UTK.

- as well as within the rail-road terminals: Małaszewicze Centralne (Cargotor), Warszawa Rembertów, Pałędzie, Siedlce, Ryki, Jarocin, Łask, Gorzów Wielkopolski Towarowy, Radzymin.

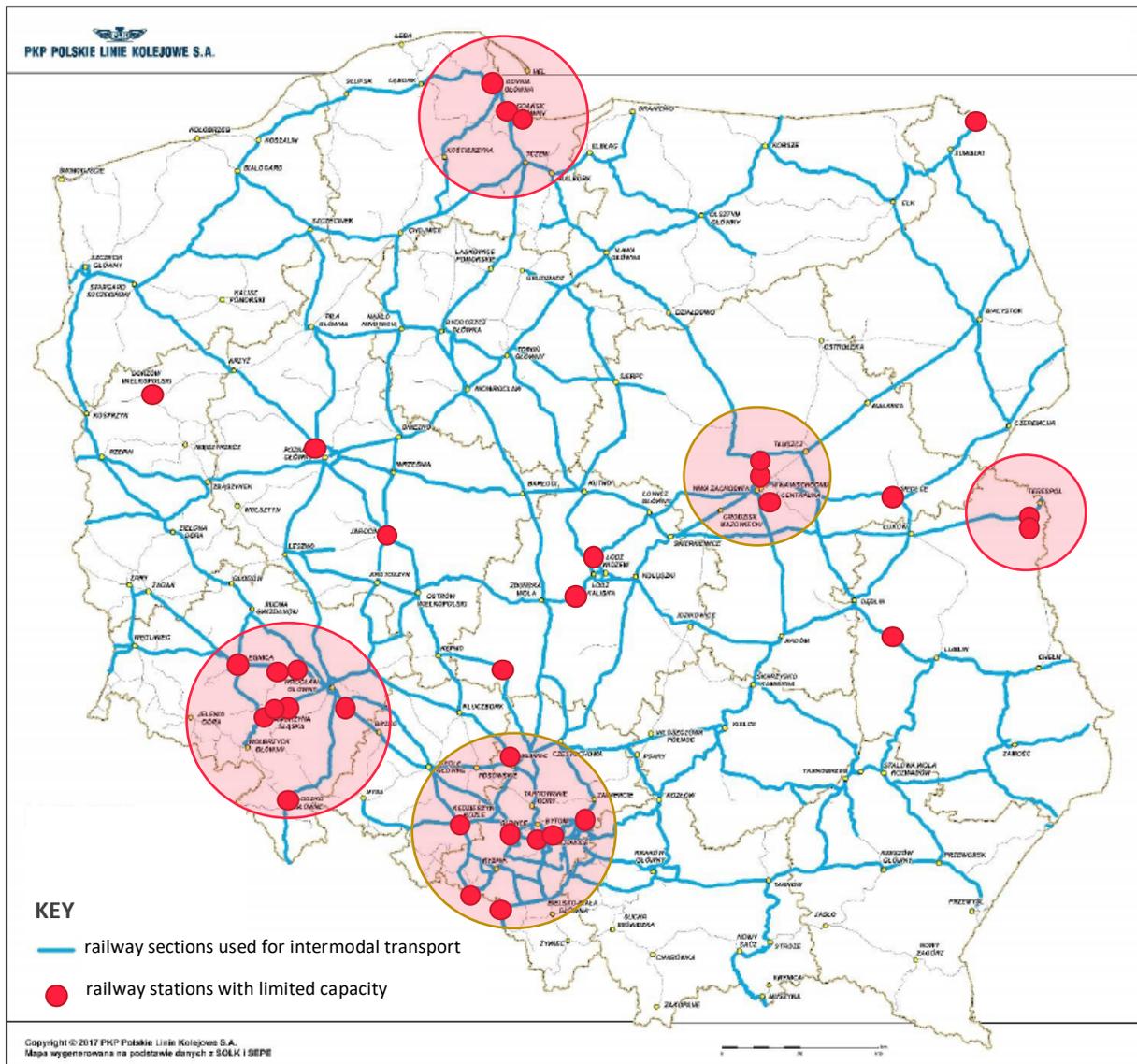


Fig. 4.1. Railway lines used for intermodal transport in 2016 and current bottlenecks

Source: own modification based on PKP PLK's map.

4.2. NATIONAL RAILWAY PROGRAMME UNTIL 2023

The *National Railway Programme until 2023*. Railway infrastructure managed by PKP Polskie Linie Kolejowe S.A. (PKP) is the largest initiative for railway infrastructure development in Poland to date. It includes projects co-financed from the EU funds within the financial framework 2014-2020 (following the n+3 rule) and other investments in railway infrastructure managed by PKP PLK financed from national public funds. The lists of investment tasks are included in the *Detailed Plan of Implementation of the KPK*, outlining planned expenditures and sources of financing of individual investment projects. As of December 2018, works were being carried out in 155 locations of the total cost of PLN 32 billion. The scale of the modernisation works is presented in [Figure 4.2](#).

4.3.1. Main railway lines

The modernisation works along the **Baltic – Adriatic Core Corridor** concern the major railway axis E59, E30, and E65/CE65. The Eastern Branch, railway line E65 between Gdynia and Warsaw has recently completed (EUR 1,130 million) to the standards required by Regulation (EU) 1315/2013, with the exception of short sections in Tczew (approx. 2 km of 60 km/h), Iława (approx. 4 km of 90 km/h) and near Modlin (approx. 7 km of 60-80 km/h) where due to technical constraints (line geometry) the required standard will not be reached. Furthermore, two upgrades in the Warsaw node to solve critical issues on the main freight route, as well as two projects to modernise and improve capacity on the section Warsaw – Grodzisk Mazowiecki (EUR 390 million) are expected to be implemented by 2019. Line E65 is already compliant on the section from Grodzisk Mazowiecki to Zawiercie, and improvement works have already been completed on Zawiercie – Dąbrowa Górnicza section (EUR 89 million). Modernisation works on the Central Branch between Gdańsk and Katowice, CE65 railway line, are envisaged to start in 2020 and are expected to be completed by 2022 except on Bydgoszcz – Tczew section (EUR 656 million), for which the implementation dates are not defined. Further modernisation works are also planned on line E65 and E30 – Chorzów Batory – Gliwice Łabędy section – at the interchange between the Central and Western Branches of the corridor (EUR 341 million), but for this particular section the start and end date are not specified (EC, 2018a, p. 37).

On the Western Branch, railway axis E59, between Świnoujście and Gliwice, a number of projects are underway ongoing whose completion will result in speed, axle load and train length compliance. These include works between Poznań and Wrocław (EUR 390 million) and on the passenger section between Błotnica Strzelecka and Opole Groszowice (EUR 46 million), which are nearly finalised, as well as between the Dolnośląskie Voivodship border and Czempin station, currently expected to be completed by 2020 (EUR 365 million). Additional works are planned between Szczecin and Poznań, which are expected to be completed by 2023 (EUR 881 million). The modernisation of Poznań central railway station is nearly completed (EUR 11 million); works for the improvement of the Poznań freight bypass are also planned, for which the implementation dates are however to be defined (EUR 10.5 million). Modernisation works are finally planned between Wrocław and Katowice, with no implementation dates specified as yet (EUR 135 million). The investments considered by the Polish authorities and listed in the current plans refer to the 2023-time horizon, including the ones for which implementation dates are not specified, which due to scarcity of financial resources are currently planned to be realised after 2020, and completed by 2030 (EC, 2018a, p. 38).

The above-mentioned projects will contribute to the achievement of the required TEN-T standard on corridor railway lines in Poland, however additional investments will be required to reach compliance by 2030. Based on the analysis of the corridor project list and of the impact of the investments on the KPIs in 2017, a number of limitations are indicated in the BAC report from February 2018. It includes:

- speed and axle load bottlenecks on the rail sections Popowice – Mikołajów – Brochów at the Wrocław node;
- speed limitations on the rail freight section between Opole Groszowice and Rudziniec Gliwicki on the main line Wrocław – Katowice (however the alternative routing Opole Groszowice – Gliwice Łabędy will be compliant, except for a very short non-compliant section at Kędzierzyn Koźle);
- 740-meter train operating bottlenecks between Szczecin and Świnoujście, between Wronki and Słonice along the main line Szczecin – Poznań – Wrocław, at the Wrocław node, on the main

Gdańsk – Tczew – Katowice section, and between Opole and Gliwice on the Wrocław – Katowice main line;

- the achievement of the speed, axle load and 740-meter train standards may be delayed, related to funding, at the Poznań node, and between Wrocław, Jelcz and Opole (the projects relating to the works on these sections are included in the reserve list of the National Railway Programme and no national funds are planned to secure their full implementation).

The modernisation works along the **North Sea – Baltic Core Corridor** concern the major lines E20/CE20 and E75 (Rail Baltica). Both Warsaw and Poznań nodes on the E20 have an internal dedicated city bypass designed to separate freight and passenger traffic with an overall goal to increase line capacity for both. It allows for better connections for passengers within the urban nodes. However, railway sections close to nodes will still be likely to suffer from rail congestion in peak hours (mixed international, national, regional, metropolitan, and cargo traffic). This refers mainly to suburban mainlines around Warsaw metropolitan area (especially western and south-western). Rail congestion in peak hours will be mitigated by the modernisation of Warsaw’s southern railway bypass (CE20 mainline, sections: Łowicz – Skierniewice – Pilawa – Łuków) (EC, 2018b, p. 25). Finally, as of January 2019, the planned high-speed line linking Warsaw, Łódź and Poznań has not yet been approved for construction.

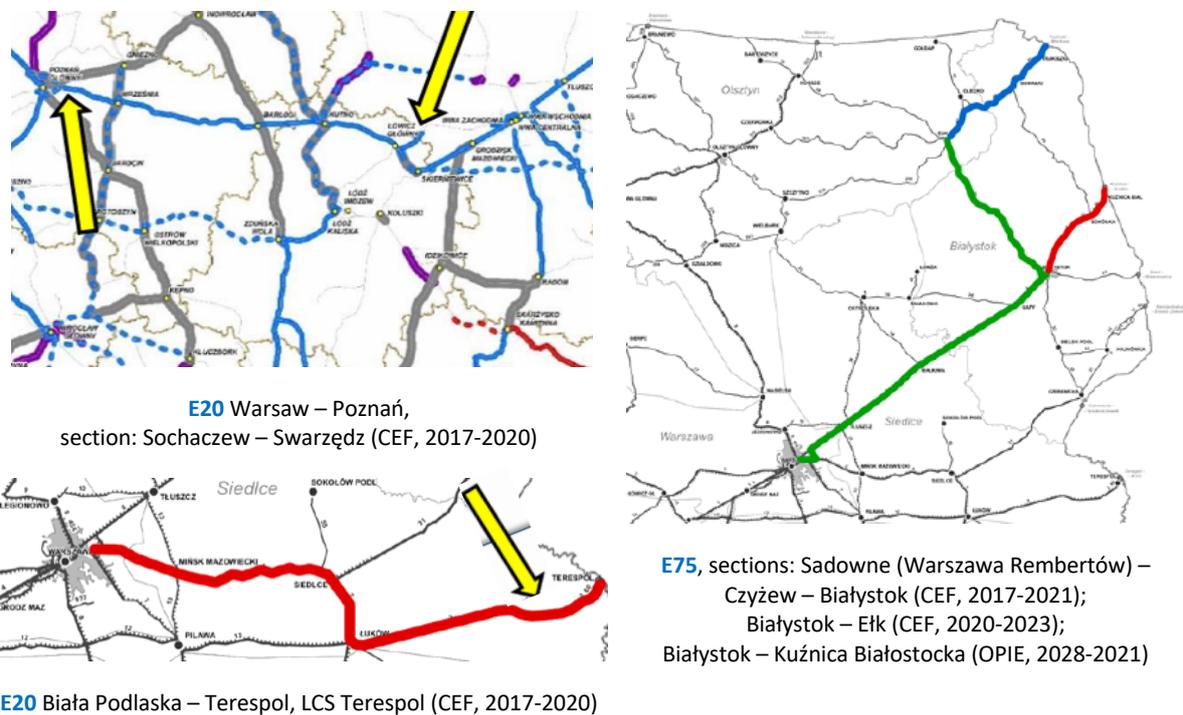


Fig. 4.3. Examples of ongoing modernisation works along the NSB corridor

Source: PKP Polskie Linie Kolejowe S.A. (2017).

A technical compliance map for the railway infrastructure (**Figure 4.4**) shows the planned status of the BAC and NSB core corridors at 2030, including the prevailing standard on these segments with reference to electrification, axle load and line speed. The colour of the lines refers to the planned works and their impact on the corridor compliance by 2030, whereas the non-compliance icons show the reasons for non-compliance and potential bottlenecks. There are a number of sections where no

investments are planned yet to comply with the standards. In addition, 740-meter train compliance and full ERTMS deployment on many corridors sections still have not been reached.

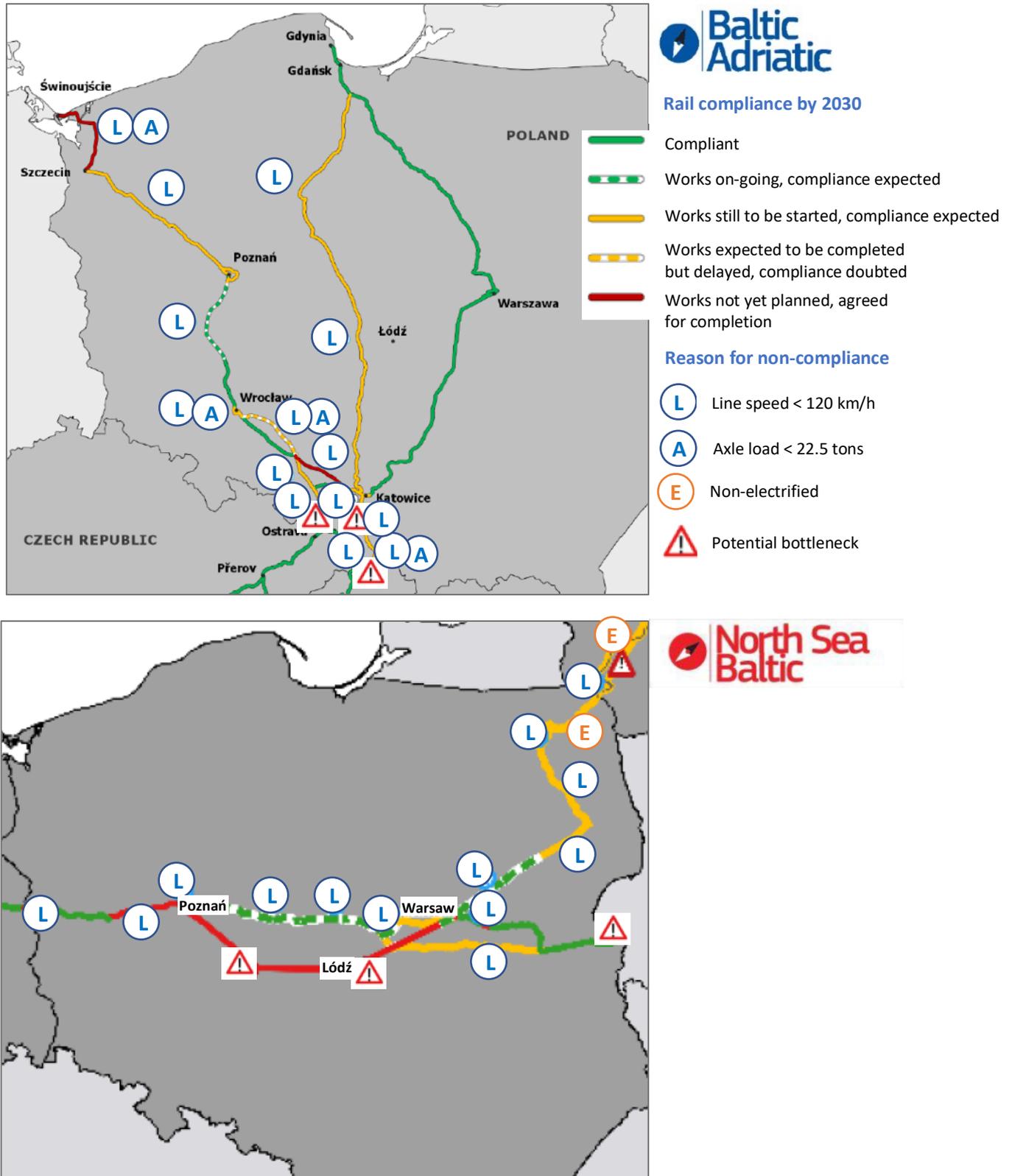


Fig. 4.4. Technical compliance and the bottlenecks expected in the BAC and NSB Core Corridors by 2030 (November 2017)

Source: own modification using EC (2018a), p. 42, EC (2018b), p. 44.

