North Sea Baltic Connector of Regions
Interreg Baltic Sea Region programme 2014–2020

NSB CoRe Interconnectivity and Interoperability Policy Paper

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1 Trends in logistics

The transport and logistics market will transform over the next few years. According to the data presented in the PwC report "CEE Transport & Logistics TrendBook 2019" and DHL report ”Logistic Trend Radar”, as many as 68% of CEOs of companies from this sector worldwide expect changes in basic service provision technologies, while 65% expect changes in distribution channels. According to PwC experts, the sector will change under the dictates of digitalization, shifts in international trade, software solutions, internal changes in trade and the development of solutions in the area of machinery and equipment.

The digital transition is no longer just about simple **information and communication technologies** or processes related to enterprise resource management. It transforms the whole transport industry, creating completely new business processes, some of which will take place in the digital world.

The increase of free trade agreements, conflicts and trade barriers, globalisation of transport companies and infrastructure development are the main causes of changes and transformations in international trade. The Eurasian region in particular is becoming more and more important - **the volume of trade between China and the EU is increasing**, new investments are appearing, and as a result international logistics are changing. It is supposed to result in lower transport costs and, on the other hand, greater possibilities of creating new services..

The importance of programming-based processes is also expected to increase. **Intelligent transport systems**, software based on **artificial intelligence solutions**, **Internet of Things**, **predictive solutions**, **analytics of large data sets** are to develop in the next few years and translate into business benefits for transport companies in the form of cost reduction, better cargo flow or increasing customer awareness. Advanced ICT solutions have become an integral part of transport, therefore chapter 6.3 explores the **usage of ICT tools** to support decision making in transport and the level of satisfaction with the current data flow between users in the NSB corridor.

The latest trends also clearly indicate the development of **e-commerce** and related changes in the transport market. According to Eurostat data, almost 70% of Europeans made online purchases in 2017. At the same time, the number of people shopping online over the last 10 years has almost doubled (from 30 to 57% in 2017).

Enlarged reality, artificial intelligence and machine learning, robotisation or electromobility - all these trends are expected to make part of the processes machine controlled, which is supposed to contribute to the efficiency of transport and logistics services.

Machine-driven processes will be possible in the long term thanks to the development of basic technologies (including progress in electromobility) and changing regulations. They will also be shaped by a growing interest in environmental sustainability.

The U.S is the largest contributor of the **Intermodal Freight Transportation** market but there is expected that **Europe will be the fastest growing market** due to the rapid adoption of intermodal freight transportation in this region and EU policies promoting this kind of transport. All these factors are expected to increase the demand of Intermodal Freight Transportation market during the forecast period from 2018 – 2023. The increased importance of intermodal transport is closely related to condition of transport infrastructure, therefore in WP2 an **analysis of nodal points** and **user needs** was carried out – the results are included in chapters 6.1 & 6.2.

2 Introduction

The NSB CoRe project enhances regional development in the Baltic Sea Region (BSR) by improving internal and external accessibility of the region along the North Sea - Baltic TEN-T Core Network Corridor. The acronym 'NSB CoRe' stands for 'North Sea Baltic Connector of Regions'. Project consists of the substantial work packages (WPs) Intermodal Logistics (WP 2), Commuting Growth Corridors (WP 3), Spatial Planning for NSB Network Development (WP 4) and Branding and Community Building (WP 5).

The Policy Paper (main output for the Work Package 2) contains the results of the previous analysis provided within the WP2:

- Logistics business requirements and networking needs,
- Nodal point infrastructure analysis,
- ICT solutions for intermodal transport.

In the project 16 partners from the six countries Finland, Estonia, Latvia, Lithuania, Poland and Germany were working together in order to enhance regional development in the north-eastern Baltic Sea Region by improving the internal and external accessibility of the region along the North Sea Baltic TEN-T corridor. Aims and mission of this work package can be described as follows:

- collecting the experience from transport operators on bottlenecks and cross-border problems from an operative perspective,
- creation of a ranking model of logistics services and analysis of nodal points,
- evaluation of technologies and applications of ITS that serve the intermodal supply chain,
- interoperability of traffic modes, infrastructure, seaport connections and other nodal points: intermodal terminal and last mile, interoperability between the future freight villages.

Activities in WP2 are focusing on gathering the background knowledge and building up the initial conditions for project's demonstration, evaluation and knowledge sharing activities, stronger networks between stakeholders and to make them work together regarding specific challenges.

The aim is to gain more understanding and future users for that intermodal corridor in order to find out what the main barriers of intermodal transport are and what they think about the opportunities arising from new intermodal infrastructures, especially Rail Baltica. The focus has been to set the picture of the current intermodal logistics situations within the North Sea Baltic Corridor and define the main goals and needs of the relevant stakeholders (Logistics Service providers and Shippers) as well as identify the main challenges, opportunities and priorities. Therefore, interviews had been conducted with Logistic Service Providers (LSPs) and shippers in each of the NSB CoRe partner countries. Afterwards, Roundtable Meetings took place in each of these countries that served as the feedback occasion for the companies (Logistics Service Providers and Shippers) that have participated in the interviews and further stakeholders from business and politics. Also carried out nodal point infrastructural analysis is the identification of already built and planned intermodal nodal points' infrastructure in the NSB Corridor. This activity utilizes the previous studies such as RBGC (Rail Baltica Growth Corridor project), update them with the latest developments, as well as, evaluates nodal points' as a link between core network corridor and its catchment area. Done activities outline also the growing use and importance of ICT tools and the related technology in supply chains.

The following report should be of particular interest to the following stakeholders:

- Policy makers – Local, Regional, National and European Authority, NSB Corridor Coordinator,
- Transport infrastructure managers,
- Logistics Service Providers (forwarding companies, Baltic Sea ports, freight villages, intermodal operators, railway or road carriers, container terminals, logistics centres),
- IT solutions developers,
- Shippers (companies),
- Logistic experts in the fields of logistics especially in intermodal transport,
- Scientist and Research Institutions,
- Journalists.

3 Policy background

3.1 White Paper

On 28th March 2011 the European Commission published a new White Paper called: "The European Commission's policy for the future": Roadmap to a single European transport area — Towards a competitive and resource-efficient transport system. The document sets out the Commission's vision for the future of the EU transport system and defines a strategy for the next decade. The programme is part of the Europe 2020 strategy and its flagship initiative on resource efficiency. It is the Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system.

The primary objective for future action is to achieve a Single European Transport Area. This will be an area where the transport sector will be highly competitive and, in addition, will make very economical use of non-renewable raw materials. This is to be achieved by 2050, with the following 10 specific objectives:

1. Reduce by half the number of conventionally powered vehicles (non-hybrid combustion engines) in cities by 2030 and eliminate such vehicles completely from urban traffic by 2050. Achieve CO_2-free urban logistics in city centres of large cities by 2030.
2. Achieve 40% use of low-carbon fuels in aviation by 2050. Reduction of 40% (and if possible 50%) of CO_2 emissions from marine liquid fuels also by 2050.
3. **Move 30% of freight from road to other modes of transport -** rail, sea and inland waterway transport over distances of more than 300 km by 2030 and 50% of freight by 2050. This will be facilitated by the creation of efficient, environmentally friendly transport corridors. However, their development requires the expansion of appropriate infrastructure.
4. **Completion of the high-speed rail network by 2050**. This should be achieved by extending its length three times by 2030, while maintaining a dense railway network in all Member States. In addition, by 2050, the majority of medium-distance journeys should be made by rail.
5. Creation of a fully functional **multimodal TEN-T core network by 2030**, covering the whole territory of the EU, and achieving high capacity and quality of this network by 2050, together with a complementary set of relevant information services.
6. Connection of all airports (core network) to the rail network; it is recommended that this should be a high-speed rail network. Ensuring that **all major seaports are well connected to the rail freight network** and, where possible, to the inland waterway network
7. Implement the upgraded air traffic management infrastructure (SESAR) by 2020 and complete the European Common Aviation Area. Deployment of adequate **traffic management systems** in the different modes of transport - **ERTMS**, ITS, SSN, LRIT, RIS and deployment of the Galileo system by 2020.
8. Setting up a framework for a European information, management and payment system by 2020.
9. Reduce the number of road fatalities to almost zero by 2050, and halve it by 2020. The EU is set to become a world leader in safety and security in all modes of transport.
10. Final implementation of the 'user pays' and 'polluter pays' principles and full involvement of the private sector to eliminate distortions such as harmful subsidies and generate revenues to secure financing for future transport investments.

3.2 EU Strategy for the Baltic Sea Region (EUSBSR)

The European Union Strategy for the Baltic Sea Region, adopted on 26 October 2009 (decision officially confirmed by the European Council of 29/30.10.2009), is an integrated framework that will enable the European Union and the Member States to identify needs and adapt them to the available resources by coordinating appropriate policies, thus ensuring that the Baltic Sea Region has a chance to benefit from sustainable environment and optimal economic and social development.