4.3.2. The cross-border sections

The following rail cross-border sections are identified by the BAC study as potential bottlenecks (EC, 2018a, p. 35-36):

- **PL/CZ: Opole – Ostrava (Chałupki/Bohumín).** The section requires improvement works on the Polish side between Kędzierzyn-Koźle and Chałupki (state border) to reach compliance in speed, and train length. Due to underfunding, this project is included in the reserve list of KPK, however national funding has only been approved for parts of the project and the time frame has not been defined yet (EUR 47 million). Whilst the Polish authorities assume that the project will be in any case completed by 2030 in line with the requirements of the TEN-T Regulation, the approval for the upgrade works is pending additional funding acquired. On the Czech side works have already been completed to increase the speed up to 140 km/h, including the improvement of the Bohumín station. This cross-border section is also expected to benefit from the modernisation of the double-track railway line E30 between Kędzierzyn-Koźle – Opole Groszowice – Opole Zachodnie to increase maximum operational speed by 2022 (EUR 150 million) as well as from the modernisation of the Ostrava junction on the Czech side by 2021 (EUR 222 million). This cross-border section is currently expected to be up to standard by 2030, with the exception of train length on the Czech side.
- **PL/CZ: Katowice – Ostrava (Zebrzydowice/Petrovice u Karviné).** The preparatory works are ongoing on the Polish side for the modernisation of this rail section, requiring major investments on lines E30 and E65, especially at Katowice, to upgrade the existing railway lines and stations. The modernisation of the existing double-track electrified line and stations is expected on Będzin – Sosnowiec – Katowice – Katowice Ligota section and at exit from Katowice towards Gliwice (centre of agglomeration), where the railway tracks will be extended by an additional pair of tracks. The works will allow for a separation of long distance and agglomeration traffic. The project includes the implementation of ERTMS/ETCS – Level 2. The modernisation works are expected to be implemented in three phases. Phase 1 involves works for the improvement of Most Wisła – Czechowice-Dziedzice – Zabrzeg section, including Czechowice-Dziedzice station, currently expected to be completed by 2023 (EUR 142 million). The second and third phases relate respectively to the modernisation of Tychy – Most Wisła section and Zabrzeg – Zebrzydowice (state border) section; and to the modernisation of the network within the urban agglomeration of Katowice (sections: Będzin – Sosnowiec – Katowice – Katowice Ligota and Katowice – Gliwice). For the latter phases the implementation dates are not defined yet. On the Czech side, the section from the state border to Petrovice u Karviné and Ostrava has already been modernised. Also, the cross-border section is expected to benefit from the completion of the modernisation of the Ostrava junction by 2021. Overall, this cross-border section is currently planned to be up to the standard by 2030 at the latest with the exception of train length on the Polish section Zebrzydowice – state border as well as on the Czech sections.
- **PL/SK: Katowice – Žilina (Zwardoń/Skalité).** On the Polish side works are expected to modernise 65 km of the existing, predominantly single-track, electrified, railway line between Czechowice – Dziedzice and Zwardoń. Due to underfunding the project comprised in the corridor project list to reach the required standards (EUR 48 million, expected to be completed by 2023) is included in the reserve list of the KPK (national funds with only partial national cost coverage). Whilst the

Polish authorities assume that the project will be in any case completed by 2030 in line with the requirements of the TEN-T Regulation, the possibility to implement the works during the current EU financing period (until 2023) will be considered if additional resources are identified. On the Slovakian side, no works are planned on the single-track section Zwardoń – Skalité – Čadca. The Skalité – Čadca subsection has already been modernised and electrified with a maximum speed of 100 km/h, axle load of 225 kN and maximum train length of 650 m. The 7.1 km subsection Zwardoń – Skalité is compliant with regard to the axle load, but non-compliant with respect to speed (70 km/h) and has limited train length operability (due to limitations at Zwardoń station on the Polish side). The modernisation of the double track Krásno nad Kysucou – Čadca section, also common to the cross-border section between Ostrava and Žilina, is expected to be completed by 2030 (EUR 220 million). This cross-border section is currently expected to be compliant by 2030 except for speed limit on the short section Zwardoń – Skalité. No works are planned till 2030 to deploy ERTMS on the Čadca – Zwardoń section.

Although the NSB study (EC, 2018b) doesn't identify the **Terespol-Małaszewicze (PL)/Brest (BY)** border crossing as a potential bottleneck, the comparison in this report of existing capacity, upgrading plans and traffic forecasts indicates that without complex technical and organisational upgrade, this border crossing will impede freight transport development between Europe and Asia, especially regarding container traffic. Inadequate capacity for future transport needs is indicated by experts in numerous recent studies (EDB Centre for Integration Studies, 2018b; UIC, 2017) as a key barrier to the growth of container traffic between Europe and Asia. The railway operators and forwarders are already looking for new routes.

Box 4.1. DB Cargo Eurasia's perspective

Dr. Carsten Hinne, Senior Vice President Corridor Development China/Eurasian Corridor, DB Cargo:

Today, the problem we have is that traffic has essentially plateaued. But there is not enough capacity to accommodate future growth. For example, the transshipment point at the Brest/Małaszewicze border crossing between Belarus and Poland has a capacity of 230,000 containers per year. But 350,000 containers are already forecast for this [2018] year.

Uwe Leuschner, Senior Vice President Business Development Eurasia, DB Cargo:

This means we have to look for alternatives. For example, running trains via the two ports near Kaliningrad or through other Baltic or southern European countries. There are some countries we don't yet travel through because — as is the case in Ukraine — organisation is difficult and not always compatible with DB Compliance. We also avoid the southern route because it takes longer. Although the route is a few kilometres shorter, the processes are more complex due to the large number of different countries transited and the interfaces this involves. As for future projects — the new rail routes via India, Pakistan, Turkey and Iran — we'll have to see how things develop.

Source: an interview published in DB (2018), p. 27.

5. POLISH RAIL CONTAINER MARKET

5.1. RAIL FREIGHT MARKET TRENDS

Following Eurostat data, rail freight transport performance in EU28 in 2017, after the periods of decline (2009, 2012, 2016) and recovery (2010-2011, 2014, 2017) was at the same mark of 416 billion tkm as in 2005. However, the situation was different in each country affecting various external factors.

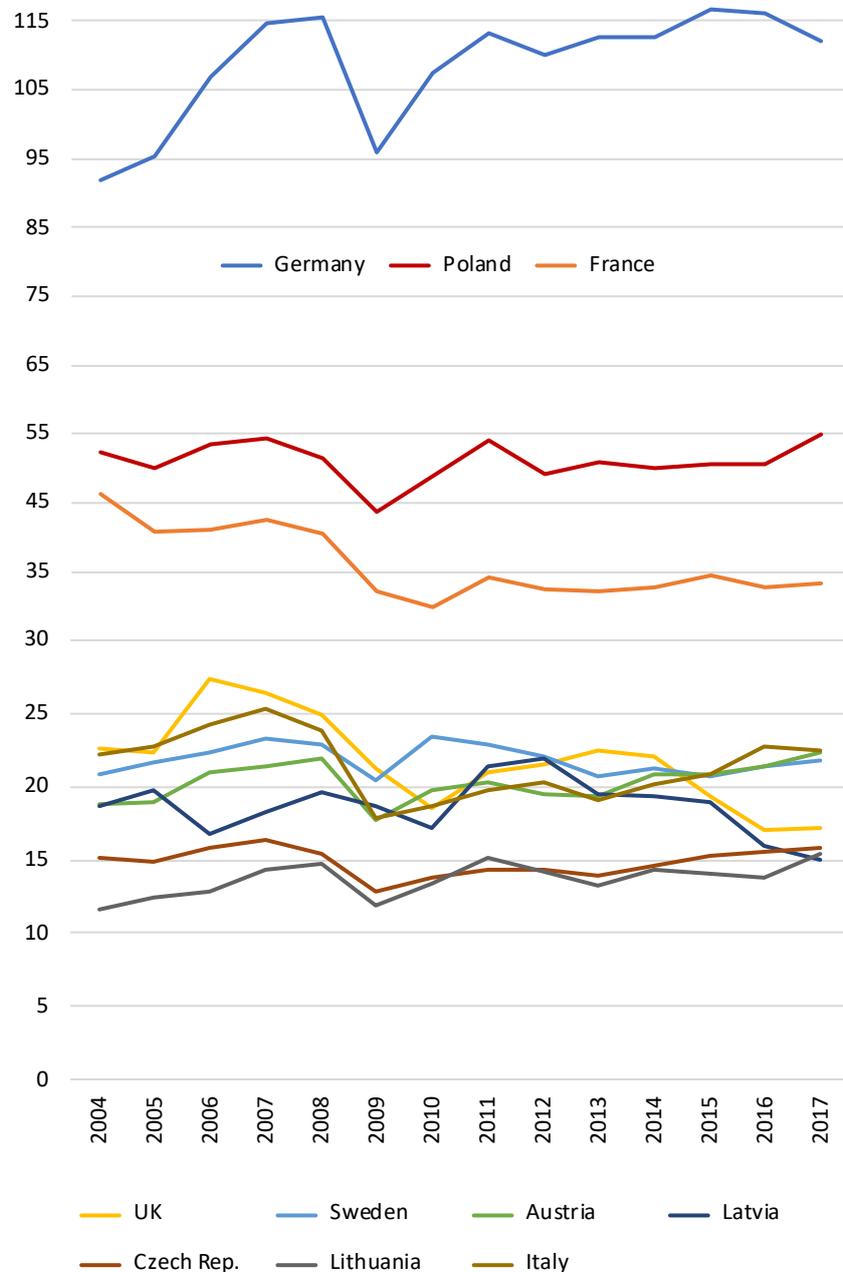


Fig. 5.1. Transport performance in the biggest rail freight EU-markets (billion tkm)

Source: own elaboration based on Eurostat data.

Between 2013 and 2017, within EU's ten largest railway markets, the highest increase was recorded in: Italy (17.6%), Lithuania (15.8%), Austria (15.5%) and the Czech Republic (13.1%), while between 2004 and 2017 – in Lithuania (32.3%), Germany (22.1%) and Austria (15.5%) (Figure 5.2). A significant fall of rail freight transport growth rate occurred in France, the UK and Latvia (mainly due to the decline of Russian transit). In Germany, although the transport performance increased by 22% between 2004-2017, decreases were recorded in 2016 and 2017.

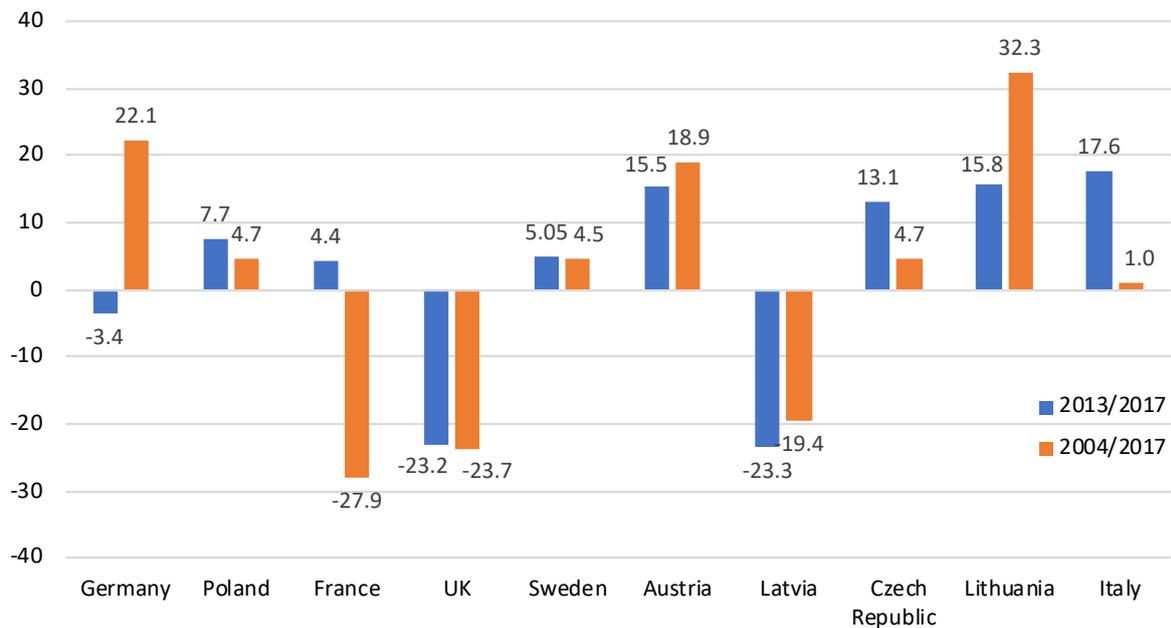


Fig. 5.2. Rail freight transport growth rate in top 10 EU-markets (% , based on tkm)

Source: own elaboration based on Eurostat data.

In Poland, the transport performance increased by 14% in the last 15 years (2004-2018) and reached 59.6 billion tkm. Between 2016 and 2018 it grew by 18%,¹² the first consecutive-two-year peak since the time of post-crisis recovery between 2010-2011. However, the share of rail freight transport continues to fall in relation to road transport (from 32% in 2004 to 13% in 2018), because of very high growth dynamics of the latter: annual increases in the volume of road transport in the last two years have been comparable to the total volume carried by railways (Figure 5.3).

In spite of losing a considerable market share between 2004-2018 (from 89% to 48%), PKP Cargo remains a dominant railway operator in Poland. The other main operators in 2018 were: Lotos Kolej (9%), PKP LHS (5.7%),¹³ DB Cargo (5.4%), CTL Logistics (4.7%), Orlen-Koltrans (3.3%), and Freightliner PL (3.2%). In international transport, PKP Cargo had about 55%, followed by DB Cargo with 7.6% and Lotos Kolej with 5.5%.

¹² This growth rate is slightly overstated due to freight train temporary route diversions related to the ongoing modernisation of railway lines in Poland.

¹³ The company operates only on one separated 400 km long broad-gauge railway line.

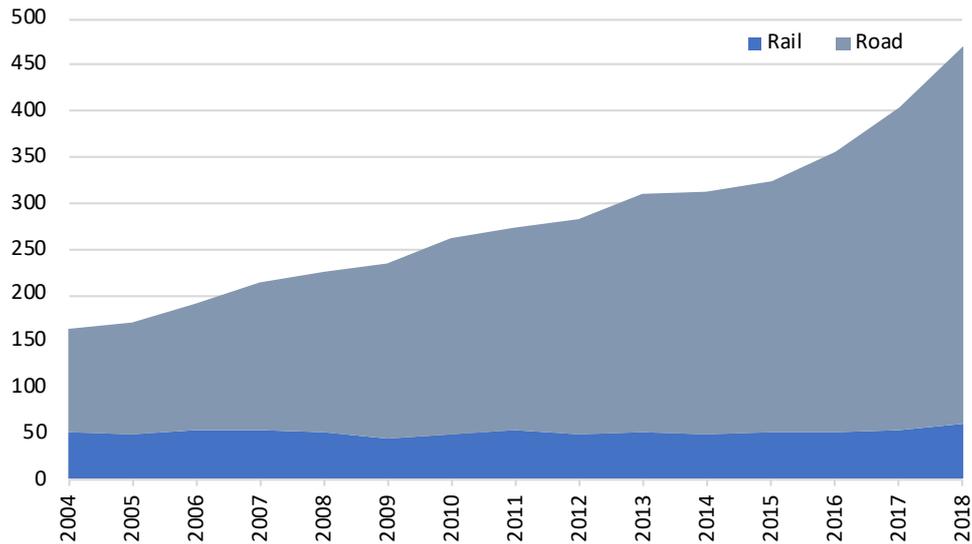


Figure 5.3. Rail and road transport performance in Poland in 2004-2018 (billion tkm)

Source: own elaboration based on GUS data.

A typical feature of Polish railway market is a low share of transit – about 7% in 2017 (3.1 billion tkm). In comparison, in Belarus with a similar volume of rail transport (48.5 billion tkm in 2017), the share of transit was 32% (Figure 5.4). Although rail transit via Poland and import have increased in the last five years, national transport leads with 56% in total freight transport performance in 2017. The share of export declined from 19% to 15%. The increase in imports was related to the transport of coal from eastern markets. Ukraine, Russia, Belarus, Germany, Australia, China, the Czech Republic and Slovakia were Poland’s key import partners, while Germany, the Czech Republic, Ukraine, Austria, Slovakia, China and Italy – the main export markets.

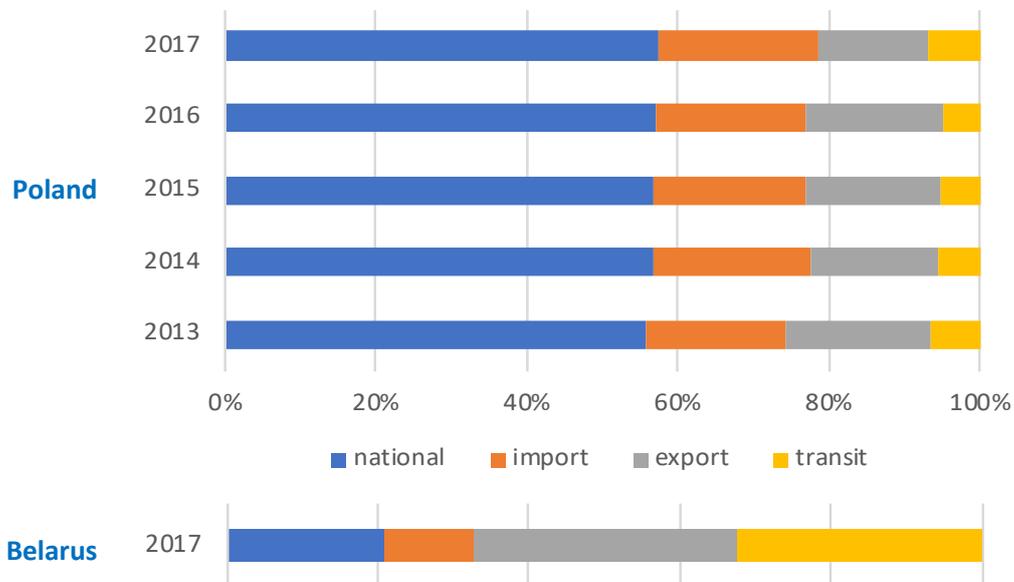


Figure 5.4. Rail transport performance in Poland and Belarus by directions (based on tkm)

Source: own elaboration based on GUS and BCh data.