It includes a macro-region made up of 8 Member States of the European Union: Denmark, Estonia, Germany, Latvia, Lithuania, Finland, Poland, Sweden.

Figure 1 Map of Baltic Sea Region (EUSBSR EU Strategy For The Baltic Sea Region)

The aim of the Strategy is to **activate and use the potential of the Baltic Sea region** resulting from the enlargement of the European Union in 2004.

This objective is to be achieved through the implementation of the following four thematic pillars:

- Environmentally sustainable region,
- Prosperity region,
- Region accessible and attractive,
- Safe region.

The core of the Strategy is **cooperation at many levels**: government, regional and local, with the participation of the world of science, research centres, universities, regional cooperation structures, operational programmes and the private sector.

The EU Strategy for the Baltic Sea Region was defined as the first European Union macro-regional strategy of an intra-EU nature. It is implemented on the basis of funds from the existing financial instruments of the European Union, funds from national budgets and funds from international financial institutions.

The basic document:

- European Commission (2015), European Union Strategy for the Baltic Sea Region – Action Plan {COM(2009) 248}, Commission Staff Working Document, SWD (2015) 177 final, Brussels.

3.3 TEN-T Regulation

The Trans-European Transport Network (TEN-T) is the European Commission's policy to implement and develop a Europe-wide network of roads, railways, inland waterways, maritime shipping routes, ports, airports and rail-road terminals. It consists of two planning layers:

- The Comprehensive Network: Covering all European regions,
- The Core Network: Most important connections within the Comprehensive Network linking the most important nodes.

The ultimate aim of TEN-T is to fill the gaps, remove bottlenecks and technical barriers between the transport networks of the EU Member States, strengthen the social, economic and territorial cohesion of the Union and contribute to the creation of a Single European Transport Area. The policy aims to achieve this objective by building new physical infrastructures, adopting innovative digital technologies, alternative fuels and universal standards, and modernising and upgrading existing infrastructures and platforms.

As a result of the TEN-T policy review, **nine core network corridors were identified in 2013** to streamline and facilitate the coordinated development of the TEN-T Core Network. These corridors are complemented by two Horizontal Priorities, the implementation of ERTMS and Motorways of the Sea, both of which have been established in order to continue the strategic implementation of the core network objectives, in line with the 2014-2020 funding period and the following one (2021-2027).

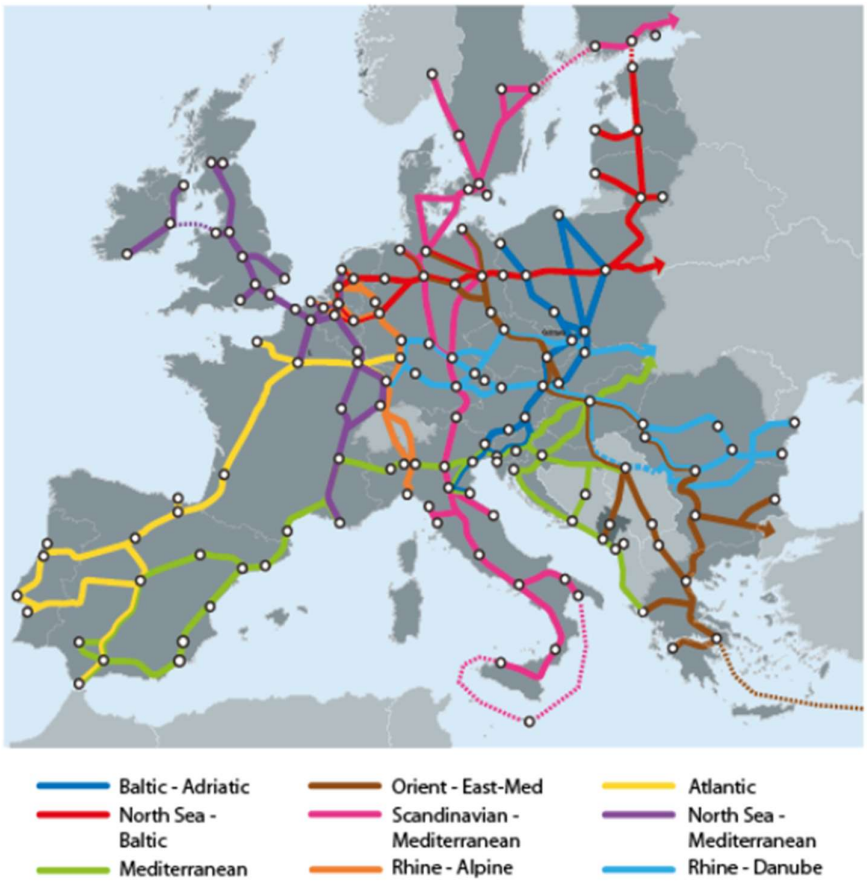

Figure 2 Excerpt from TEN-T Core Network Corridor Map (European Commission, 2013a)

The supervision of the Corridors and the implementation of the two horizontal priorities is the responsibility of the European Coordinators; high-level personalities with many years of experience in transport, financing and European policy, nominated by the European Commission.

Catherine Trautmann is the North-Sea Baltic TEN-T Corridor Coordinator.

In 2014, first generation work plans were presented for each corridor and each horizontal priority, setting precise objectives for each corridor and horizontal priority within the TEN-T core network. It is an ongoing process, taking into account current developments.

EU funding for projects within each corridor and horizontal priorities **is provided by the Connecting Europe Facility. (CEF)**, with the Member States concerned being obliged to align their national infrastructure investment policies with European priorities. Other sources of funding and financing include the European Structural and Investment Funds and the European Strategic Investment Fund.

The basic document describing TEN-T is:

- Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU Text with EEA relevance.

3.4 Single European Railway Area

As a result of the provisions for the gradual opening up of the market and the revitalisation of rail transport, the railways' share in transport has stabilised after years of decline. Nevertheless, achieving a single European railway market has proved difficult. Since 2007, the European market has been open to rail freight transport and, since 2010, to international passenger services. The Directive therefore applies, with minor exceptions, to all European Union railway lines, as well as to the equipment and services needed to gain access to the railway system and to operate trains in the EU.

Directive 2012/34/EU establishing a single European railway area brings together in a single piece of legislation the previous directives ("first railway package") and their successive amendments. It also adds important substantive changes to address the lack of competition, poor regulation and low investment in the rail market over the last decade. It applies to rail freight and international passenger services.

Market access conditions were not sufficiently precise and therefore favoured well-established organisations (often national monopolies). To address this problem, the Directive:

- It sets out an exhaustive list of licensing conditions for railway undertakings throughout the EU and access to licensing data;
- Requires the application of more detailed network statement: these are documents published annually, containing the characteristics of the available infrastructure and the conditions for its use;
- Ensure non-discriminatory access by railway operators to rail-related services such as railway stations, freight terminals and maintenance facilities. The service provider belonging to a body with a dominant position in a given railway market must be independent (with separate accounts and organisational and decision-making decisions, although there is no need for a separate legal entity);
- Provides for competitive and non-discriminatory charges for the use of infrastructure, facilities and services, lays down rules on conflicts of interest and unfair practices in rail-related services.

An important element is stronger regulatory supervision, greater independence of regulators and enhanced cooperation between regulators at EU level.

National rail regulatory bodies must be independent. They may not hold any shares in regulated companies, they must be nominated by bodies which do not directly exercise the rights of shareholders in regulated companies, and there are other clauses protecting their independence (e.g. there are new provisions on transitional periods and transitional periods to control the movement of staff between the regulatory body and regulated companies). Their sanctioning and auditing powers have been strengthened and must cooperate with their counterparts on cross-border issues. Their powers have been extended to rail-related services in order to eliminate discriminatory barriers.

Investment in rail infrastructure is to be improved through long-term planning, giving investors greater certainty. By December 2014, EU countries had to publish an indicative rail infrastructure development strategy to meet future mobility needs in terms of maintenance, renewal and development of infrastructure. Based on sustainable financing of the railway system, taking into

account the EU state aid rules and the overall needs of the EU, including the need for cooperation with neighbouring countries.

4 Characteristics of the North Sea Baltic corridor

4.1 Current situation along the NSB corridor

Figure 3 shows the whole NSB corridor for each transport mode. The corridor starts off in the major North Sea Ports of Amsterdam, Rotterdam (Netherlands), Antwerp (Belgium) as well as Hamburg, Bremen and Bremerhaven (Germany) in the west and links all capital cities of the eight states being part of the corridor ending in the North-East in the Finish capital region Helsinki-Uusimaa. It follows that the corridor crosses eight national borders (1 maritime: FI-EE and seven terrestrial: EE-LV; LV-LT; LT-PL; PL-DE; DE-NL; NL-BE; DE-BE). These cross border sections have a high priority in the work on the corridor as in many cases they are also bottlenecks for intermodal transport.