The map below shows that only 4.7 million tons (16%) of export and transit cargo crossed Polish-Belarusian border OUT of the total of 29.1 million tons carried from Russia and Asian countries through Belarus in 2017. Over 50% of cargo crossing border between Russia and Belarus went via Latvian seaports and 27% via Klaipeda, Lithuania, and 16% via Kaliningrad, Russia (Figure 5.5). These cargo flows can be considered a potential for Gdańsk or Gdynia seaports if Poland offered the necessary infrastructure and quoted favourable service charges. This is also important from the point of view of the development the China-Belarus Great Stone Industrial Park (near Minsk), as well as Belarusian Railway and Duisport's plans for cooperation in expansion of railway services via this location (Fig. 5.6).

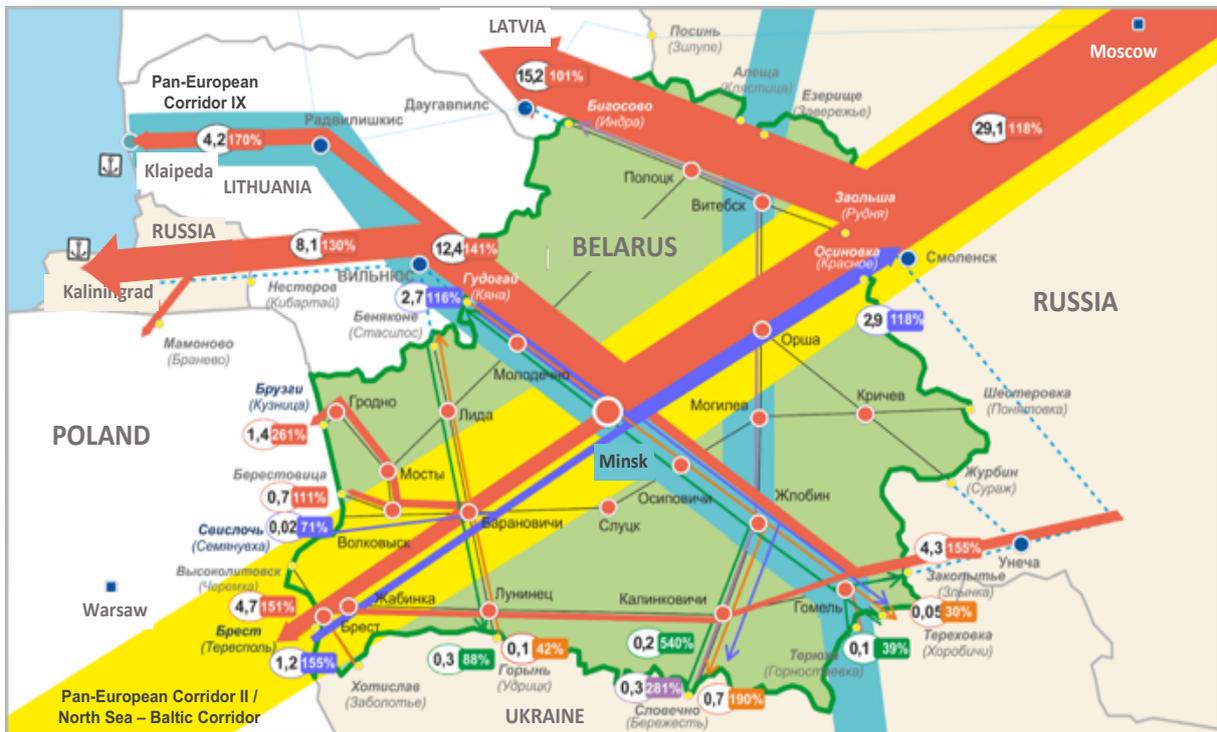
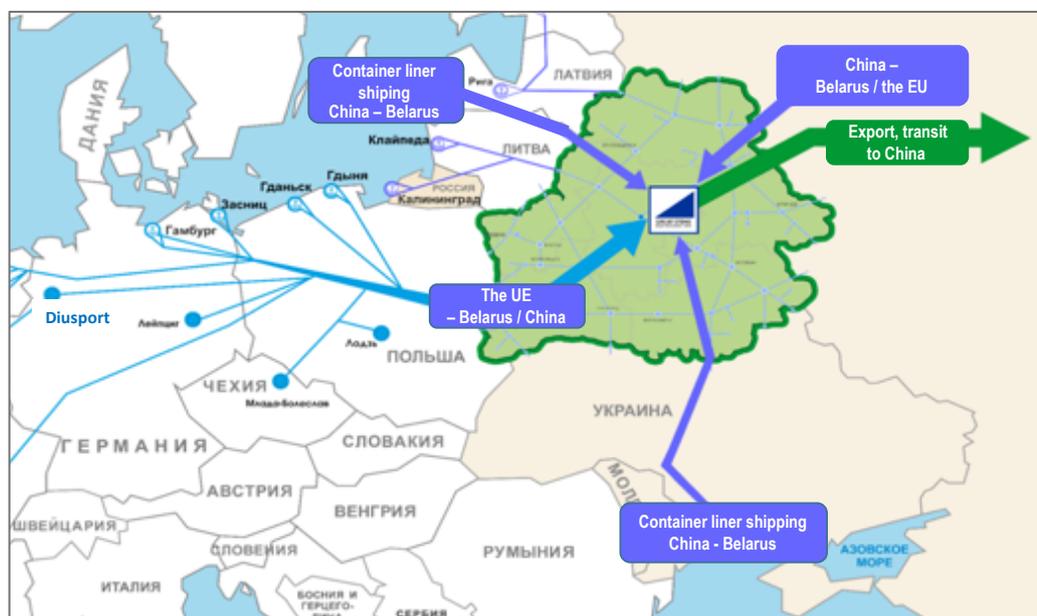


Figure 5.5. Rail transit via Belarus by main directions in 2017 (million tons)

Source: BCh (2018).

Figure 5.6. China-Belarus Great Stone Industrial Park and its railway connections

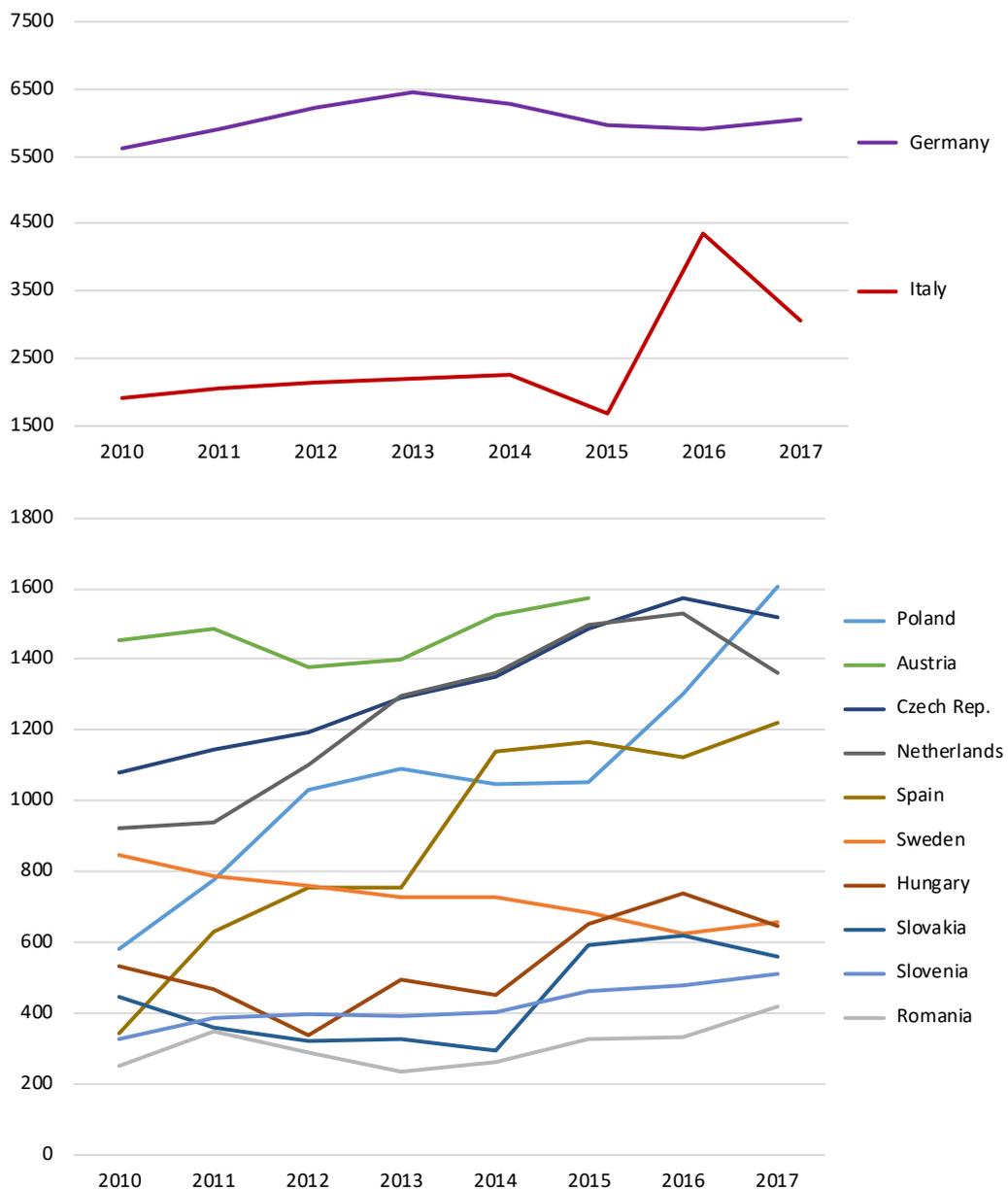
Source: BCh (2018).



5.2. RAIL CONTAINER MARKET TRENDS

5.2.1. The EU market

Largest rail freight market in the EU, Germany is also the leader in container transport: in total, more than 6 million TEU were carried in 2017. The second biggest market was Italy with 3 million TEU. Polish container market had been developing dynamically since 2010, placing Poland ahead of the UK, the Netherlands, the Czech Republic and Sweden, and becoming the third largest market with 1.6 million TEU (Figure 5.7). In spite of a high growth rate, the share of intermodal rail transport in total rail freight turnover in Poland remains below 10% (Figure 5.8).



Note: Data for Austria not available for the years 2016 and 2017.

Fig. 5.7. Rail container traffic in selected EU-countries in 2010-2017 (thousand TEU)

Source: own elaboration based on Eurostat data.

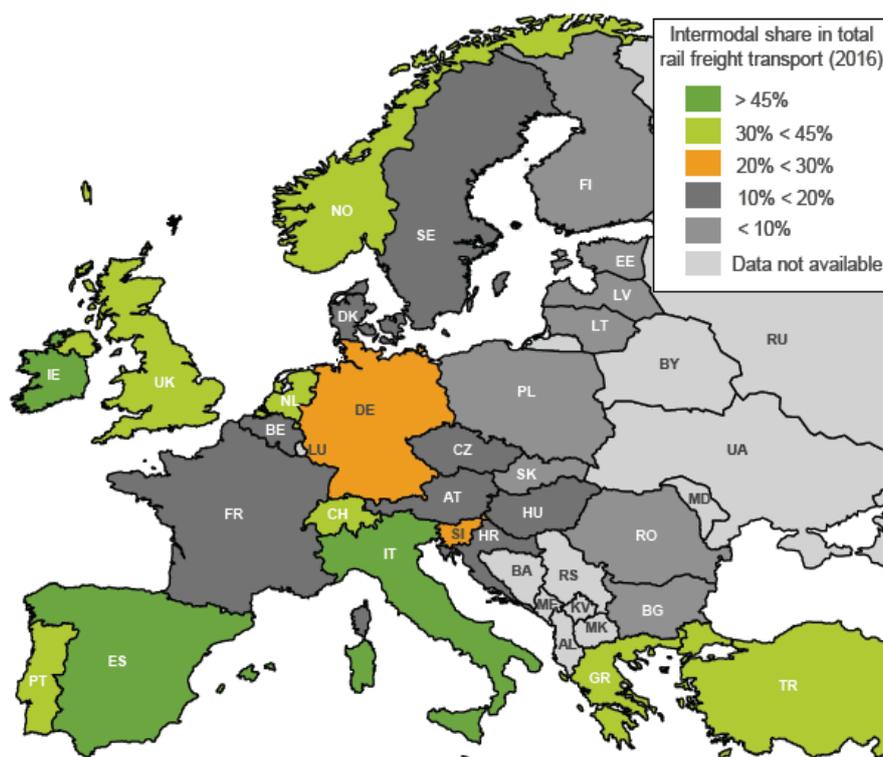


Figure 5.8. Rail intermodal transport development in selected countries (% in total rail freight tkm)

Source: UIC-ETF (2019), p. 5.

Eurostat’s statistics on the EU’s container transport are incomplete,¹⁴ however, additional data are available from the International Union for Road-Rail Combined Transport’s current report (UIRR, 2018). The traffic handled by UIRR members¹⁵ represents about half of the European combined transport market.¹⁶ The total number of consignments¹⁷ of UIRR operators in 2017 increased by 5.5% to 3.2 million (6.4 million TEU), whereas transport performance grew by 8.7% to 64.1 billion tkm. The share of unaccompanied combined transport (containers and swap bodies) continued its growth with about 82% of all consignments. Intra-European cross-border services expanded by 5%, while the trans-continental services increased by 38%. The main routes of containers transport connect North-West Europe with South Europe (transalpine corridors with more than 50% of the total volume). Traffic is also dynamically developing on western-east routes, and even more within the CIS-countries and along the intercontinental routes towards China, Russia and Turkey. Best-performing routes during 2017 were: Belarus – Germany (+3,888%), Belgium – Sweden (+2,143%), Croatia – Hungary (+191%), and Austria – Belgium (+90%). The best performing routes in absolute terms were: the new route Russia – Slovakia (with a traffic of more than 40,000 units), Hungary – Slovenia (+78%); Belgium – (+34%), Belgium – Spain (+49%), and China – Germany (+40%). Meanwhile, declines have been recorded in the

¹⁴ For example, data regarding France and Belgium are not available.

¹⁵ As of January 2018, UIRR has 37 members from 17 EU-member states, including the biggest operators, such as: Kombiverkehr, Hupac, IFB, Adria Kombi, Bohemiakombi, HHLA, Polzug.

¹⁶ Combined transport is the sub-category of intermodal, where the road sections of the transport chain are kept to the minimum, while aiming to maximise the distance performed by non-road transport mode(s). In this report it concerns rail-road transport.

¹⁷ A UIRR consignment corresponds to the transport capacity of one full size truck on road (equivalent to 2 TEU), meaning: one semi-trailer; two swap bodies less than 8.30 m and under 16 tons; one swap body above 8.30 m or over 16 tons; one vehicle on the Rolling Motorway (RoLa).

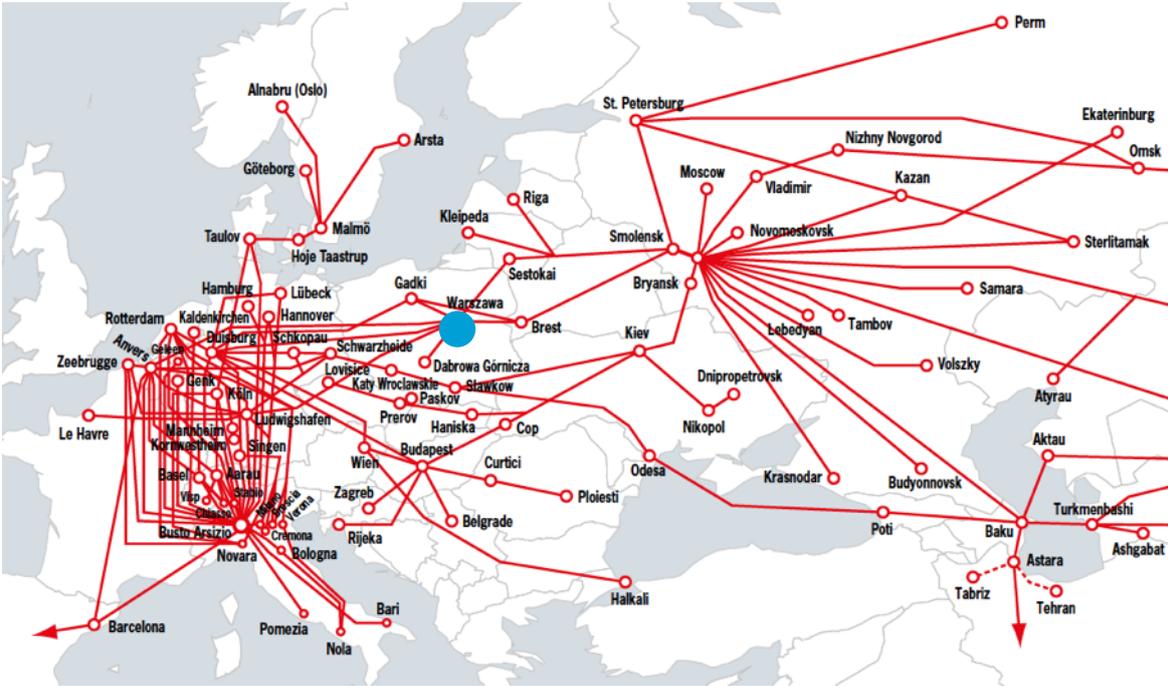
following routes: Austria – Hungary (-95%), the Czech Republic – Germany (-27%), Switzerland – Germany (-13%). Accompanied combined transport (RoLa) is focused on Transalpine routes.