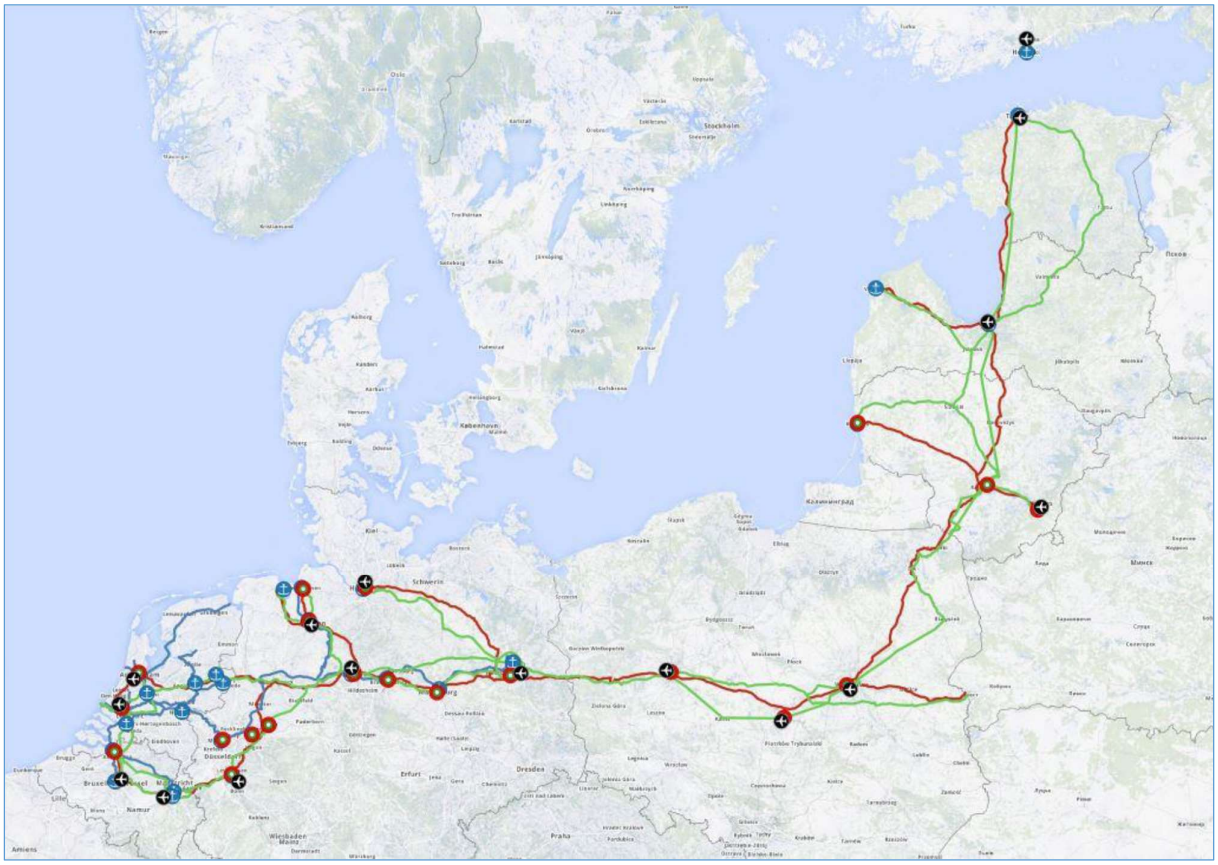

Figure 3: North Sea-Baltic Corridor – Urban nodes and transport interconnections by mode (Trautmann, 2018)

Taking a deeper look to the railway infrastructure in each of the countries along the corridor in Table 1, one of the most striking bottleneck is that there are three different railway gauges along the corridor:

- the standard UIC gauge of 1435 mm in Belgium, the Netherlands, Germany and Poland,
- the 1520 mm gauge in Estonia, Latvia and Lithuania (with the exception of the section between Kaunas and the Polish border that has a dual gauge or parallel tracking of 1520 mm and 1435 mm),

- the 1524 mm gauge in Finland.

Another important infrastructural bottleneck is the missing electrification in the biggest part of railway line of the Baltic States. In Lithuania, only the line between Kaunas and Vilnius is electrified so far and the cross-border traffic with Poland can only be run using diesel traction. In Latvia and Estonia, only sub-regional lines for passenger transport around Riga and Tallinn are electrified.

RAILWAYS		All entries: Share of all sections fulfilling the respective standard								
TEN-T parameters		BEL	NED	GER	POL	LIT	LAT	EST	FIN	Corridor
Length of all sections	km	397	477	1,783	1,442	848	594	442	3	5,986
Electrification	electrified	100 %	100 %	97 %	91 %	18 %	11%	17 %	100 %	75 %
Track gauge	1,435 mm	100 %	100 %	100 %	100 %	13 %	0 %	0 %	0 %	76 %
Line speed (core freight lines)	≥100 km/h	80 %	100 %	100 %	9 %	25 %	0 %	0 %	N/A	61 %
Axle load (core freight lines)	22.5 t	100 %	100 %	100 %	99 %	100 %	100 %	100 %	N/A	100 %
Train length (core freight lines)	min. 740 m	100 %	100 %	100 %	38 %	100 %	100 %	100 %	N/A	85 %
ERTMS / signalling system	YES	32 %	43 %	0 %	0 %	0 %	0 %	0 %	0 %	7 %

Table 1: Compliance of railway infrastructure with TEN-T requirements in 2014 (Trautmann, 2018)

Rail-road terminals (RRTs) are also very important for the use of intermodal transport on land routes. In Germany, there are tri-modal terminals in several ports (Hamburg, Hannover, Berlin, Bremen, Bremerhaven, Dortmund and Cologne), as well as a well-developed network of rail-road terminals, owned either by the railway infrastructure manager or privately. All ports have at least one terminal which provides open access to all operators. The network of the RRTs in Poland is under development, supported by EU Cohesion Funds. Three core areas designated for the RRT localisation are the urban nodes of Poznań, Łódź and Warsaw. All are conveniently located at the crossroads of two TEN-T corridors (Baltic-Adriatic corridor and NSB). The highest number of RRTs is located in Poznań which capitalizes on its location as gateway to Poland from Germany. There were two stand-alone RRTs completed in Lithuania – Vilnius and Kaunas intermodal terminals, others are developed in Klaipeda seaport. There are no RRTs in Latvia, but they are planned to be constructed jointly with Rail Baltic project. In Estonia, rail-road terminals (RRTs) exist in ports, but not on a stand-alone basis without the port, except a project idea to develop a dry port (RRT) at the outskirts of Tallinn. Rail Baltica project includes a new multi-modal Ülemiste RRT in Tallinn. In Finland, the Corridor features a trimodal terminal in the port of Helsinki. Further development of RRTs along the NSB Corridor is especially important in locations with cross-border impact and potential for modal shift (Trautmann, 2018).

4.2 Infrastructure development projects on the corridor

Figure 4 shows the number of projects split by countries. The distribution of projects across the countries located on the Corridor is unbalanced. Germany (28%) and Poland (19%) contribute together already almost 50% of the total number of projects. The number of Multiple Country projects is significant and amounts to 57 projects, many of which have received support via the 2015-CEF Transport Call for Proposals. The midfield is formed by Latvia (54 projects or 10%), Lithuania (54 projects or 10%) and the Netherlands (43 projects or 8%). Last but not least there is Belgium (26

projects or 5%), Estonia (25 projects or 5%) and Finland (18 projects or 3%). These investments should help developing new railway lines and eliminating bottlenecks (Trautmann, 2018).