Box 5.1. Hupac – an example of a successful intermodal business

Hupac is a leading intermodal transport operator through Switzerland and one of the market leaders in Europe, which in recent years has also been expanding services within Eurasia. The Hupac Group consists of 18 companies based in Switzerland, Italy, Germany, the Netherlands, Belgium, Poland, Russia and China. In 2017, Hupac carried about 763,000 consignments by rail. The key success factors are:

- intermodal network with 110 trains connecting Europe's major economic regions every day, including megatraillers service across the Alps; around 60 transshipment terminals in 16 European countries, including Pruszków and Sławków in Poland;
- own fleet of 5,941 rail platforms;
- terminal infrastructure management in 7 locations: Busto Arsizio, Piacenza, Aarau, Basel Wolf, Chiasso, Singen, Antwerp;
- own Russian branch (Intermodal Express Russia); 220 cars for the CIS network (1520 mm-gauge); Europe – Asia connections;
- digital solutions: GOAL (integrated software solution for intermodal transport); WOLF (web-oriented framework for all corporate processes), Cesar (web-based tracking and tracing system).

A new terminal is being built in Brwinów near Warsaw.



Source: Hupac (2018), Annual Report 2017, April.

5.2.2. The Polish market

The increase of containerised rail cargo in Poland 2004-2017 reaching a 14% CAGR showed a more dynamic trend than other cargo groups. However, this was a fluctuating growth: reaching as low as -38% (2008 compared to 2007) and climbing as high as +46% (2006 to 2005). In the given analysed period, the highest growth in the number of TEU containers carried, reaching 145% was observed twice: between 2006-2008, preceding the world financial crisis, and, directly following it, between 2010-2012. The last 3-year period of continuous growth, this time reaching 62%, occurred between 2016-2017 (Figure 5.9).



Fig. 5.9. Rail container transport in Poland in 2004-2017 (percentage change, based on number of TEU)

Source: own elaboration based on GUS data.

The railway sections used for container services in Poland are presented in Figure 4.1. According to the study carried out by Boheński (2016), the following changes could be observed in freight and container traffic intensity between 2000 and 2010:

- The highest freight traffic intensity in 2000 was recorded on the railway lines linking Silesia with seaports in Gdańsk, Gdynia, Szczecin and Świnoujście, including: CE65 (60 trains per day on average), CE59 Szczecin – Zielona Góra – Wrocław (45 trains), E30 Węgliniec – Wrocław – Katowice – Kraków – Przemyśl (over 40 trains), E59 Szczecin – Poznań (38 trains); Poznań – Ostrów Wielkopolski – Kluczbork line – Tarnowskie Góry, as an alternative line linking Szczecin – Świnoujście with Upper Silesia (50 trains); Kielce – Radom – Dęblin line (40 trains). A large traffic of freight trains also occurred between Skarżysko – Kamienna and Ożarów;
- In 2005, as in the year 2000, CE65 was the line with the most intensive traffic (over 60 trains a day), followed by the Szczecin – Poznań – Ostrów Wielkopolski – Kluczbork – Tarnowskie Góry. Another line with a significant traffic volume was the E30, especially on section from Katowice to Przemyśl via Kraków. The largest daily traffic intensity of freight trains was recorded on the lines: Zebrzydowice – Chybie (54 trains), Kędzierzyn-Koźle – Nędza (92), Nędza – Rybnik (62), Chybie – Zabrzeg (81), Lubliniec – Kluczbork (63), Oleśnica – Wrocław (61);

- In 2010, the same main lines carried the largest traffic. In addition, significant traffic was recorded on the lines Toruń – Kutno and Skierniewice – Łuków – Terespol. However, the overall traffic volume in 2010 was lower than in previous years. Between 2000 and 2010 the largest decrease was recorded in the E30/CE30 rail corridor – from the German border in Bielawa via Wrocław, Katowice, and Kraków to the border with Ukraine. Significant decrease – by more than 15 trains a day – was recorded on lines: 131 (CE65), 272 Poznań – Lubliniec and 273 (CE59) Szczecin – Czerwieńsk. The sections with the largest decrease were: Kraków – Tarnów on line 91 (E30) (about 43 trains) and Skarżysko – Kamienna – Ożarów (about 42 trains a day);
- In 2010, the largest intermodal trains traffic was on CE20 Frankfurt Oder – Poznań – Terespol, connecting Germany with Belarus, followed by the CE65 line from Gdańsk/Gdynia to Upper Silesia and further to the Czech Republic. Intermodal train traffic was also taking place on the routes from: from Silesia to Małaszewicze/Brest border crossing, from Poznań to the border with Kaliningrad region in Skandawa (Inowrocław – Skandawa), from Frankfurt Oder to Wrocław and from Poznań to Upper Silesia via Ostrów Wielkopolski (Figure 5.10).

Between 2010 and 2017, intermodal transport was consistently growing. The number of railway operators providing intermodal services increased from 5 (PKP Cargo, DB Cargo, Lotos Kolej, PKP LHS, and CTL Express), to 18. In 2017, they carried jointly 1,667 million TEU, reaching transport performance of 5.4 billion tkm. The market share of the leading operator, PKP Cargo, decreased from 70% in 2010 to 50% in 2017 (based on tkm). Another three operators with a strong position on the Polish intermodal transport market are: Lotos Kolej (21%), DB Cargo Polska (12%) and Captrain Polska (7%) (Figure 5.11).

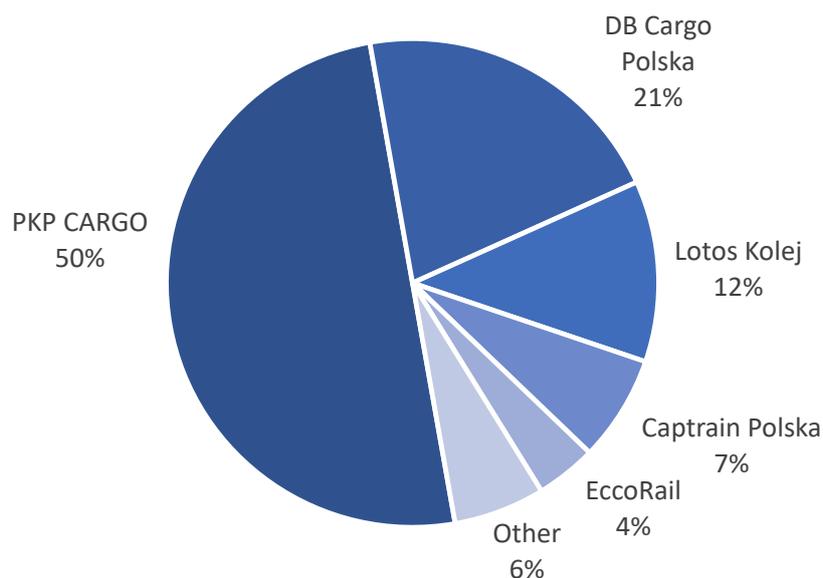


Fig. 5.11. The market share of railway operators in intermodal transport in 2017 (based on tkm)

Source: own elaboration based on UTK data (2018b).

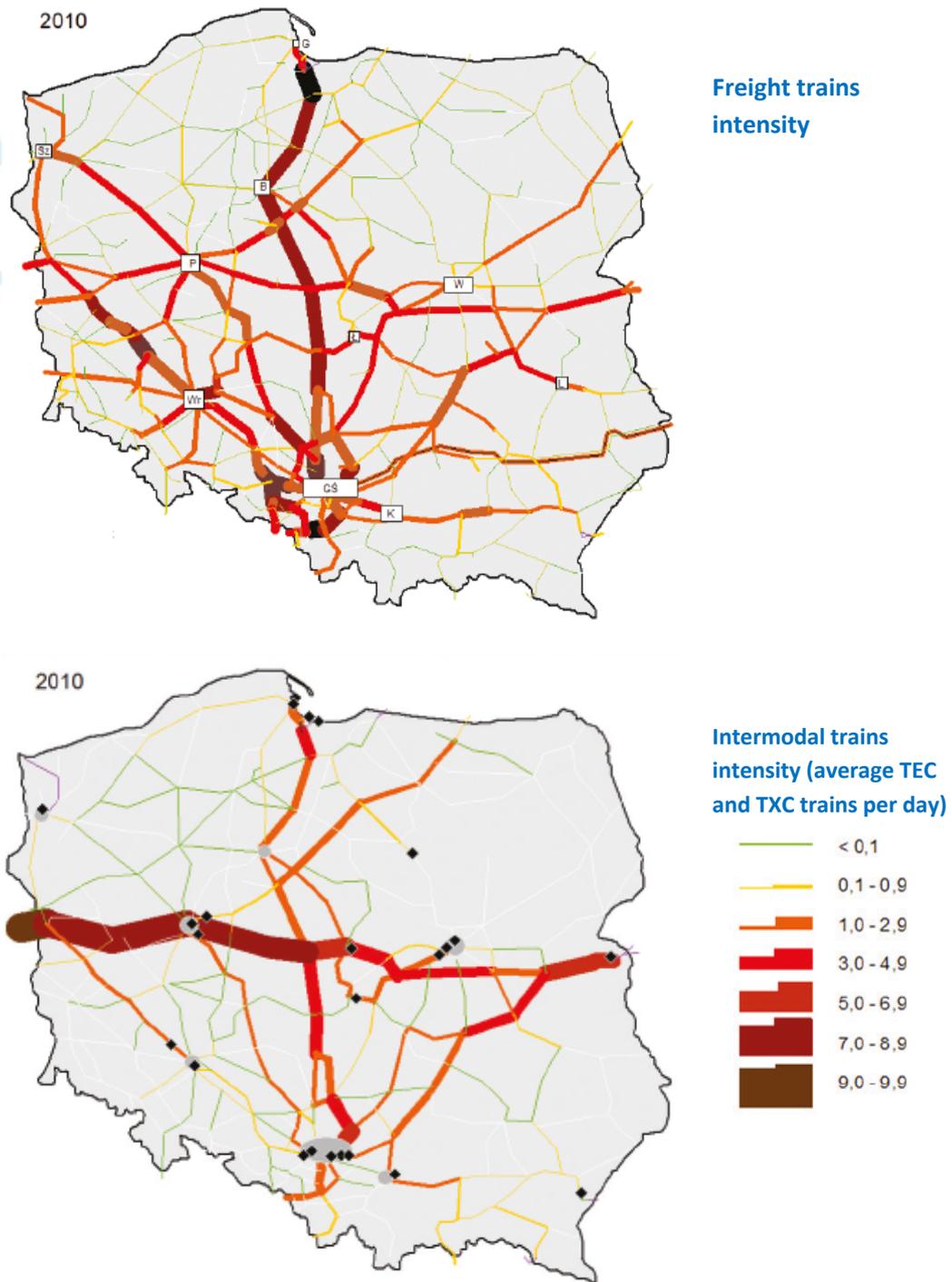


Fig. 5.10. Freight and intermodal traffic intensity in Poland in 2010 (average trains per day)

Source: Bocheński (2016), p. 104, 107.

Rail intermodal transport in Poland still uses mainly containers (97% of the total intermodal units), of which 44% are 20-foot units and 47% are 40-foot units. In 2017, over 70% of the containers were carried to international destinations, mainly via Gdańsk and Gdynia seaports and border crossings with Germany and the Czech Republic. As current PKP PLK's data on freight trains are not available, two maps with the connections of the PKP (Figure 5.12) and the selected intermodal connections from an open access portal show the current connections (Figure 5.13).

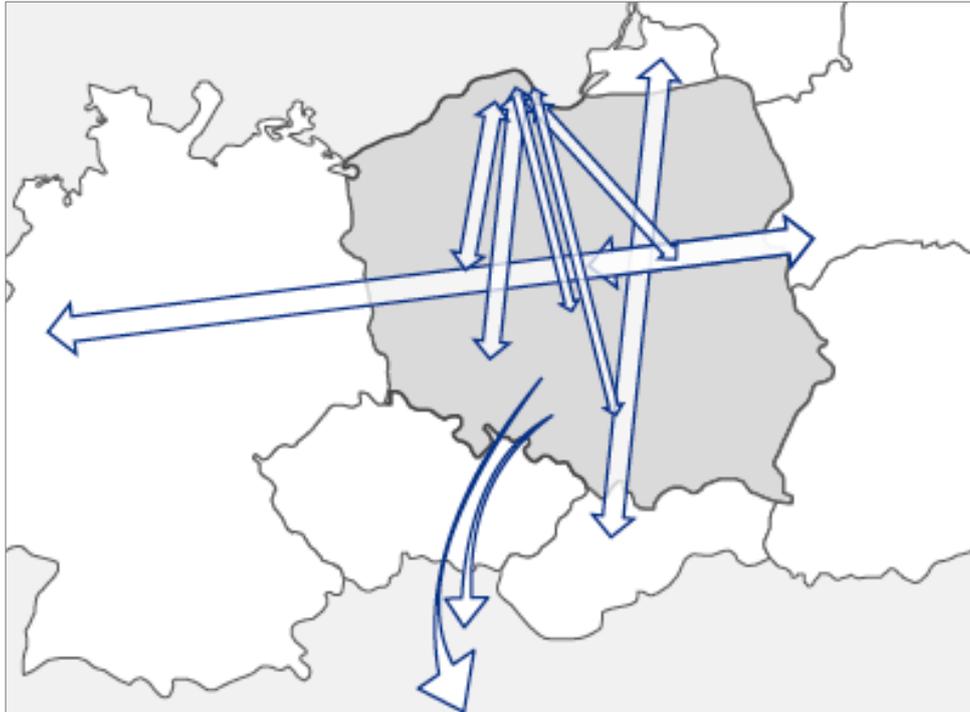


Fig. 5.12. The PKP Cargo's main intermodal connections in 2018

Source: PKP Cargo (2018a).

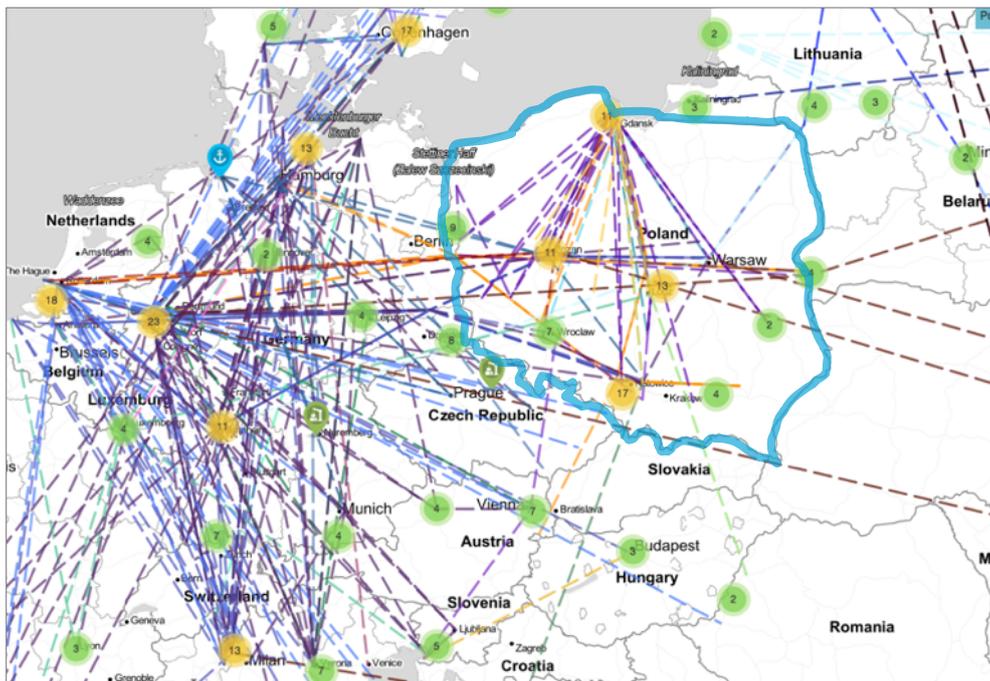


Fig. 5.13. The selected rail intermodal connections in Poland in 2018

Source: European Transport Maps (2019).

As reported by GUS, about 11.2 million tons were carried in containers in 2017 by road transport. According to Eurostat, the modal shift potential of long-distance (over 300 km) road to rail containerised cargo in Poland is estimated at almost 4 million tons, i.e. 36% of total volume. However, the average distance covered by rail container transport in 2017 was 377 km in national transport and 397 km in international transport. These indicators show the significant weakness of rail intermodal transport in Poland in competition with road transport.

The most intensive inter-urban road freight traffic is recorded between Warsaw, Poznań, Wrocław, Katowice, Łódź, Tricity (Gdańsk, Gdynia and Sopot), Szczecin, Białystok, especially on motorways A1, A2 and A4, as well as expressway S8 Białystok – Warsaw – Wrocław. In transit traffic, three most popular directions with the highest truck traffic density are: Lithuania – Germany, Lithuania – the Czech Republic, Belarus – Germany.

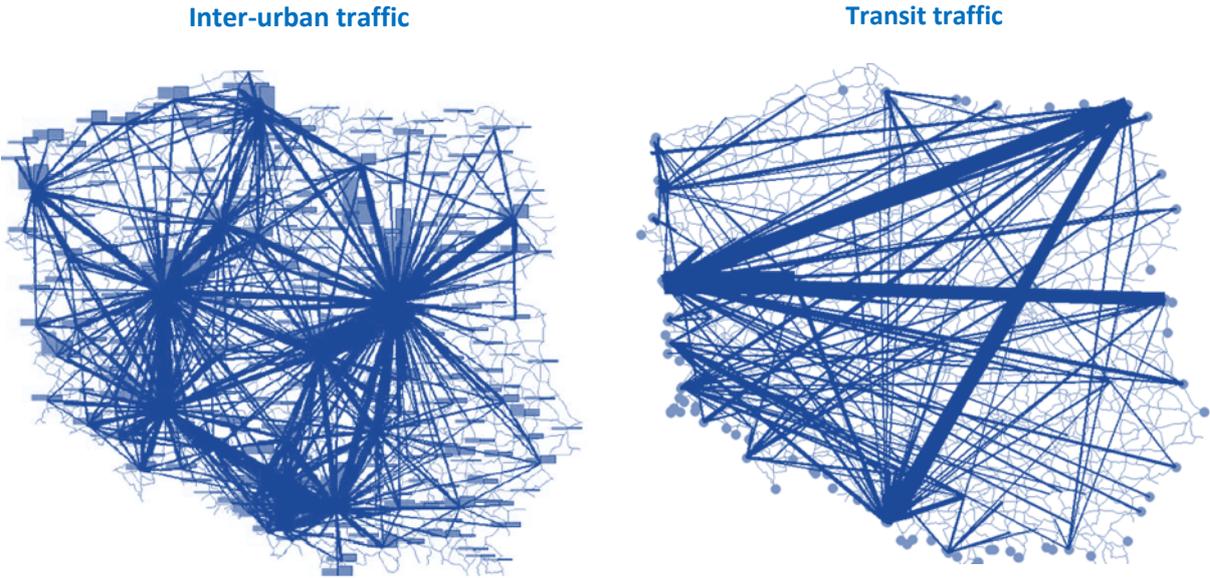


Fig. 5.14. Road transport intensity in Poland (trucks with a trailer or semi-trailer)

Source: UTK (2017) based on study's findings: *Zasady prognozowania ruchu drogowego z uwzględnieniem innych środków transportu, DZP/RID-I-62 /11/NCBR/2016.*

The analyses of best practices of such countries as Austria, Switzerland and Germany (UTK, 2017; Gójski, 2018) confirm that the reduction of road transport and the development of rail container transport requires regulatory measures, including charging for access to road infrastructure in main transit corridors as well as public coordination of rail-road terminals development. For example, public aid scheme to promote the shift of freight traffic from road to rail has been implemented in Germany. The scheme has a yearly budget of EUR 350 million between 2018 and 2023. Under the scheme, rail freight operators will be compensated for up to 45% of their track access charges (EC, 2018c).

5.3. RAIL-ROAD TERMINALS

5.3.1. Land rail-road terminals: location and capacity

In December 2018, 37 public-service (OIU)¹⁸ rail-road terminals (RRTs) operated in Poland.

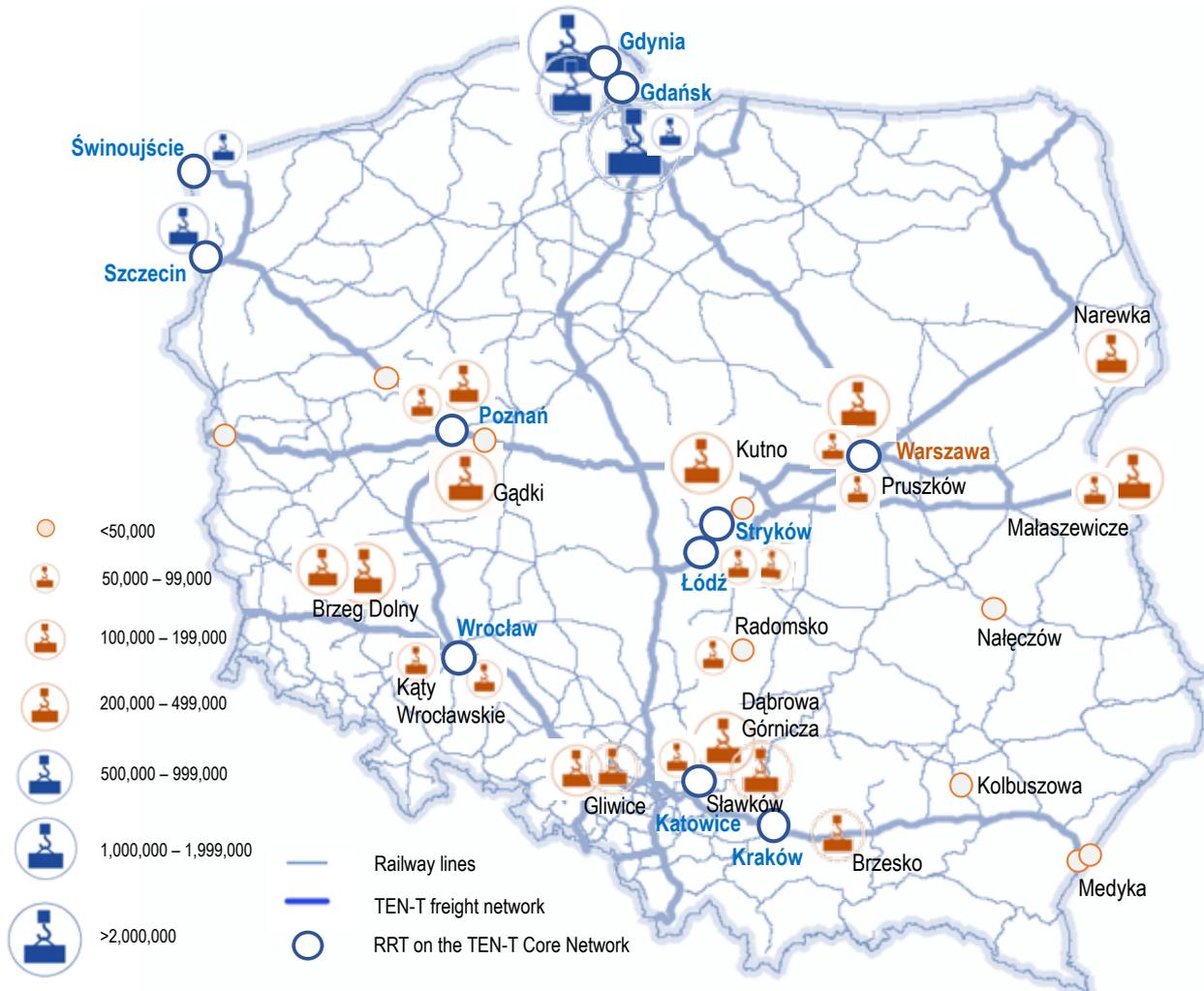


Fig 5.15. Rail-road terminals on the TEN-T freight corridors (December 2018)

Source: own elaboration.

A summary of the existing RRTs is given below:

- the overall transshipment capacity of 8.6 million TEU, of which 5.4 million TEU of 6 seaports' terminals and 3.2 million TEU of 31 land terminals;
- about 1.2 million TEU were reloaded in land RRT from container yards to railway platforms, and 1.7 million TEU to semi-trailer trucks in 2017;

¹⁸ According to the Rail Transport Act of 10 December 2017, an operator of OIU manages or provides services to make available facilities on equal and non-discriminatory terms to all railway undertakings applying for it.

- over 50% of land RRTs' capacity is concentrated in three urban areas: Katowice (4 terminals with 26% of total capacity), Poznań (4 terminals with 19% of total capacity), Warsaw (3 terminals and 8% of total capacity), and another 10% around Wrocław and Łódź (2 terminals in each area) (Figure 5.15 and Figure 5.16);
- three leading intermodal operators owning (or/and managing) the RRTs are: HHLA/METRANS (Polonia)¹⁹ (3 terminals of 715,000 TEU), PKP Cargo Group (6 terminals of about 590,000 TEU), and PCC INTERMODAL (4 terminals of total 526,000 TEU); these operators jointly offer 57% of container capacity in Poland (Figure 5.16);
- the top 5 land RRTs with annual handling capacity over 200,000 TEU are: METRANS RAIL HUB TERMINAL POZNAŃ (Gądkki) (385,400 TEU), followed by EUROTERMINAL SŁAWKÓW (284,819 TEU), PCC INTERMODAL KUTNO (250,000 TEU), METRANS TERMINAL DĄBROWA GÓRNICZA (233,600 TEU), PKP CARGO CENTRUM LOGISTYCZNE MAŁASZEWICZE (223,380 TEU); another 7 RRTs has capacity over 100,000 TEU; other 19 RRTs are relatively small, of which 9 with annual capacity below 50,000 TEU (Table 5.1);
- the only four land RRTs have 700-m or longer loading-reloading tracks: CLIP INTERMODALNY TERMINAL KONTENEROWY (2 x 871 m) and SCHAVEMAKER TERMINAL KONTENEROWY KĄTY WROCŁAWSKIE (1 x 764 m); TERMINAL PCC KUTNO (4 x 700 m), EUROTERMINAL SŁAWKÓW (4 x 700 m) (Table 5.1); many RRTs remain railway sidings, using existing track system, and not being intermodal terminals;
- besides four cross-border RRTs and EUROTERMINAL SŁAWKÓW, with the 1435/1520 mm track gauge changes, only SCHAVEMAKER TERMINAL KONTENEROWY KĄTY WROCŁAWSKIE is equipped with container cranes.

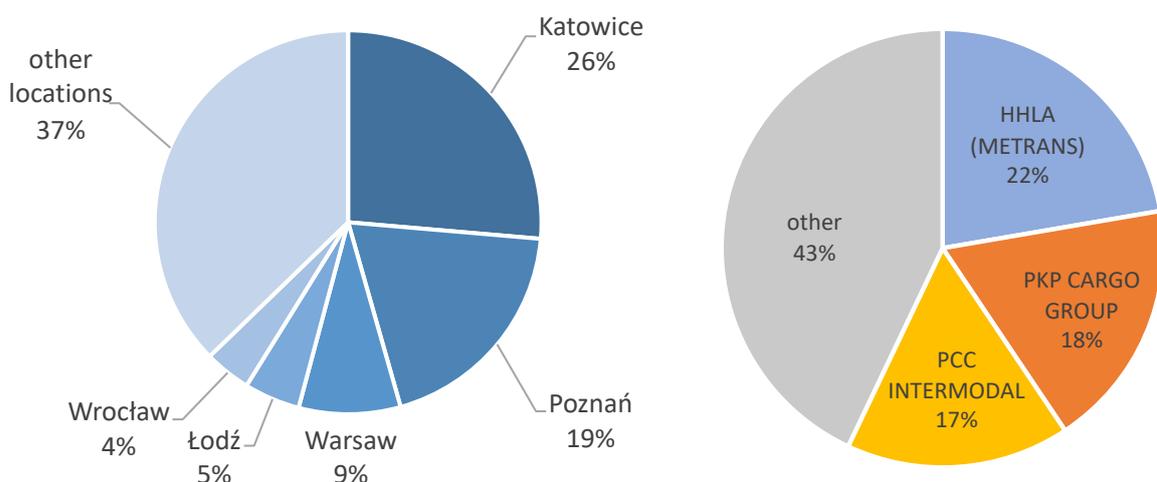


Fig. 5.16. Land rail-road terminals in Poland by locations and ownership

Source: own elaboration based on UTK's data.

¹⁹ Former Polzug Intermodal Polska.

Table 5.1. Main technical parameters of rail-road terminals in Poland

	Terminal's manager (owner – if other than manager) TERMINAL NAME (location)	Annual capacity, TEU	Number and length of load/reload railway tracks
SEAPORT TERMINALS			
1	BCT – BAŁTYCKI TERMINAL KONTENEROWY SP. Z O.O.	1,200,000	3 x 675 m, 2 x 300 m
2	DCT – DEEPWATER CONTAINER TERMINAL GDAŃSK	3,250,000	4 x 618 m
3	GCT – Gdynia Container Terminal S.A.	636,000	4 x 520 m, 3 x 638 m
4	GDAŃSKI TERMINAL KONTENEROWY S.A.	70,000	2 x 257 m
5	DB PORT SZCZECIN SP. Z O.O.	150,000	3,041 m in total
6	OT Port Świnoujście – Terminal Kontenerowy	70,000	1,200 m in total
LAND TERMINALS			
1	Andrex-Logistics Andrzej Konończuk ANDREX LOGISTICS TERMINAL CHRYSANÓW (Narewka, near Białystok)	180,000	2 x 660 m
2	KARPIEL Sp. z o.o. BRZESKI TERMINAL KONTENEROWY (Brzesko)	108,000	6 x 366 m
3	Centrum Logistyczno Inwestycyjne Poznań II Sp. z o.o. TERMINAL TOWAROWY II – CLIP INTERMODALNY TERMINAL KONTENEROWY (Swarzędz-Jasin near Poznań)	75,000	2 x 871 m, 1 x 829 m, 1 x 836 m
4	Erontrans Agencja Celna Sp. z o.o. ERONTRANS TERMINAL KONTENEROWY STRYKÓW	16,000	1 x 320 m
5	Erontrans Agencja Celna Sp. z o.o. ERONTRANS TERMINAL KONTENEROWY RADOMSKO	10,000	1 x 320 m
6	„Euroterminal Sławków” Sp. z o.o. EUROTERMINAL SŁAWKÓW	284,810	7 x 700 m
7	LTK Intermodal Sp. z o.o. LUBELSKI TERMINAL KONTENEROWY (Nałęczów)	13,000	1 x 600 m
8	Loconi Intermodal S.A. TERMINAL KONTENEROWY POZNAŃ	40,000	1 x 350 m
9	Loconi Intermodal S.A. TERMINAL KONTENEROWY WARSZAWA	100,000	1 x 580 m, 1 x 460 m
10	Loconi Intermodal S.A. TERMINAL KONTENEROWY ŁÓDŹ CHOJNY	70,000	1 x 600 m
11	Loconi Intermodal S.A. TERMINAL KONTENEROWY RADOMSKO	80,000	1 x 600 m
12	Ostsped Intermodal Sp. z o.o. Spółka Komandytowa TERMINAL KONTENEROWY SZAMOTUŁY (near Poznań)	27,000	900 m in total
13	PCC Intermodal S.A. TERMINAL PCC BRZEG DOLNY	110,000	2 x 650 m, 2 x 650 m (shunting tracks)
14	PCC Intermodal S.A. TERMINAL PCC GLIWICE	150,000	4 x 650 m
15	PCC Intermodal S.A. TERMINAL PCC KUTNO	250,000	4 x 700 m, 1 x 700 m (shunting track)
16	PCC Intermodal S.A. PCC DP KOLBUSZOWA (near Rzeszów)	16,000	1 x 510 m (Kolbuszowa station's track)

	Terminal's manager (owner – if other than manager) TERMINAL NAME (location)	Annual capacity, TEU	Number and length of load/reload railway tracks
17	PKP CARGO CONNECT Sp. z o.o. TERMINAL KONTENEROWY POZNAŃ FRANOWO	117,000	2 x 610 m
18	PKP CARGO CONNECT Sp. z o.o. TERMINAL KONTENEROWY WARSZAWA	77,000	1 x 320 m
19	PKP CARGO CONNECT Sp. z o.o. TERMINAL KONTENEROWY GLIWICE	128,000	2 x 410 m
20	METRANS (POLONIA) Sp. z o.o. (HHLA) RAIL HUB TERMINAL POZNAŃ (Gądki)	385,400	4 x 610 m 1x 610 m (shunting track)
21	METRANS (POLONIA) Sp. z o.o. (HHLA) TERMINAL KONTENEROWY PRUSZKÓW	96,000	1 x 300 m, 1 x 100 m 2 x 250 m (access track)
22	METRANS (POLONIA) Sp. z o.o. (HHLA) TERMINAL DĄBROWA GÓRNICZA	233,600	3 x 625 m 1 x 100 m, 1 x 400 m (shunting tracks)
23	Rail Polska sp z o.o. (Baltic Rail AS) TERMINAL KONTENEROWY SIECHNICE (near Wrocław)	50,000	2 x 600 m
24	Rail Polska sp z o.o. (Baltic Rail AS) TERMINAL KONTENEROWY WŁOSIENICA (near Katowice)	50,000	1 x 400 m
25	Rail Terminal Rzepin sp. z o.o. RAIL TERMINAL RZEPIN	40,000	2 x 200 m 2 x 400 m (shunting track)
26	Schavemaker Invest sp. z o.o. TERMINAL KONTENEROWY KĄTY WROCŁAWSKIE	75,000	1 X 764,5 m
27	Spedycja Polska SPEDCONT Sp. z o.o. w Łodzi TERMINAL KONTENEROWY SPEDCONT ŁÓDŹ	80,000	2 x 400 m
CROSS-BORDER TERMINALS			
28	PKP CARGO S.A. (PKP CARGO Centrum Logistyczne Małaszewicze Sp. z o.o.) PKP CARGO CENTRUM LOGISTYCZNE MAŁASZEWICZE	223,380	4 tracks of 1,766 m in total (1520 mm) 4 tracks of 1,746 m in total (1435 mm)
29	PKP CARGO Centrum Logistyczne Medyka – Żurawica Sp. z o.o. TERMINAL T1 ŻURAWICA	23,800	180 m (1435 mm) 180 m (1520 mm)
30	PKP CARGO Centrum Logistyczne Medyka – Żurawica Sp. z o.o. TERMINAL T2 MEDYKA	20,000	300 m (1435 mm) 300 m (1520 mm)
31	EUROPORT Sp. z o.o. EUROPORT MAŁASZEWICZE DUŻE	80,000	2 x 250 m (1435 mm) 2 x 250 m (1520 mm)

Source: own elaboration based on OIU's UTK database.