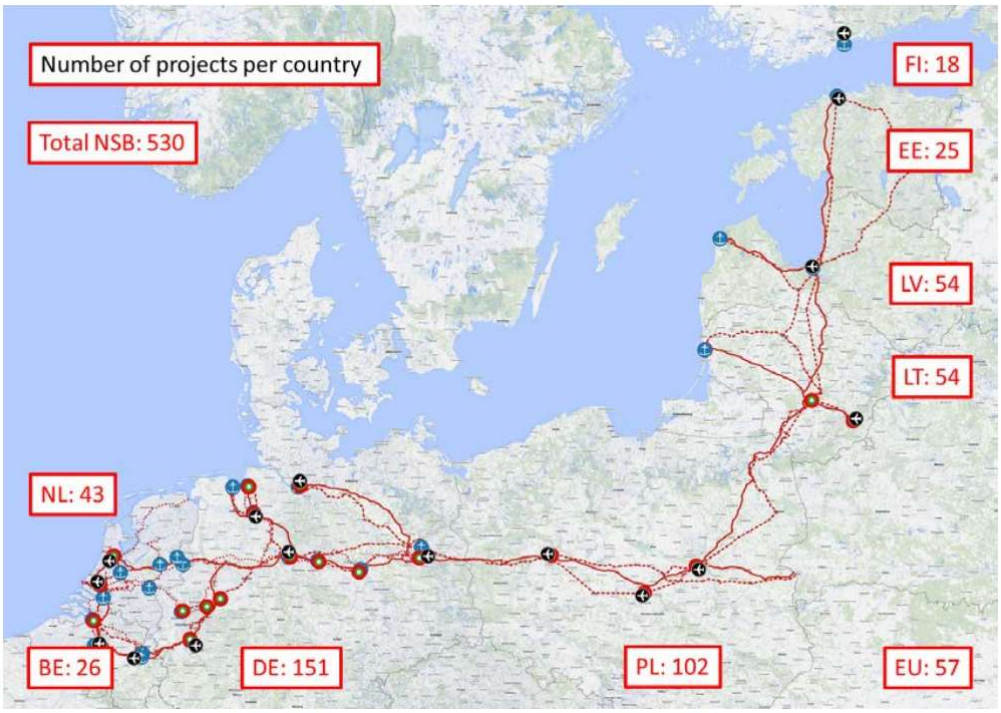

Figure 4: North Sea-Baltic corridor project list split by countries (Trautmann, 2018)

Figure 5 and Figure 6 show the compliance of the rail network on the NSB corridor with certain requirements of the TEN-T Regulation as the status quo of 2015 and the outlook into 2030. If we look at the 2015 status we can see that there are many lines identified as non-compliant and especially two major missing links: Rail Baltica and the high-speed line Poznań-Łódź-Warsaw in Poland. The planned investment volume is allocated especially to the airport connection and other projects in Helsinki (6 billion EUR), the Rail Baltica project (5.9 billion EUR), electrification of further lines in the Baltic States (close to 1 billion EUR in Lithuania and Latvia), new and upgraded lines in Poland (8 billion EUR), electrification, speed and capacity issues in Germany (9 billion EUR) and speed, interoperability and capacity issues in Belgium. (Trautmann, 2018)

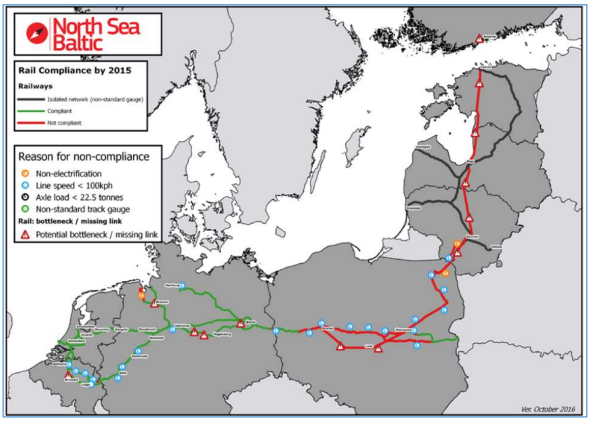

Figure 5: Rail compliance by 2015 (Trautmann, 2018)

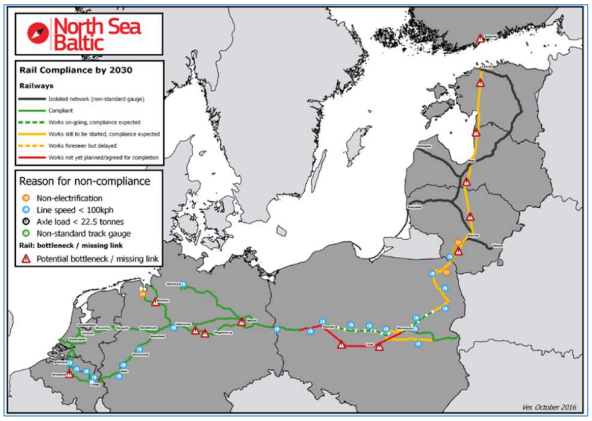

Figure 6: Rail compliance by 2030 (Trautmann, 2018)

Comparing the maps on rail compliance 2015 and 2030 we can see that the most striking difference is the section between Warsaw and Tallinn, the Rail Baltica project, which will be explained and presented in more detail in the following subchapter.

4.3 Rail Baltica project

The Rail Baltica (RB) project is the most important project for the development of the NSB corridor. The project comprises a new 1435 mm standard gauge rail connection from Warsaw to Tallinn linking four countries and their capitals in goods and passenger transport via rail. Rail Baltica ensures traffic flows via rail along the corridor without any gauge breaks in between. The connection should serve also as North-South link between Finland and South-East Europe and as an alternative to the predominant traffic flows along the West-East route from and to Belarus and Russia.

According to the corridor coordinator, the whole **Rail Baltica project is of highest importance for the whole NSB corridor and especially the three Baltic States' economies**: "*Without the full implementation of the Rail Baltic line, the flow of goods and services from the rest of the Single Market cannot pass easily by rail into the Baltic States and on to Finland or vice versa. The Corridor cannot operate at its full potential if the situation of two different gauges would remain in place. The freight and passenger rail traffic is currently low because the infrastructure in the North/South direction is not adequately connected or interoperable, and traffic is dominated by trucks and cars. The Baltic States can highly benefit from the symbiosis of the new Rail Baltic railway and the currently dominant East/West trade flow. The Baltic States also need to become better connected to the rest of the EU for strategic reasons in the current geopolitical realm*."[1] The connection to the corridor is illustrated in Figure 7.

[1] Trautmann (2016)

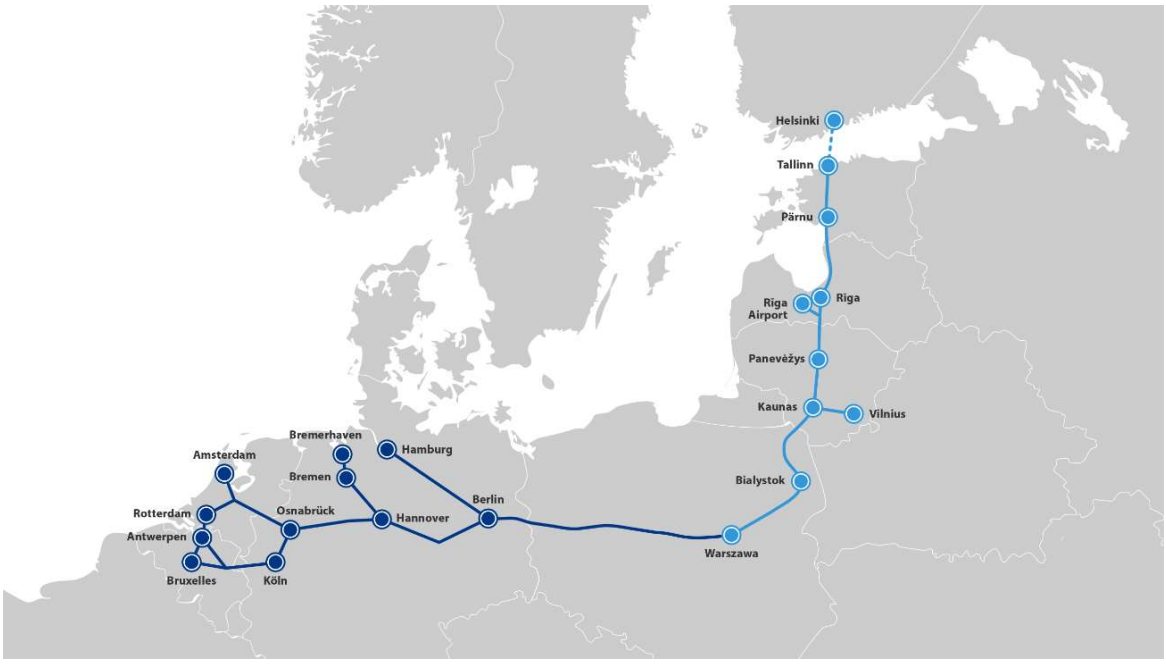

Figure 7: Rail Baltica North Sea - Baltic Network (Rail Baltica, 2017d)

For the development of the infrastructure the three Baltic States have established the **Joint Venture RB Rail AS** in 2014. Since then, feasibility studies and preparatory works have been done by means of CEF funding. For the section of the existing dual gauge/parallel 1435/1520 mm track from the Polish border to Kaunas it is planned to remove the bottlenecks in terms of speed restrictions (at the moment 80 km/h for freight and 120 km/h for passenger transport) and missing electrification and ERTMS (planned to be installed by 2020). **Construction works for Rail Baltica are planned to begin in 2020 and completed by 2026 in the three Baltic States**. The connection with Warsaw is planned to be fully active before 2030.[2]

[2] This timeline has been stated in the Rotterdam Joint Declaration of June 2016 by the partners.