Compared to the RRTs included in Annex II of Regulation 1315/2013, only Kraków doesn't have an intermodal terminal. However, the existing terminals in Warsaw and Łódź (Stryków), which are the important crossing points of the NBC and BAC core corridors, are relatively small to service the expected container flows. In addition, the development of the rail container connections within the BAC corridor depends on the upgrade of the railway access to Gdańsk and Gdynia seaports, as well as opening of an extended port (dry port) on their hinterland (Zajączkowo Tczewskie is a possible location), which will allow an efficient consolidation and deconsolidation of cargo moving to and from both main Polish seaports. Also, the upgrade of railway infrastructure in combination with operational changes within Terespol-Małaszewicze/Brest border crossing area should be a priority in the coming years.

5.3.2. Polish-Belarusian rail border crossings

The 460-km long Polish-Belarusian border is an external border of the EU. After 1945, military transshipment zones were built within the border stations. These objects were adapted for civil use, after the change of political doctrine in Poland after 1989 and further integration with the EU. Both systems (1435 and 1520 mm) have five joint points, which are mainly used in freight traffic:²⁰

1. **Terespol-Małaszewicze/Brest:** the southern branch (1 track 1435 mm of 3 kV DC, 1 track 1520 mm, non-electrified, main route to Brest Central) and the northern branch (1 track 1435 mm of 3 kV DC non-electrified, 1 track 1520 mm, non-electrified, route to Brest Severny Station);
2. **Czeremcha/Wysokolitowsk:** single-track non-electrified line, currently not in use;
3. **Siemianówka-Cisówka/Swislocz:** single-track non-electrified line (1435 mm and 1520 mm), using only in freight traffic;
4. **Zubki Białostockie/Bierestowica:** single-track non-electrified (1435 mm), currently not in use;
5. **Kuźnica Białostocka/Brzugi (Grodno):** 1 track 1435 mm of 3 kV DC, 1 track 1520 mm, non-electrified.

In addition, the opening of border crossing Włodawa/Tomaszówka was initiated in 2004 by local government and was re-discussed again in 2013. This project was included in the cross-border cooperation programmes for 2014-2020, however will not be funded within the current financial perspective. One of the variants assumes the extension of a wide gauge track to Chełm and further to the Zawady station, connecting with the LHS railway line.

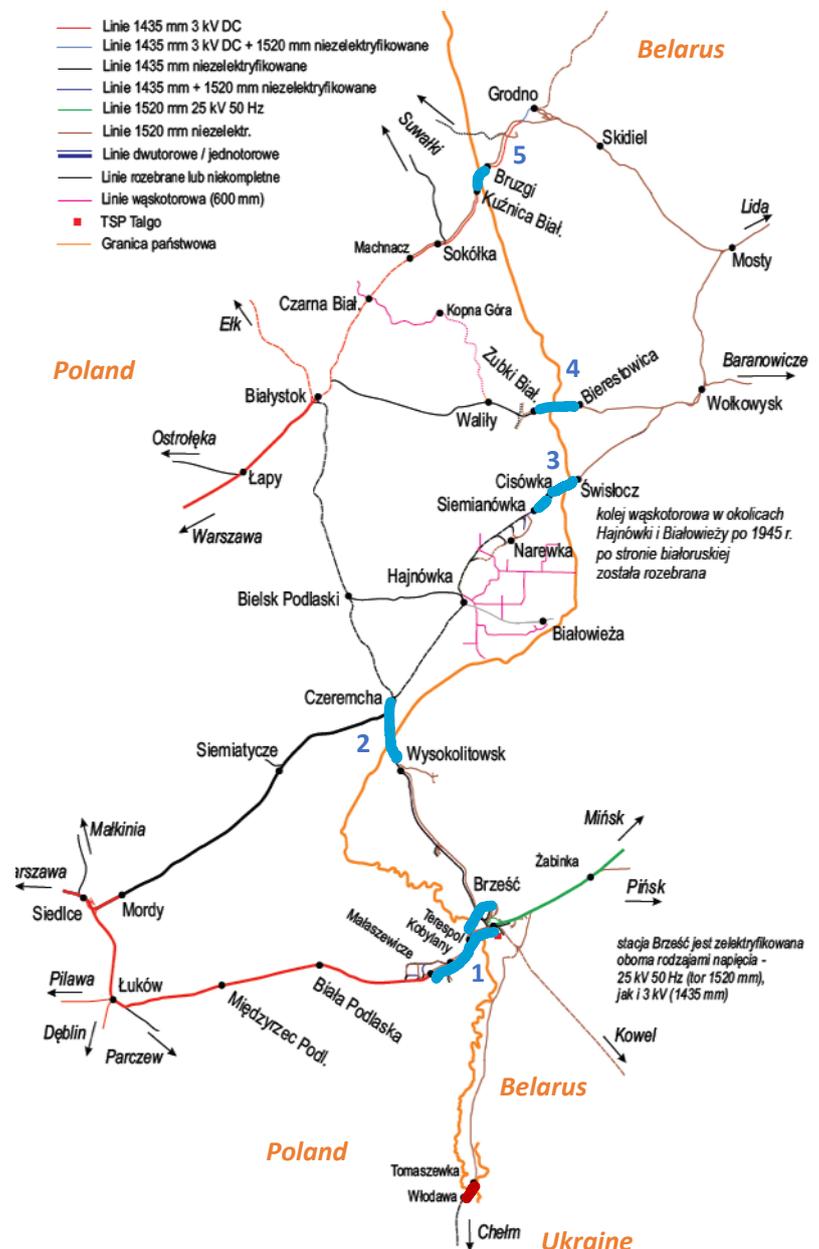


Fig. 5.17. Railway lines on Polish-Belarusian border

Source: based on Maciążek (2017), p. 23.

²⁰ The long-distance passenger trains use the Terespol/Brest and Kuźnica Białostocka/Grodno border crossings.

In 2017, 12.5 million tons were transported through all Belarusian-Polish border crossings. On average, 24 trains passed through this border per day. The total capacity of all Belarusian-Polish rail border crossings was 50 pairs of freight trains per day (26 – on a gauge of 1520 mm, 24 – 1435 mm). The main border crossing both for freight and passenger transport is Terespol-Małaszewicze/Brest.

5.3.3. Terespol-Małaszewicze/Brest cross-border transshipment area

The existing PKP PLK's infrastructure includes:

- 6 tracks 1435 mm used for border operations in passenger traffic,
- 2 tracks 1520 mm used for border operations in freight traffic,
- 2 single-track bridges,
- single-track 1520 mm-gauge connection through railway line 60 with Kobylany station (19 tracks 1520 mm-gauge managed by CARGOTOR),
- double-track 1435 mm-gauge connection via railway line 2 with Małaszewicze station (managed by PKP PLK).

Table 5.2. Main technical parameters of railway infrastructure between Terespol and Brest (2017)

Technical parameter	Terespol – Brest Central				Terespol – Brest Severny			
	29(N)PLK	2(N)BCh	60(S)PLK	60(S)BCh	453(N)PLK	453(N)BCh	446(S)BCh	446(S)BCh
Technical speed, km/h	40	40	40	40	30	30	30	30
Max length of freight/pas. trains, m	300/600		300/750		300/600		-/600	
Max axle load, kN	221	221	206	206	216	221	216	221
Line electrification	3kV	3kV	-	-	-	-	-	-
Railway line capacity, trains per day	23		28		30			

Source: PKP PLK (2017).

The Małaszewicze station has the largest area of transshipment terminals on the Polish eastern border,²¹ for westbound cargo reloading. In total, 18 independently managed freight terminals are located in Małaszewicze freight area. The containers are reloaded in two of them: PKP CARGO CENTRUM LOGISTYCZNE MAŁASZEWICZE and EUROPORT MAŁASZEWICZE DUŻE.

Current infrastructure capacity in freight traffic is 14 pairs of trains per day, while average capacity usage is 12 pairs of trains. The following factors affecting the capacity of the Terespol-Małaszewicze are reported by the railway operators and forwarders (UTK, 2018):

- there is only one PKP PLK 1520 mm-gauge track between Terespol and Kobylany, so it is not possible to serve two westbound trains at the same time;
- the Kobylany station lacks tracks for intermodal trains; holding tracks at terminals are 300 m long, so longer trains significantly reduce the throughput of the station;
- the lack of available tracks at Małaszewicze Południowe forces railway operators to move trains to Chotyłów and other stations in the area;
- the ring line for terminals lacks modern rail signaling devices and the ability to serve two trains at the same time;

²¹ The detailed map is available on CARGOTOR's website: http://cargotor.com/wp-content/uploads/2016/05/reg_malaszewicze_mapa.jpg.

- different terminals are managed independently, and a number of them only have a minimum track infrastructure, which means they are unable to group trains, thus reducing capacity, and often transship only several wagons per day;
- the capacity of the bridge on the Bug River is an infrastructural limitation.

PKP PLK's modernisation plan of Terespol-Małaszewicze area includes:

- modernisation of Terespol, Małaszewicze and Biała Podlaska stations by 2020 (PLN 560 million)
- construction of group of 9 tracks at Terespol Szerokotorowy by 2023 (PLN 130 million) and construction of the second track of line 60 on Terespol Szerokotorowy – Terespol section;
- construction of new Małaszewicze West station by 2023 (PLN 300 million);
- construction of group of 10 tracks at Biała Podlaska Towarowa by 2020 (PLN 60 million);
- extension of Kobylany station by 2023 (PLN 250 million);
- construction of a new double-track bridge on the Bug River between Terespol and Brest Central stations by 2025 (PLN 140 million).

The implementation of a modernisation plan will enable to achieve capacity of up to 55 pairs of trains per day, both gauges. The capacity of container terminals of PKP Cargo will be also increased. The BCh plans to increase the existing capacity of Brest Severny station from current 992 TEU to 1,380 TEU per day.

A real rail corridor capacity is dependent on both technical and organisational parameters of all its subsystems. The technical issues include: main railway line sections' capacity, a number of sections with limitations of speed or load axle, train length, a number of passing loops, signalling systems, a number of freight and passenger trains of different categories, as well as a number and length of passing loops and secondary tracks on railway stations. In many cases, actual capacity is 60% of the theoretical one, whereas for tracks with dense and homogeneous traffic it can reach 90% of the theoretical capacity (Profillids, 2006, p. 421).

A unique case is border crossing between 1520 mm and 1435 mm gauge railway systems. Besides the investments in railway infrastructure mentioned above, a number of organisational improvements are necessary. For example, RZD proposes to transfer part of the shunting work on the selection of containers from Brest to Kolyadichi terminal at Minsk node, and thereby reduce the operating time of containers at Brest node. Insufficiently harmonised border and customs clearance cause delays at cross border. Today, there is no room for separate checks carried out by various control authorities. In addition, the whole Eurasian corridor will not be attractive without developing such solutions as Digital Corridor 4.0 which will enable electronic documents interchange and container tracking & tracing. In 2018, RZD and BCh digitalised consignment notes of all bilateral freight traffic, as is the case on route Kaliningrad — Lithuania — Belarus — Russia and in the opposite direction. Similar solution should be a standard in case of CIM/SMGS international rail freight transport. In addition, the experience of the TEN-T's RFC in organisation of one single point of contact (One Stop Shop) allowing applicants to request and receive answers regarding infrastructure capacity for international freight trains can be useful to integrate the TEN-T and Eurasian corridors.

5.4. RAILWAY AND INTERMODAL OPERATORS' STRATEGIES

The examples of the strategies of four leading railway carriers and intermodal operators developing their container business in the BAC and NSB Core Corridors are presented below.

PKP Cargo Group

PKP CARGO Group includes PKP CARGO SA and its 30 subsidiaries, including PKP Cargo Connect (container and logistics services provider), Cargotor (a manager of railway infrastructure in Małaszewicze station), PKP Cargo CL Małaszewicze and PKP Cargo CL Medyka-Żurawica (handling services at the eastern border crossings), as well as AWT Group, which operates in the Czech Republic. The new *Strategy of the PKP CARGO Group for 2019-2023 (with a long-term perspective until 2038)* aims to achieve the leading position in Central and Eastern Europe, including both North – South (Baltic – Adriatic and Amber) and East – West (China – Europe) corridors (**Figure 5.18**).

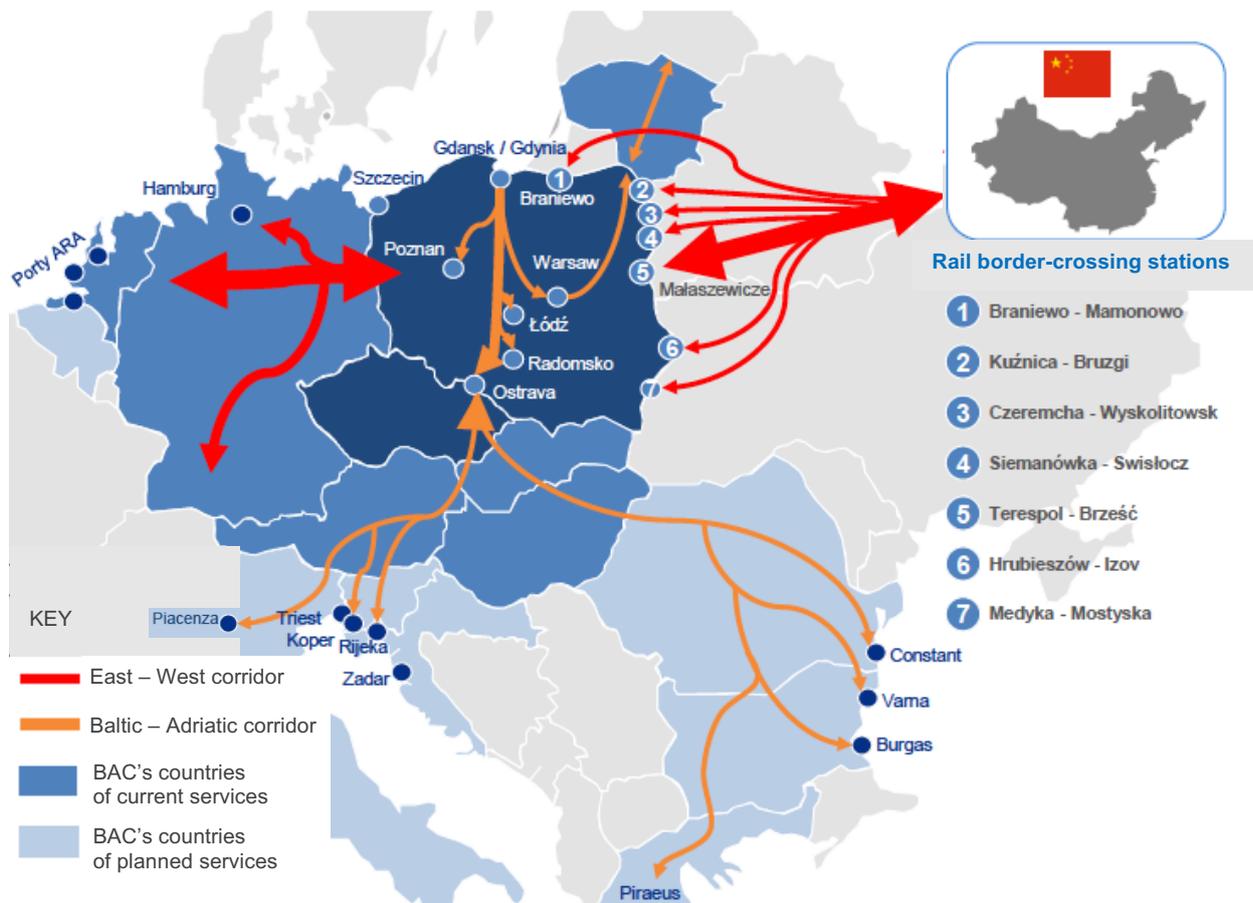


Fig. 5.18. PKP Cargo strategic connections development within East – West and North – South corridors

Source: PKP Cargo (2018b).