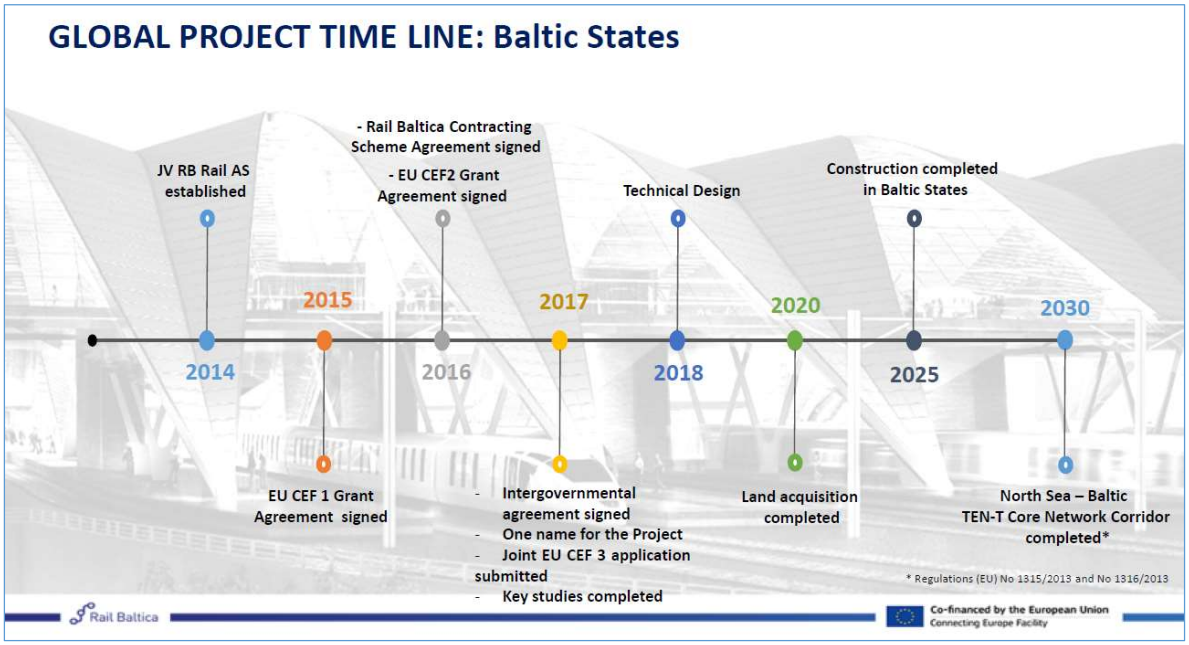

Figure 8: Global time line of the Rail Baltica project (RB Rail, 2017a)

The electrified double track route of Rail Baltica has a total length of 870 km in the three Baltic States, divided into 213 km in Estonia, 265 km in Latvia and 392 km in Lithuania. The design speed is planned with 240 km/h for passenger trains and 120 km/h for freight trains with a maximum train length of 740 m and axle loads of 22.5 t. The course of the route is depicted in Figure 9.

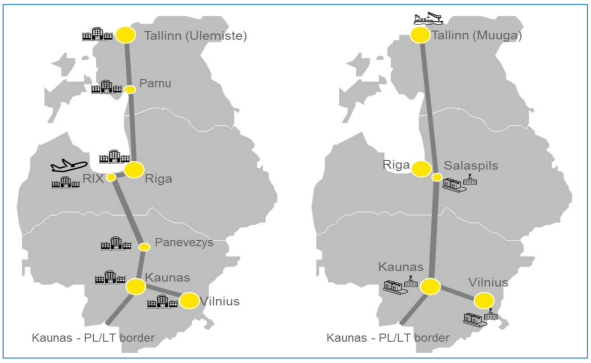

Figure 9: Main passenger and freight terminals (RB Rail, 2017b)

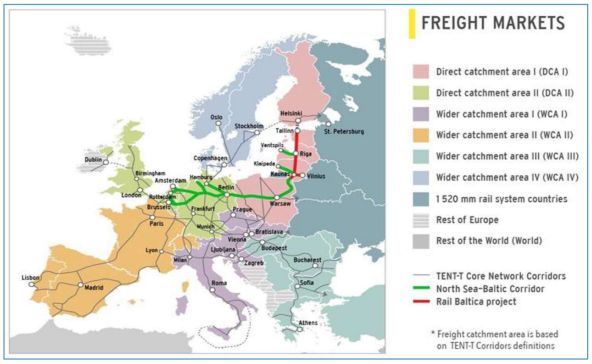

Figure 10: Rail Baltica freight catchment areas (RB Rail, 2017b)

The catchment area of the Rail Baltica freight flows is illustrated in Figure 10. Here we can see that especially the area of the NSB corridor is in the direct catchment area, but also the UK. However the connection of this new transport corridor to **Adriatic and Black Sea ports as gateways as well as the rail connection to China should also be noted**. Furthermore, the long distance offers a price advantage, adds to the Single Market approach of the EU and the increasing cargo flows and the potential hub functionality of intermodal terminals along the Rail Baltica.

4.4 Silk Road – Belt and Road Initiative

Freight flows on the rail link between Europe and China are constantly growing, resulting in cross-border bottlenecks on the BSR rail network (e.g. Małaszewicze, PL) towards China. Rail connection between China and Europe was identified being **the main trend and having the biggest business potential in European intermodal transport** in the coming years (proofed by Round Table Meetings discussion organized within the NSB CoRe project). Obviously RB & Belt and Road Initiative (BRI) do not compete but will complement one another in near future. **BRI is an opportunity for the countries along the RB corridor to position and enter new global markets and better participate in international trade**. Therefore, the New Silk Road has been included in the description of the characteristics of the NSB corridor. The map below shows the NSB corridor in blue with the light blue Rail Baltica route connection to the New Silk Road (orange).

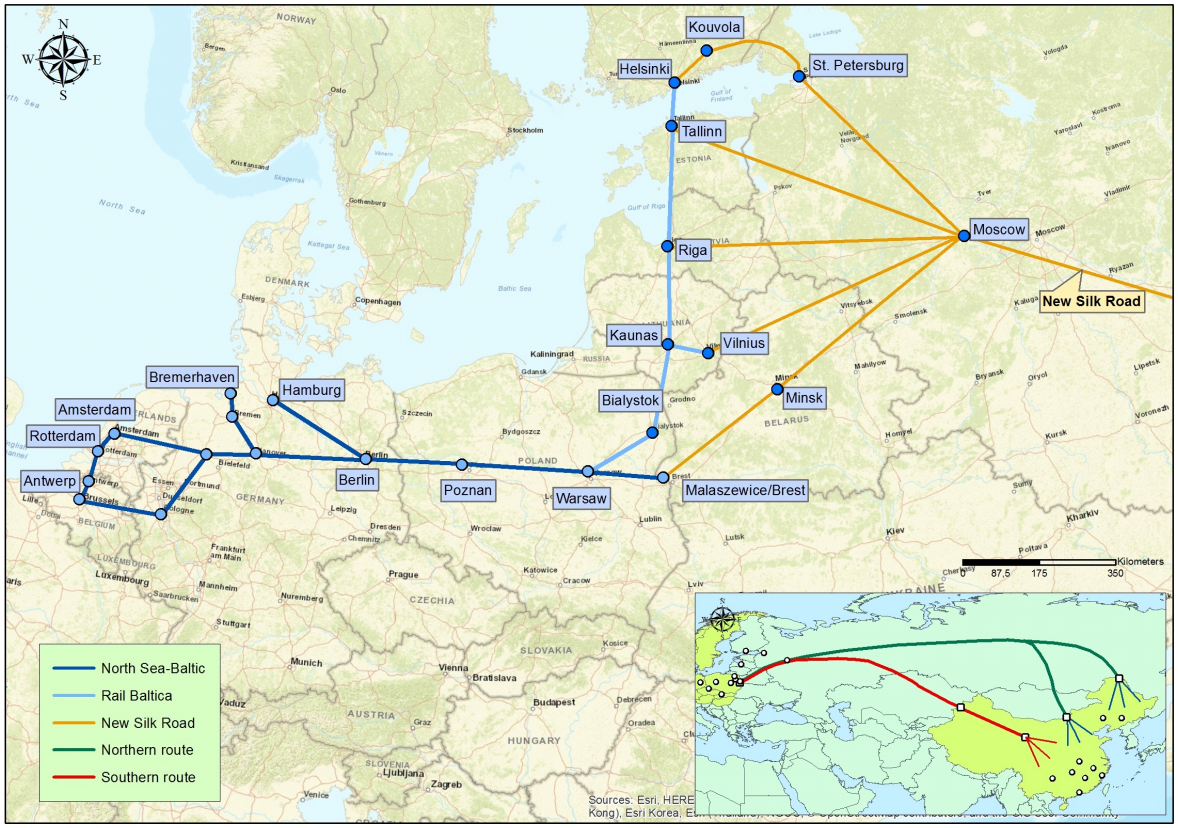

Figure 11 Connection between NSB corridor, RB and the Belt and Road Initiative

The concept of the New Silk Road (One Belt, One Road) was presented in Kazakhstan in 2013, also known as "the Belt and Road Initiative" is an opportunity for China and Europe to further development, expand its sphere of influence and strengthen its position in the international arena, as well as to strengthen economic cooperation between the countries along the Silk Road. So far, about 70 countries and regions have already confirmed their participation in the project, which

together account for about 30% of the world's GDP and 60% of the world's population. This is a long-term project, so it is constantly evolving and its scale is growing.

The new Silk Road is not supposed to be a single road, but a whole network of routes. The land "Belt" will connect China with Central Asia and Europe, while the sea "Road" will connect the Far East with the Middle East and Africa. The strategy of creating the New Silk Road assumes the construction of new communication and trade routes and infrastructural investments in the countries along the route.

The freight flows of the newly opened China-EU connections are channelled through transport corridors that already offer the highest capacity, the best infrastructure and the most favourable regulatory environment. The development of rail connections between China and the European Union so far is almost completely based on three trans-Siberian corridors running through Russian territory:

- Currently, the largest number of containers is transported using the corridor running through Kazakhstan, starting from the China-Kazakh border crossing Alaszankou/Dostyk. Between 2014 and 2016, the number of containers transported by it increased from 22,000 TEU to 104,000 TEU, in 2016 it accounted for 68% of all transit between China and the EU-China running through Russia.
- The second corridor uses a wide-gauge connection between the China-Mongolian Erenhot border crossing point and the China-Russia border crossing point in Nauszki. In 2016, it was responsible for 13,300 TEU.
- The oldest Trans-Siberian corridor, starting in Zabajkalsk in the Russian Far East, is second in terms of the number of containers transported (32.7 thousand TEU in 2016), but has recorded the slowest growth in recent years.

All three corridors connect in the Urals, near Ekaterinburg, goods are then transported to the EU via Russia and Belarus, with transhipment to platforms of European width in Małaszewicze on the Polish-Belarusian border. Due to the differences in track gauge between the former Soviet Union countries (1520 mm) and Europe and China (1435 mm) at border points, containers are transferred to appropriate railway platforms (wagons). The look of the new Silk Road is presented by Figure 12

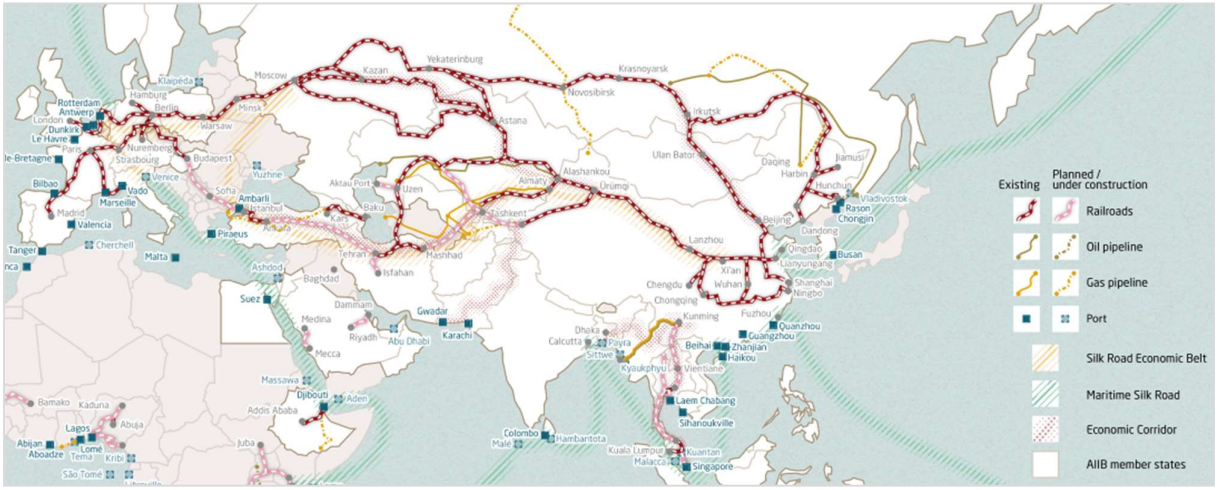

Figure 12 An overview of the BRI plan (Stevens, 2018)

One of the important factors shaping the development of EU-China connections in the European section is the ongoing Russian-Ukrainian conflict. Starting from January 2016, as a result of a decision of the Russian authorities, rail transit from Ukraine to Central Asia was blocked - the action was to hit Ukrainian exports. The extension of the blockade on the Russian side, as well as rhetoric on the Ukrainian side, resulted in the disappearance of rail transit from China to the EU via Ukraine, both for practical reasons (blockade) and business reasons (increased risk and instability of supplies). It was not until June 2017 that test transit connections to the EU, ending in Slovakia (Bratislava) and Hungary (Budapest), started to travel again. The blockade of transit through Ukraine has important consequences for Central Europe. Rail freight flows have been concentrated on the route through Belarus and Poland. So far, connections with the Czech Republic or Hungary (Yiwu-Budapest) have been made via the Polish border crossing in Małaszewicze and not via the Ukrainian-Slovakian and Ukrainian-Hungarian railway border crossing points (or the Polish border crossing in Medyka or the LHS – Broad Gauge Metallurgical Railway Line).

The development of railway routes is connected with the growth of online shopping. The new Silk Road is to create opportunities for goods from any place to reach another continent within a dozen or even a few days. **The main objective of the Belt and Road initiative is to search for the most effective ways of transporting goods between continents**. The biggest advantage of rail transport is that it is an intermediate form between slow and cheap sea transport and fast and expensive air freight. **On routes between China and Europe, goods are transported from the terminal to the terminal by air in 5-9 days, by rail in 14-19 days and by sea in 30-50 days.** The competitiveness of train transport in relation to ships increases in the case of locations away from seaports. In many industries, the rate of market change is so fast that companies may be prepared to pay a slightly higher price than ocean freight in order to profit in time. **Rail can also be attractive for products previously transported by air, as long as slightly longer delivery times are acceptable. The sea, land and air routes of the new Silk Road are not supposed to be competitive, but complementary.**

4.5 SWOT analysis

Within the framework of the ‘North Sea – Baltic Connector of Regions’ programme the project partner VASAB, together with other project partners, carried out a SWOT analysis of the ‘North Sea – Baltic Corridor’. Some of the important strengths of the corridor are: the extensive infra-structure available, the planning of further infrastructure connections across the border, and the currently available funding opportunities. Examples for the cooperation are the ‘Rail Baltica’ project, or the ‘Joint future concept 2030’ between Poland and Germany (Berlin Brandenburg, 2017). The cooperation in improving the infrastructure connections will for example bring accessibility opportunities, increase economic opportunities for the regions along the corridor and trigger harmonisation in various standards. A summary of the strength and opportunities is illustrated in Figure 13 below.

STRENGHTS	OPPORTUNITES	WEAKNESSES	THREATS
• existing infrastructure and transport connections - air hubs in Helsinki, Riga, Berlin, competitive ports and maritime connections as well as existing road networks • cross-border connection and planning - Tallinn-Helsinki, Vaasa-Umea, Joint future concept 2030 (PL-DE) • Sustainable Tourism Potential • Common Schengen area and Eurozone • Existing funding opportunities and successful absorption of available funding • Existing global connections – to Arctic, Russia, Asia, direction east-west	• Improved accessibility – within (to peripheral areas) and outside the macroregion, creation of new routes, potential Hel-Tal fixed link • Improved cross-border cooperation and broader stakeholder involvement • Economic opportunities for the region – growth, new markets, new jobs, new logistic centers, flows in north-south direction • Extension of CNC to North • Harmonization of standards across borders, joint planning across borders (for technical standards, ticketing systems, cargo flows, spatial issues, legal framework) • Raised environmental standards, less impact on environment • Experience on mega projects, new approach in transnational transport and spatial planning	• Different standards (gauge width, signalling systems, ticketing systems planning periods, financing mechanisms) leads to bottleneck on borders • Missing connections – last mile solutions, ringroads, bypasses, 2nd level networks, other transport modes, catchments are, hinterland, between airports and city centres • Missing Rail Baltica, unclear vision on its benefits, planned RB might be to slow • Low density on inhabitants, lack of critical mass which may lead to low demand for new transport links • Administrative planning instead of functional, different planning systems, no harmonization among national plans, lack of transnational planning	• Geopolitical instability, changes in political environment, EU-Russia relation • Decline of available EU funding • Negative decisions on new infrastructure (Rail Baltica, Tallinn-Helsinki fixed link) • Under realization of corridor opportunities – inefficient connections to 2nd level networks, likelihood of high ticket prices of RB, small settlements may not benefit from RB implementation • Lack of growth in the microregion

Figure 13 SWOT Analysis – Summary discussed at EUSBSR Forum Berlin (VASAB, 2017)

One of its opportunities is currently one of its weaknesses. There are, for example, different standards in respect to railway gauge, signalling systems and planning periods. Therefore, there are missing connections in some areas of the corridor. The 'Rail Baltica' Project is an attempt to rectify this. However, due to the administrative approach and, as suggested from the survey, too little knowledge about the project itself, the establishment of this infrastructure link might be too slow. One possible threat to the corridor is the decline in available funding. The current funding period is nearing its end and new programmes for the years 2021 – 2027 are under preparation. It cannot yet be foreseen if there will be changes in the focus of funding. Therefore, it is possible that further funding will be denied. This can be a decisive factor on the completion of the project and other infrastructure projects related to the corridor. Other threats that are not foreseeable are the geopolitical situation and the economic growth along the corridor.