As logistics centres and intermodal terminals are key components of the PKP's *Development of Intermodal Transport for years 2020-2030 Programme*, creation of their network is planned both by building new terminals and using the existing ones in cooperation with other partners (**Figure 5.19**).

As of November 2018, PKP SA signed cooperation agreements with 16 intermodal operators and seaports authorities.

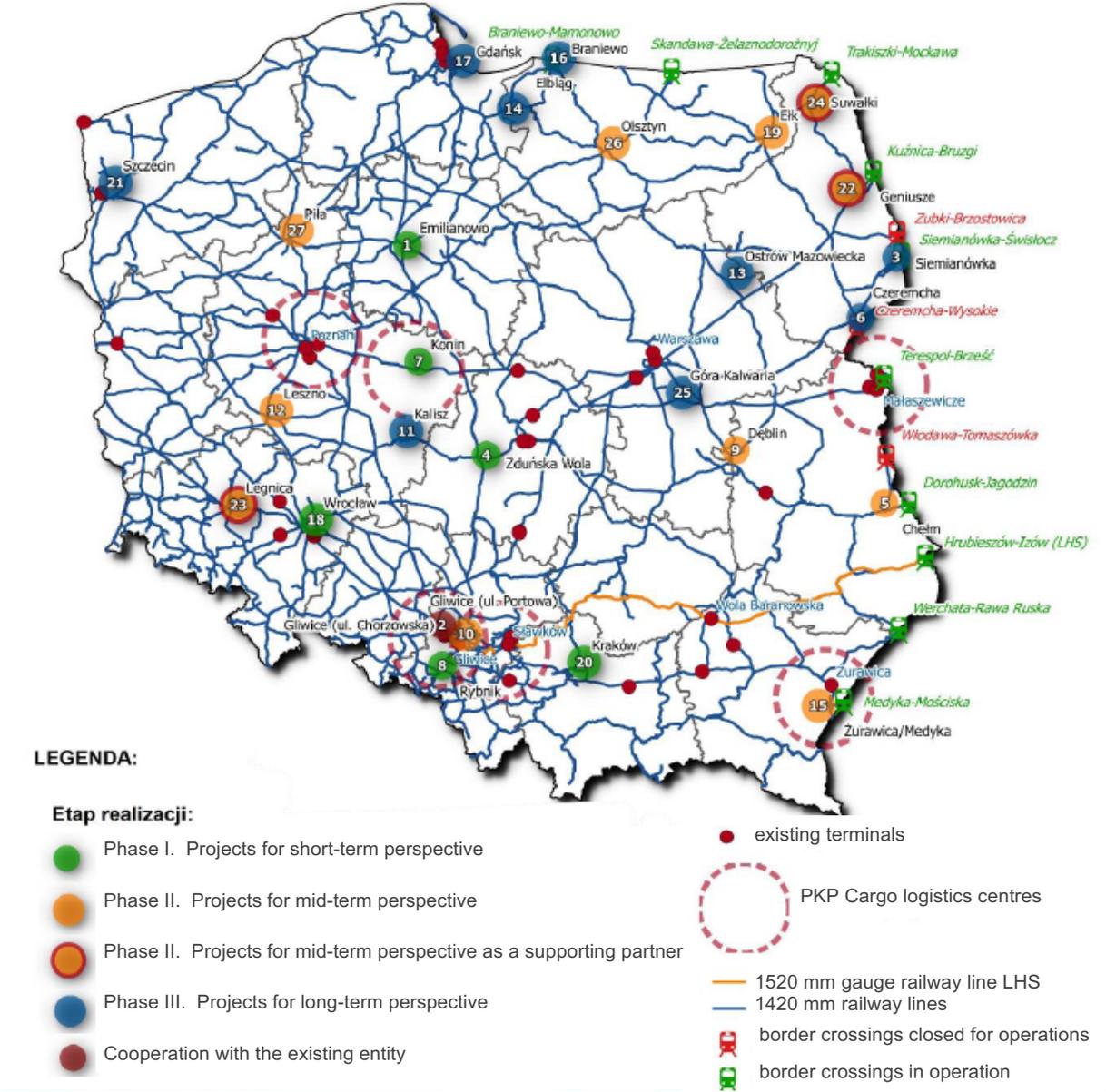


Fig. 5.19. Locations of future logistics projects with a participation of PKP SA

Source: Zielaskiewicz (2018).

METRANS (Polonia)

The company owned by Hamburger Hafen und Logistik AG (HHLA) with headquarters in Prague, operates shuttle container trains to/from the Czech Republic, Slovakia, Hungary, Germany, Benelux, Austria, Slovenia and Poland. Its three Polish intermodal terminals – Dąbrowa Górnicza, Gądky near Poznań and Pruszków – are managed by METRANS (Polonia), and another terminal in Kąty Wrocławskie is owned and managed by Schavemaker.

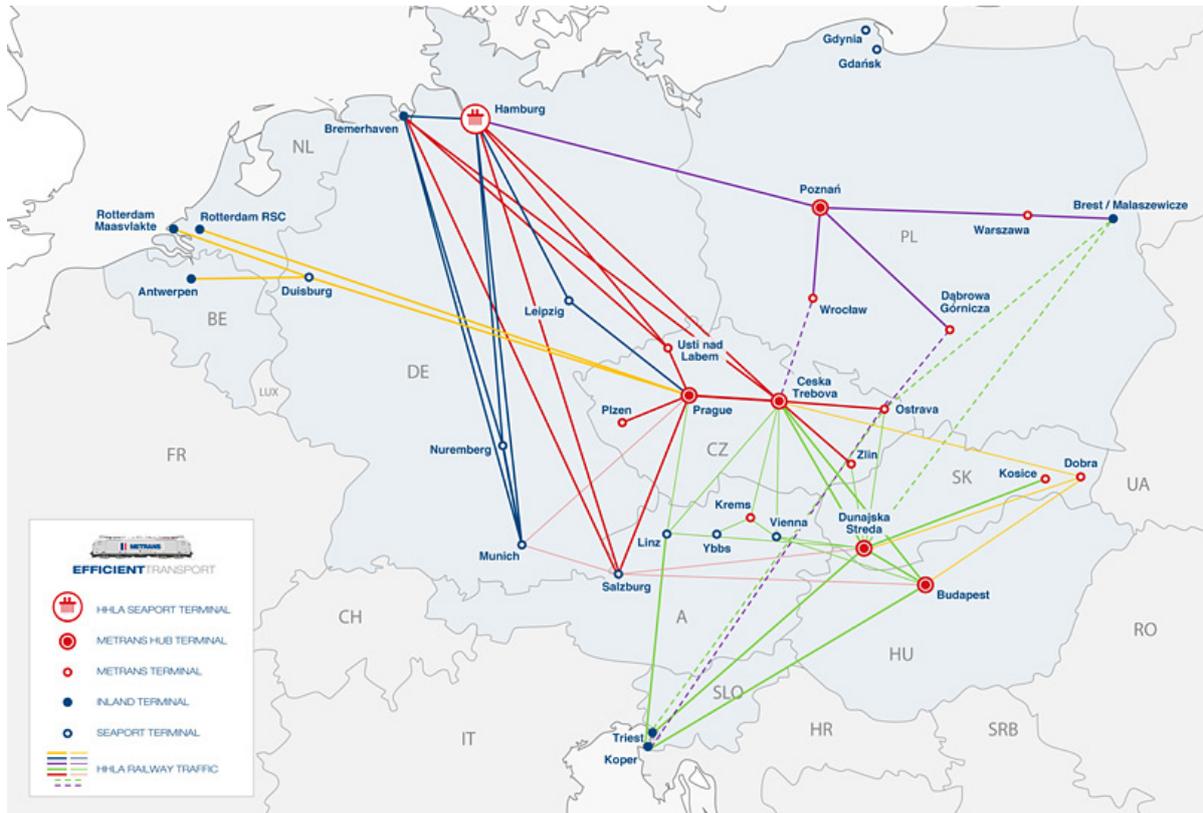


Fig. 5.20. METRANS's container train connections

Source: Metrans (2018).

Pruszków is one of the first container terminals in Poland, established in 1993 located near Warsaw, the largest Polish consumer market, while Gądkki near Poznan of 385,400 TEU capacity is the biggest intermodal terminal in Poland and METRANS's key rail hub, which runs intermodal trains from Hamburg 7 times a week.

PCC Intermodal

The company, belonging to the capital group PCC SE based in Duisburg, has been operating on the market since 2005. In 2017, 223 thousand TEU were handled by their intermodal terminals located in: Kutno (the central consolidation and distribution hub), Gliwice, Brzeg Dolny, Kolbuszowa near Rzeszów (the depot) and Frankfurt Oder. The service includes daily intermodal connections from Poland (Central, Upper and Lower Silesia and Subcarpathia) to the following ports: Gdansk and Gdynia (22 times a week in total), Hamburg/Bremerhaven (5 times a week), Rotterdam (7 times a week). The company also operates regular connections with Duisburg (4 times a week). In total, about 5,000 intermodal trains operated by Lotos Kolej were run in 2018.

Since 2010, the company has been developing regular connections to the East within Central and Northern Eurasian corridors. Currently, in cooperation with partners from Russia and Belarus, PCC Intermodal provides a service to Belarus, Russia, Kazakhstan, Mongolia, China, Kazakhstan, Uzbekistan and Turkmenistan. The capacity of the border crossing in Małaszewicze/Brest is a key consideration for a further extension of the company's connections to CIS-countries and Asia.

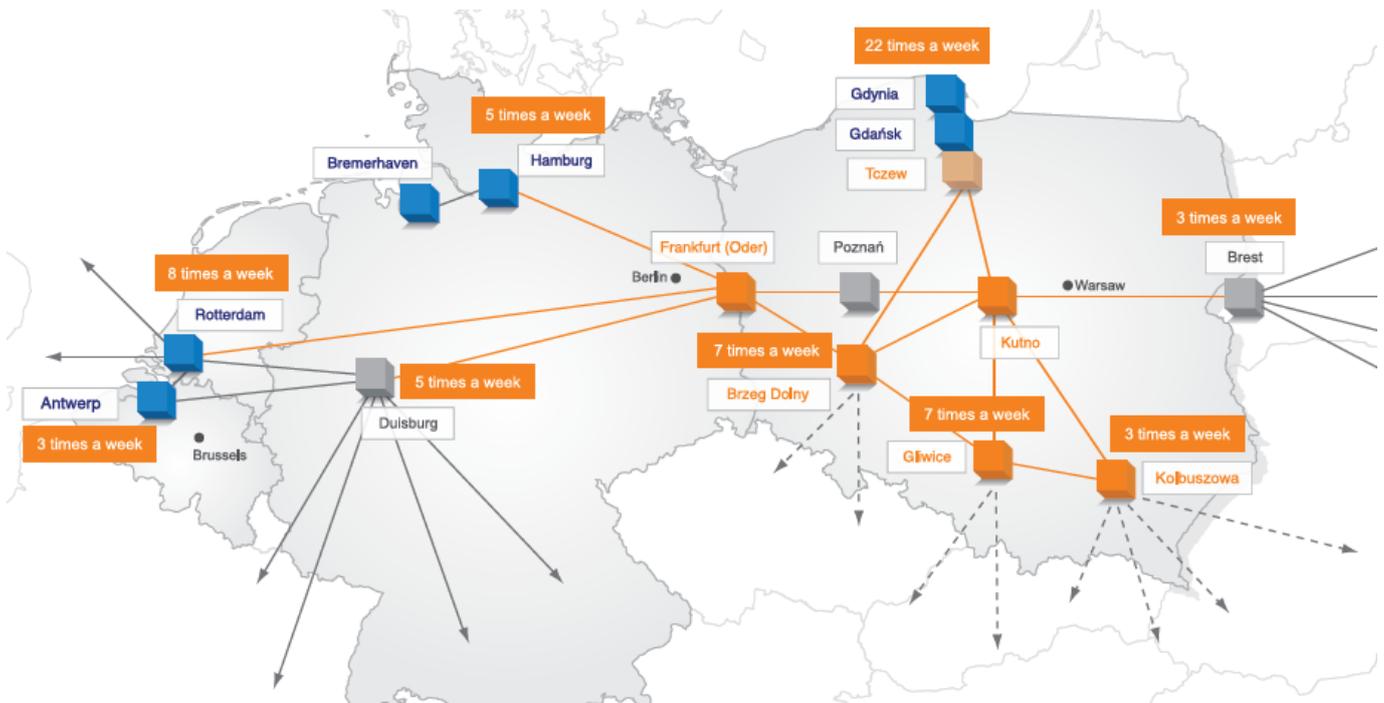


Fig. 5.21. PCC Intermodal container regular connections

Source: PCC Intermodal (2018).

Baltic Rail

As a container-train operator founded in 2008 within Rail World Group, it has been running intermodal trains in the Baltic Adriatic Rail Corridor since 2011. The company owns two container terminals, in Wrocław and in Katowice, and runs 5-8 container trains per week on the route: Koper – Wrocław – Katowice – Ostrava – Koper. In cooperation with railway operator Rail Polska a total of 341 trains (13,464 TEU) from/to the Port of Koper were dispatched in 2018. It means a growth of 30% from 2017 and 285% from 2014. However, this volume is still low even in comparison to parallel south – north route Odessa – Minsk – Vilnius – Klaipeda with 45,000 TEU carried by Viking container trains in 2018; another 8,850 TEU were transported by Zubr trains between Odessa and Vilnius.

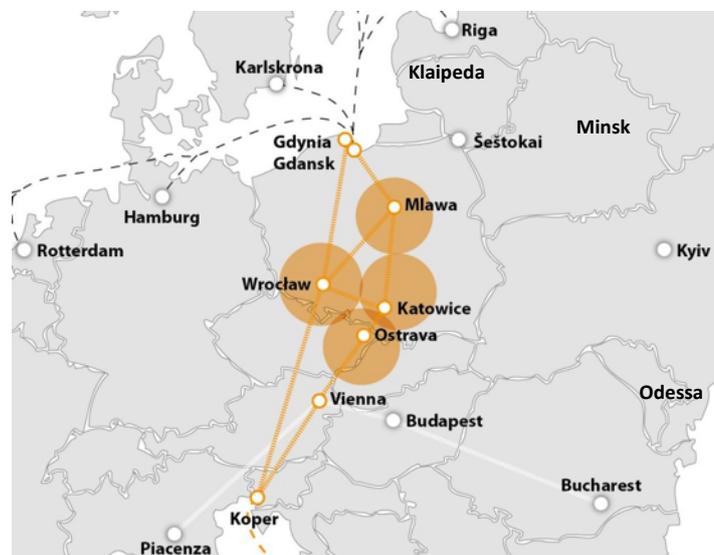


Fig. 5.22. Baltic Rail's regular connections

Source: Baltic Rail (2018).

CONCLUSIONS

1. Geopolitical and economic as well as technological and environmental factors will have the most significant impact on container transport market development in the next ten years both on a global and national scale.
2. Macroeconomic trends and recent forecasts show that the global economy will experience a slowdown from 2020. The world's largest economy, China is predicted to grow by 3.4% in 2024-2028, while the biggest economy in Europe, Germany – only by 1.7%. The economic downturn of Poland's main trading partners, especially from the EU, will affect its economy: the GDP growth rate in Poland is expected to decline below 3% by 2021, and below 2% by 2028.
3. Global trade is forecast to grow faster than the GDP, at 3.4% on average annually for next 20 years. The trade value growth rate between China and the EU is estimated at a higher level 4.8%, however in case of a crisis, it will drop below 3%. Poland has a significant imbalance between exports and imports in trade with China, which will be very difficult to compensate for the next years.
4. Germany and China are the most central economies, attracting value added from most neighbours. For B&R economies there are two gravitational centres, China and Russia. Also, Poland, over half of whose export is GVC-based, is well-connected with other countries.
5. Containerised trade is expected to continue its growth during 2018-2026 at the average rate of 4.6% worldwide. Top four EU exporters and importers of containerised cargo (Germany, Italy, the Netherlands and Spain) rank within the top 20 globally, followed by countries from East Asia. The global container seaports' throughput is forecast to grow by 5.5% annually in 2019-2023 reaching almost 1,000 million TEU. The estimations for the Polish seaports, which showed a double-digit annual growth rate in past years, are still positive with over 6 million TEU in 2028.
6. In 2017, the overall container handling in two largest ports, Shanghai and Singapore, were comparable to the volume jointly served by top 15 European container ports. In Europe, the leading northern ports reloaded twice as much as the southern ones. The three leading European ports (Rotterdam, Antwerp and Hamburg) are significantly ahead of the rest. Hinterland container train connections, including transcontinental, play a significant role for these ports' competitiveness. In 2017, the share of rail transport in hinterland traffic of Gdańsk was about 35%, while only 26% in case of Gdynia (compared to 41% in Hamburg and 53% in Koper).
7. The Northern Eurasian corridor (via China, Kazakhstan, Russia, Belarus and Poland) is currently the fastest and most reliable route for rail container transport between Asia and Europe with almost 325,000 TEU carried in 2018. Depending on the scenario, the traffic of 437,000 – 4,800,000 TEU is expected by 2030. Two significant factors will affect this development: rail transport subsidies by Chinese local governments and the infrastructure capacity along main railway routes and border crossings, especially between Poland and Belarus.
8. Between 2004-2018 the volume of rail freight transport performance in Poland increased by only 14%: from 52.3 to 59.6 billion tkm. A typical feature of Polish railway market is a low (about 7%) share of transit. At this stage the potential of rail freight transport for a further growth (2019-2028) is rather low, and it may reach about 65 billion tkm.

- 9. The increase of containerised rail cargo between 2004-2017, while reaching a 14% CAGR, showed a fluctuating growth. The last 3-year period of continuous growth, this time reaching 62%, occurred between 2016-2018. Such a positive trend is not expected to manifest itself again in the coming years. Considering the strong correlation between the volume of containerised freight rail transport and the GDP and the volume of Poland’s foreign trade and its main trade partners, especially Germany and China, the forecast growth of the relevant seaborne transport, the potential for growth in rail transport can reach 1.2 million TEU, up to the level of 3 million TEU by 2028.

- 10. There is a growth potential for both core TEN-T corridors: the Baltic – Adriatic and the North Sea – Baltic. The largest increase in international transport can be expected on mainline E20 as a part of NSB Corridor, generated by growth of transit between Europe and Asia (up to 650,000 TEU by 2028), but only in case the operational and technical bottleneck on the Terespol-Małaszewicze/ Brest border crossing is removed. The development of international rail container transport within the BAC Corridor depends on the upgrade of the railway access to Gdańsk and Gdynia seaports, opening an extended port (dry port) on their hinterland, which will allow for an efficient consolidation and deconsolidation of cargo moving to/from both main Polish seaports, as well as to remove the bottlenecks on the border crossing with the Czech Republic and Slovakia.

- 11. The table below summarises the advantages and disadvantages, prospects and risks concerning a further growth of containerised rail transport in Poland.

Container rail transport in Poland – SWOT Analysis

Strengths	Opportunities
<ul style="list-style-type: none"> • The location, whereby three neighbouring countries are landlocked without own sea ports, and another 3 landlocked countries are no further than 750 km away. • The current principles of global climate policies as well as EU transport policy, supporting rail transport (political goodwill). • Highly dynamic growth of Polish foreign trade volumes and changes in its composition (finished products). • Political stability and favourable economic conditions in Poland. • The location of Poland along the shortest and the most cost-effective rail transport route between Europe and Asia. • EU’s established priorities and commitments which support the development of the TEN-T, including two core corridors that running through the Polish territory. • The highly dynamic growth of the Polish seaports’ throughput. • The high share of international traffic in rail freight transport with average journey exceeding 350 km. 	<ul style="list-style-type: none"> • The continued growth of road transport in Poland leading to its congestion in many locations, which will limit its potential for further growth. • Investment programmes implemented by Polish seaports. • Gdansk’s participation in the Smart and Secure Trade Lanes Programme, aiming to improve the efficiency of trade between Europe and China. • The completion of infrastructure upgrade projects on the main railway lines. • The potential for growth of rail transport between China and Europe via Poland. • The availability of digital technologies that improve the operators’ efficiency and add value to supply chains.

Weaknesses	Threats
<ul style="list-style-type: none"> • The proximity of Germany, the world’s major economy, and especially of its seaport of Hamburg and the inland waterway port of Duisburg, with solid trade relationships worldwide. • Lack of the government’s strategy for the development of intermodal transport and rail-road terminals, including list of priority projects. • No unit dedicated to rail-road transport development within the Polish government administration. • Modal shifts in Polish freight transport suppressed by high dynamics of road transport. • Low share of rail transit across Poland. • Rail operators’ competitiveness and efficiency reduced by rail infrastructure upgrade projects in Poland until 2023. • Although many investments in railway infrastructure are being implemented in Poland, there will be a number of sections both in the Baltic – Adriatic and North Sea – Baltic Core Corridors that do not meet the standards by 2030. • No substantial changes in the commodities’ structure of rail freight transport in Poland. • No centralised coordination of the handling of train traffic at EU-external border crossings, or management of the border infrastructure development. • Insufficient technical equipment of terminals in rail infrastructure, such as adequately long loading/reloading tracks (less than 740 m), and specialized equipment for containers handling. • Low level of digital solutions in cross-border rail transport. • Failure to implement Port Community System by Polish seaports. • Low level of innovation due to insufficient funding of rail companies. • Rail operators’ strategic planning and decision making within foreign capital groups and following their objectives. 	<ul style="list-style-type: none"> • A major fall in transport volumes in the event of a world financial crisis. • Trade wars between countries and regional trade agreements. • The economic downturn expected in the EU and Poland in next ten years. • Global sea transport alliances’ strategies, including competing on price, leading to the lowering of the cost of their services to the client. • No subsidising by China’s government of the Chinese-European rail transport. • The opening of price and time-competitive, alternative land-sea routes between China and Europe, that circumvent Poland. • The German aid scheme to promote the shift of freight traffic from road to rail until 2023 by reducing track access charges can affect the competitiveness of railway connections via Polish seaports. • A reduction in the growth trend of container rail transport in Poland. • Insufficient transshipment capacity at the rail border crossings with Belarus.

Source: own elaboration.

RECOMMENDATIONS

1. Priorities in the development of **railway infrastructure** in next years should lie in the following areas:
 - 1.1. Extending the length of tracks to 740 m and the number of secondary tracks in stations and passing loops which already exist and potential bottlenecks (based on PKP PLK's SEPA data and UTK's data);
 - 1.2. Removal of bottlenecks in most major railway nodes serving RRTs in core and comprehensive networks, especially in Silesia and at stations: Gdynia Port and Gdańsk Port Północny, including the new fourth track on the Zajązkowo Tczewskie – Pruszcz Gdański rail section;
 - 1.3. Removal of bottlenecks at border crossings (extending existing tracks and building new tracks), especially at Małaszewicze-Terespol/Brest border crossing.
2. The investments in **rail-road terminals** development should prioritize:
 - 2.1. Construction of new terminals (with the technical parameters meeting the TEN-T Regulations) at: Kraków, Łódź/Stryków, Warsaw, Wrocław, and in the Eastern Poland; as well as an extended port (dry port) on hinterland of Gdańsk and Gdynia seaports;
 - 2.2. A study on the new location for a new terminal as an alternative to Małaszewicze-Terespol with a possibility of extended 1520-gauge line from Belarus.
 - 2.3. Increasing the efficiency of terminal operations, including the construction and upgrades of tracks in existing rail-road terminals to allow trains of up to 740 m as well as the purchase of loading/unloading, and scanning equipment.
3. The most urgently required **digital solutions** include:
 - 3.1. *Digital Corridor 4.0* which will enable electronic documents interchange and container tracking & tracing between all parties involved the transport within Eurasia corridors (China – Russia – Kazakhstan – Belarus – Poland – Germany as a pilot case);
 - 3.2. *Smart cross-border digital platform* which will allow professional management of Małaszewicze's transshipment area;
 - 3.3. *Railway port connections online tool* which will integrate maritime and railway services of Polish seaport and optimize their hinterland connections.
4. The following **legal and organisational solutions** are recommended:
 - 4.1. The creation of a unit dedicated to intermodal transport within the Polish public administration, which will prepare a strategy for intermodal transport development in Poland, including legal measures to sustain road and rail transport and a list of priority projects;
 - 4.2. To establish a One Stop Shop contact point for the stakeholders of the Northern and Central Eurasian Rail Corridors;
 - 4.3. To organize bilateral annual meetings (round tables) to promote intermodal transport in Poland as a part of railway fairs (TRAKO, The Transport Week in Gdynia, INNOTRANS, Belarusian Transport Week, TransKazakhstan, TransRussia) as well as intermodal forums (such as Intermodal Asia).

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Capacity, speed and axle load limitation on the Poland's railway network (2017)

No. railway line	From ... km/ station	To ... km Station	Limitations
3	139	158	Capacity
6	Tłuszcz	Małkinia	Capacity (the passing loop restoration at Przybyłowiec or Nowa Wieś Legnicka stations is required)
6	Jawor	Legnica	Axle load, non-electrified
6	38	177	Capacity
8	Warka	Radom	Capacity (single-track line with a mixed passenger and freight traffic)
8	102	56	Capacity (high traffic with a small number of tracks for passing trains)
12	Skierniewice	Łuków	Capacity, speed, axle load (single-track line between Mszczonów – Puszcza Mariańska of a poor technical condition)
12	Góra Kalwaria	Kępa Gliniecka	Capacity (single-track line)
14	Lublinek	Zduńska Wola	Capacity, speed
14	Żagań	Głogówek	Capacity, speed, axle load
14	236	281	Capacity
14	341	281	Capacity (restricted operating times on Żagań – Głogów section which is closed between 7pm to 7am)
14	281	236	Capacity (restricted operating times on Głogów – Leszno section which is closed between 7pm to 7am)
20	11	12	Capacity (single-track traffic via railway bridge)
25	Chmielów k. Tarnobrzegu	Dębica Towarowa	Capacity (restricted operating times)
25	260	321	Capacity, speed (restricted operating times on Dębica – Chmielów section)
25	324	260	Capacity, speed (restricted operating times on Mielec – Dębica section in poor technical condition)
27	Toruń Wsch.	Nasielsk	Capacity, speed, axle load
30	Lublin Płn.	Łuków	Capacity
31	km 0.00 Siedlce	km 90.167 Czeremcha	Non-electrified
31	km 90.167 Czeremcha	km 146.1 Siemianówka	Capacity (single-track non-electrified line)
33	Sierpc	Płock Trzepowo	Capacity
33	58	6	Capacity
33	3	58	Capacity
38	Ełk	Korsze	Capacity (restricted operating times)
38	Korsze	Ełk	Capacity (single-track line with a high traffic)
70	0	87	Capacity, speed (single-track line with a high traffic)
93	Trzebinia	Czechowice Dziedzice	Train length
93	km 46.664 Czechowice Dziedzice	km 24.728 Oświęcim	Speed
95	Kraków Mydlniki	Podłęże	Axle load

No. railway line	From ... km/ station	To ... km Station	Limitations
100	Kraków Mydlniki	Gaj	Axle load
100	14	19	Capacity
127	km 26.922 Radzionków	km 37.307 Tarnowskie góry	Capacity (track no. 3 is closed due poor technical condition)
130	km 39.70 Tarnowskie Góry	km 47.96 Kalety	Speed, capacity (track no. 4)
131	km 8.98 Chorzów Miasto	km 12.80 Chorzów Stary	Capacity, speed (track no. 1)
132	Opole Główne	Opole Zachodnie	Axle load
132	Ząbrze Biskupice	Pyskowice	Restoration of this is required to increase capacity at Gliwice
133	km 45.097 Krzeszowice	km 33.200 Trzebinia	Capacity (restricted operating times)
133	DG Ząbkowice	Kraków Gł.	Capacity (single-track line with the restricted operating times)
136	Opole Groszowice	Zdzieszowice	Capacity
137	Legnica	Jaworzyna Śl.	Capacity (single-track line with a mixed high traffic)
137	km 70.150 Kędzierzyn Koźle Zachód	km 79.619 Twardawa	Capacity (track no. 2 closed since 1997)
138	Oświęcim	Mysłowice	Train length
138	km 0.525 Oświęcim	km 15.485 Mysłowice Kosztowy	Speed
139	Kamieniec Ząbkowicki	Legnica	Capacity, axle load, non-electrified (single-track sections; the passing loop restoration at Przybyłowice or Nowa Wieś Legnicka stations is required; a traffic growth is expected on Jawor – Legnica section after Mercedes plant construction)
139	km 44.203 Bielsko Biała	km 113.785 Zwardoń state border	Capacity, axle load, train length
140	Rybnik Towarowy	Sumina	Train length
140	Leszczyny	Rybnik	Axle load
142	km 0.757 Katowice Ligota	km 1.840 Katowice Ochojec	Capacity (the track is closed due poor technical condition)
142	km 1.840 Katowice Ochojec	km 2.800 Staszic	Capacity (the track is closed due poor technical condition)
143			Capacity
144	km 0.18 Tarnowskie Góry TGA	km 34.50 Zawadzkie	Capacity (restricted operating times)
148	km 7.62 Radostowice	km 0.00 Pszczyna	Capacity, speed (single-track line)
151	Kędzierzyn Koźle	Chałupki (state border)	Train length
153	km 0.000 Toszek Płn	km 19.426 Rudziniec Gliwicki	Capacity, speed (due poor technical condition)

No. railway line	From ... km/ station	To ... km Station	Limitations
153	0	12	Capacity
161	km 12.80 Chorzów Stary	km 5.10 Siemianowice	Capacity, speed
164	Chorzów Batory	Ruda Kochłowice	Speed
169	Tychy	Orzesze Jaśkowice	Train length
171	Radoszowy	Katowice Janów	Capacity
171	km 30.097 Stawiska	km 35.280 Katowice Muchowiec KMA	Capacity (track 2 is closed due poor condition)
171	km 35.280 Katowice Muchowiec KMB	km 41.693 Panewnik	Capacity (track 2 is closed due poor condition)
189	km 1.60 Ruda Orzegów	km 5.33 Zabrze Biskupice	Capacity, speed
199	km 49.055 Rudziniec Gliwicki	km 55.498 Sławięcice	Capacity (track 3 is closed due poor condition)
206	1	4	Capacity (Inowrocław Rąbinek – Dziarnowo – Inowrocław Rąbinek)
206	Wapienno	Żnin	Speed (Vmax = 0 km/h)
220	0	85	Train length, capacity (single-track line, profile of the line)
231	Ino. Rąbinek	Kruszwica	Speed (poor technical condition)
241	Pruszcz Bagiennica	Koronowo	Speed (Vmax = 0 km/h)
273	Wrocław Gł.	Zielona Góra	Capacity
274	48	78	Train length, capacity
276			Capacity (single-track Strzelin – Kamieniec Ząb. Section)
277	Opole Groszowice	Wrocław Brochów	Axle load, speed, capacity
281	Oleśnica	Gniezno	Axle load, speed, capacity
281	Gniezno	Nakło n.Not.	Capacity (restricted operating times)
281	160	136	Capacity
281	160	216	Capacity (restricted operating times on line to ZNTK depot)
286	Kłodzko Główne	Ścinawka Średnia	Axle load
286	Kłodzko Gł.	Wałbrzych Gł.	Capacity, speed (a poor technical condition)
287	km 0.50 Opole Zachodnie	km 48.75 Nysa	Capacity, speed (single-track line)
288	km 47.62 Brzeg	km 0.00 Nysa	Capacity, speed (single-track line, no passing loops)
296	Wielkie Piekary	Miłkowice	Axle load
355	Ostrów Wlkp.	Grabowno Wlk.	Capacity (single-track line)
355	54	0	Capacity
356	Szubin	Gołańcz	Speed (Vmax = 0km/h)

No. railway line	From ... km/ station	To ... km Station	Limitations
356	0	51	Capacity (single-track line)
358	km 48.834 Czerwieńsk	km 94.257 Gubin (state border)	Capacity (single-track non-electrified line)
370	53	0	Capacity (restricted operating times on Żary – Zielona Góra section)
371	Wolsztyn	Żagań	Vmax = 0km/h
374	33	43	Train length at Piła Główna station
516	Turczyn	Białystok Starosielce	Capacity
664	Radoszowy	Gottwald	Speed
698	km 0.080 Kosztowy MKsA	km 1.533 Kosztowy MKsC	Capacity (track 102 is closed)
814			Missing direct link between lines 272 and 181
282, 14	Węglińiec	Tuplice (state border)	Speed, axle load
40, 51	Las Suwalski	Trakiszki	Missing direct link between lines 40 and 51

Source: own elaboration based on UTK's data.

Examples of online sea-rail tools

www.hafen-hamburg.de/en/intermodal

PORT HANDBOOK

- PORT SECURITY
- INFORMATION FOR SHIPS
- INFORMATION FOR TRUCKERS
- PORT CONNECTIONS ▾
- Sailing list
- Railway connections ▾

RAILWAY CONNECTIONS

Interactive map

Choose layer

- VESSELS IN PORT
- CONTAINER RAILWAY CONNECTIONS
- REPRESENTATIVE OFFICES
- TERMINALS

Country	Route	Frequency
Austria	Koper - Graz (Adria Transport)	10x weekly

www.luka-kp.si/eng/railway-connections

ANALYSIS OF THE POTENTIAL

OF THE DEVELOPMENT OF RAIL CONTAINER TRANSPORT MARKET IN POLAND

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