Germany has a lot of potential in the intermodal sector and is already strong on some relations with its geographic location within Europe. The infrastructure is far-reaching and with its strong logistics sector also provides a wide terminal network. The sharing of the railway infrastructure makes the network utilisation complex and delays can be caused easily. There is the possibility to run longer trains, but only at certain times. Furthermore, the sidings often do not allow for longer trains and thus might need to be extended. In some areas the sidings may be missing at all.

The possibility to upgrade the infrastructure and the digitalisation of the infrastructure however bear potential. The Eurasian land bridge is a sector that sees continuous growth with trains coming via Poland to Germany. German intermodal transport chains could utilise Hamburg, Frankfurt (Oder) or Duisburg as a gateway to Poland for the Eurasian land bridge via Poznań and Małaszewicze. Hamburg, with 235 marketed departures per week and 27 destinations, is already strong in this area

(Hafen Hamburg Marketing, 2018a). With the surging offerings by intermodal operators, this will potentially increase the amount of cargo transported by rail, rather than being transported across Europe to one of the seaports and then to Asia by ocean vessel.

5 NSB CoRe – state of the art – research context

In order to identify, categorise and rank the barriers, bottlenecks and business needs for intermodal logistics and the use of ICT solutions along the NSB corridor, structured interviews have been conducted among the relevant target groups from the business side with strong interrelations along the corridor. The target of survey was to receive relevant experts' views on factors and trends influencing the freight transport in NSB Core area.

Survey results are used in the NSB CoRe corridor – 3 layers dimension analysis presented in chapter 6.

5.1 Methodology and setup of questionnaires

The questionnaires have been divided into the 2 main groups of a) logistic service providers (LSPs) and b) shippers as the roles of these groups in the supply chain are totally different. The questionnaire for the LSPs has been further divided and dedicated for 5 different groups: freight forwarders, intermodal operators, rail carriers, container terminals and road carriers. Each of the questionnaires for LSPs differed especially in the bottlenecks that had to be ranked by the interviewees.

Interviews have been conducted with companies in each of the partner countries by NSB CoRe project partners or external consultants. Interviews were made by phone calls, face-to-face or online questionnaire:

- CATI – Computer-Assisted Telephone Interview,
- CAPI – Computer-Assisted Personal Interview,
- CAWI – Computer-Assisted Web Interview.

Each of the questionnaires started with general questions about company details, size and industrial sector representation or role in the transport chain. Shippers have also been asked to identify their transport volumes and main transport directions as well as kinds of transported goods and modal split. The main part of the questionnaire was dedicated to intermodal transport development barriers identification. LSPs and shippers were asked to range the importance of several barriers in the scale from 1 (low importance) to 6 (highest importance). Additionally, shippers have been asked to give the opinion regarding intermodal transport advantages and possible needs for support. LSPs were asked to identify main intermodal trends, success conditions and possible threats for intermodal transport development. The final part of the questionnaires was used to collect information regarding the level of usage ICT tools supporting logistics services.

5.2 Structure of interviewed companies

An overall number of 225 companies from the private sector have been interviewed between January and September 2017 by NSB CoRe project partners from the six countries Finland, Estonia, Latvia, Lithuania, Poland and Germany, among them 119 Logistic Service Providers and 106 shippers.

Table 2 provides a breakdown of the LSPs by country and role in supply chain. The vast majority of them are freight forwarders and road carriers which also reflects the market structure in the logistics sector.

LSPs' role in supply chain	GER	POL	LIT	LAT	EST	FIN	TOTAL
Freight Forwarders	9	16	2	9	8	7	**51**
Intermodal Operators	3	4	3	3	0	0	**13**
Rail Carriers	1	1	1	3	2	0	**8**
Container Terminals	2	3	5	4	1	0	**15**
Road Carriers	2	16	5	3	3	3	**32**
TOTAL	**17**	**40**	**16**	**22**	**14**	**10**	**119**

Table 2: Numbers of conducted interviews with Logistic Service Providers

According to the economic sectors of the interviewed shippers, most companies are from the wood/furniture, chemical and food industry. Table 3 provides a breakdown of shippers by country and economic sector.

Economic sector	GER	POL	LIT	LAT	EST	FIN	TOTAL
Other manufacturing	4	13	3	3		1	**24**
Manufacture of wood and of products of wood and cork, incl. furniture	2	3	3	3	4		**15**
Manufacture of chemicals and chemical products	4	2	1	2	2		**11**
Manufacture of food products, beverages and tobacco products	1	2	4	2	2		**11**
M. of basic metals and metal products, except machinery and equipment	1	4		2		1	**8**
Manufacture of machinery and equipment n.e.c.	1	2			3	2	**8**
Manufacture of textiles, wearing apparel, leather and related products	1	2	1	2	1		**7**
Manufacture of paper and paper products	1		1	2	1	2	**7**
M. of computer, electronic and optical products, electrical equipment		3			3		**6**
Manufacture of rubber and plastics products		1		2			**3**
M. of motor vehicles, trailers and semi-trailers and other transport equipment		2					**2**
M. of basic pharmaceutical products and pharmaceutical preparations				2			**2**
Printing and reproduction of recorded media		1					**1**
Manufacture of other non-metallic mineral products						1	**1**
Manufacture of coke and refined petroleum products							**0**
TOTAL	**15**	**35**	**13**	**20**	**16**	**7**	**106**

Table 3: Numbers of conducted interviews with shippers

As shown in Figure 14, the interviewed companies are located well along the NSB corridor what underlines the relevance of the sample. The companies from southern part of Germany are also relevant as they show big transport volumes along the NSB corridor.

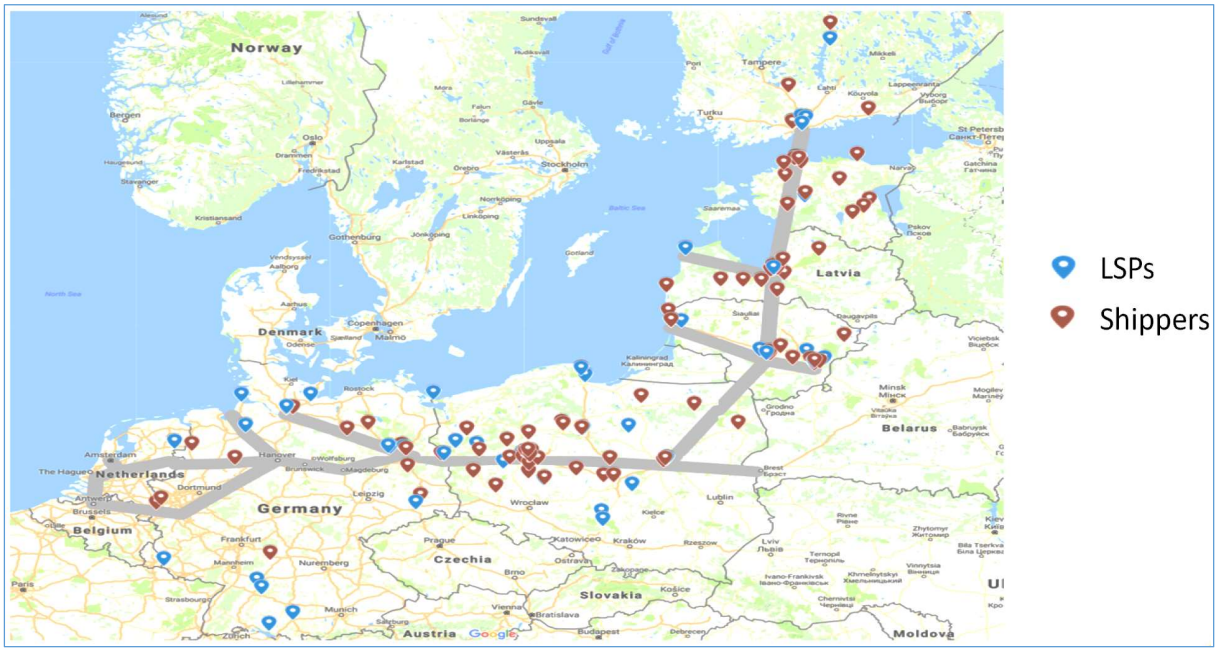

Figure 14: Location of the interviewed companies (own illustration by means of google maps)

Concerning the company size[3] of the interviewees the aim was to mainly interview larger companies as their transport volumes are higher and therefore their statements are more representative in order to derive more general conclusions from the interviews. As 37 % of the interviewed companies are medium-sized (more than 50 employees and/or more than € 10 million annual turnover) and 39 % of them are large enterprises (more than 250 employees and/or more than € 50 million annual turnover) the sample can be seen to be of good relevance to the survey. The sizes of interviewed companies are listed in Table 4.

Company size	*GER*	*POL*	*LIT*	*LAT*	*EST*	*FIN*	*TOTAL*
Micro enterprises	2	5	3	0	1	0	**11**
Small enterprises	7	14	7	14	1	0	**43**
Medium-sized enterprises	12	23	12	20	13	3	**83**
Large enterprises	11	33	7	7	16	14	**88**
TOTAL	**32**	**75**	**29**	**42**	**30**	**17**	**225**

Table 4: Size structure of interviewed companies

Shippers have also been asked for their modal split of all goods in procurement and distribution. Overall the result is as noted in Table 5. As expected there was a big dominance of road transport. The modal split has been determined as average of stated modal split shares by number of interviewed companies because many of the interviewed companies were not willing to give data concerning their transport volumes.

[3] Company sizes have been determined based on the stated numbers by the interviewees according to the thresholds defined in the SME User Guide published by the EU. Partner enterprises and linked enterprises have not been taken into account if not covered by the stated numbers in the interviews.

Transport mode	GER	POL	LIT	LAT	EST	FIN	TOTAL
Road	87	94	89	83	72	82	**84**
Rail	4	4	6	6	3	5	**5**
Water	9	1	14	8	21	13	**9**
Air	1	1	1	3	3	0	**2**

Table 5: Average modal split in % by number of interviewed companies

The numbers are not comparable to the official Eurostat statistics because Eurostat statistics are related to transport volumes and only depict the land transport. As the water transport via North Sea and Baltic Sea plays a big role especially for the interviewed shippers especially in the Baltic States and Finland we have more transport on water than in the official statistics as these only refer to inland waterways which play nearly no role in these countries. There is also a big difference in use of rail transport which has a bigger share in official statistics in each of the partner countries. In the Baltic States this could also be because of the big share of rail transport in East-West direction (along existing broad gauge rail network) whereas the interviewed shippers are chosen in a way to have big transport flows along the corridor, e.g. in North-South direction where an adequate rail network is not existing yet. The official statistics of the modal split in the partner countries are given in Table 6.

Transport mode	GER	POL	LIT	LAT	EST	FIN	TOTAL EU28
Road	65	84	65	44	67	74	**76**
Rail	24	16	35	56	33	26	**18**
Inland Waterway	11	0	0	0	0	0	**6**

Table 6: Modal split of goods land transport 2015 (Eurostat, 2017)

6 NSB CoRe corridor – 3 layers dimension

Achieving significant structural changes in the freight transport market in accordance with the recommended principle of sustainable transport development will be possible by ensuring intermodal transport **interoperability and interconnectivity**, by eliminating technical, operational and organizational bottlenecks in freight transport. Therefore, **users' needs** were examined and identified, and the analysis of **nodal points** was carried out. Because software is also a crucial component of interoperability, the usage of the **ICT solutions** have been check for their effective improvement communication and data exchange between actors in intermodal supply chains.

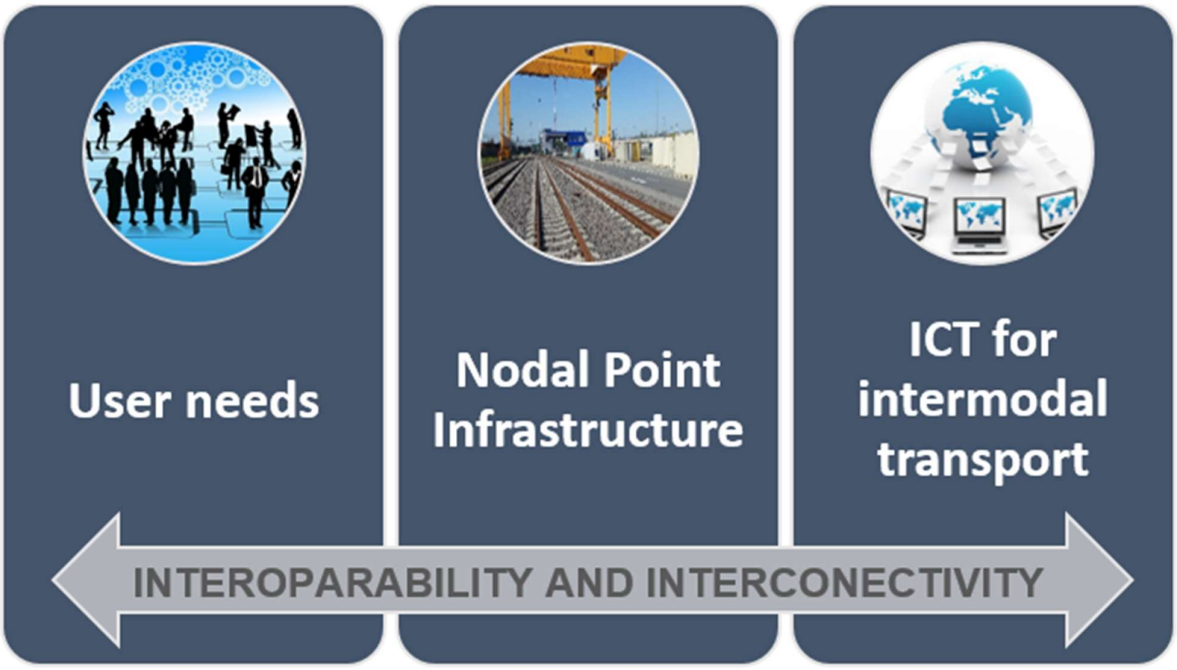

Figure 15 Interoperability and interconnectivity components

Each of the components has the same structure divided into three elements:

- state of the art analysis,
- challenges,
- recommendations.

6.1 User needs

This chapter is based on the work carried out in the activity 2.1: Logistics business requirements and networking needs. The following subchapters are the core of the research and conclusions, and the full description is included in Output 2.1.

6.1.1 State of the art analysis

Shippers and LSPs had been asked to rank the **most important barriers** to intermodal transport on a scale from 1 (low importance) to 6 (highest importance). Overall the project partners defined a number of 20 barriers which are of big importance from their point of view. But as not each barrier is important for each interviewee, the questionnaires have been split into shippers and the five kinds of LSPs. Table 7 gives an overview of the barriers and who was asked to rank which of them.

In order to make the evaluation of the barriers easier and clearer the barriers had been further categorized into the six main categories cost, transit time, security, network, resources and information. Table 7 also shows which barrier belongs to which category.

Category	Barrier	Freight forwarder	Intermodal operator	Rail carrier	Container terminal	Road carrier	Shippers
Cost	Not competitive towards road transport	X	X	X	X	X	X
	High fee for access to infrastructure		X	X	X		
Transit time	Long transit time	X	X	X	X	X	X
	Lack of reliability / schedule deviations	X	X	X	X	X	X
	Lack of flexibility						X
Security	Low security of cargo	X	X	X	X	X	X
	No track and trace service available	X	X	X	X	X	
Network	No adequate network (density)	X	X	X	X		X
	Lack of logistics centres nearby	X	X	X	X		
	No open terminals for every carrier		X	X	X		
	Different track gauge		X	X			
	Change of locomotives at borders		X	X			
	Inadequate frequency						X
	Infrastructural bottlenecks						X
Resources	Shortage of rolling stock		X	X			
	Shortage of multi system locomotives		X	X			
	Short. of qualified locomotive drivers		X	X			
	Small freight volumes						X
Information	Poor exchange of EDI messages	X	X	X	X	X	
	No information about connections	X	X	X	X	X	X

Table 7: Categorisation of barriers to intermodal transport

In general, the results of the survey show that **shippers are more critical of intermodal transport than LSPs**. As Figure 16 shows, each category of barriers has been ranked higher by the shippers. A reason for this could be that they are not as familiar to intermodal transport as LSPs are.

Furthermore, it came out that **cost are the most important barrier either for LSPs (average ranking of 3.9) or shippers (4.4)** and that security reasons as well as resources do not have as much influence on transport decisions as the other barriers for both groups.

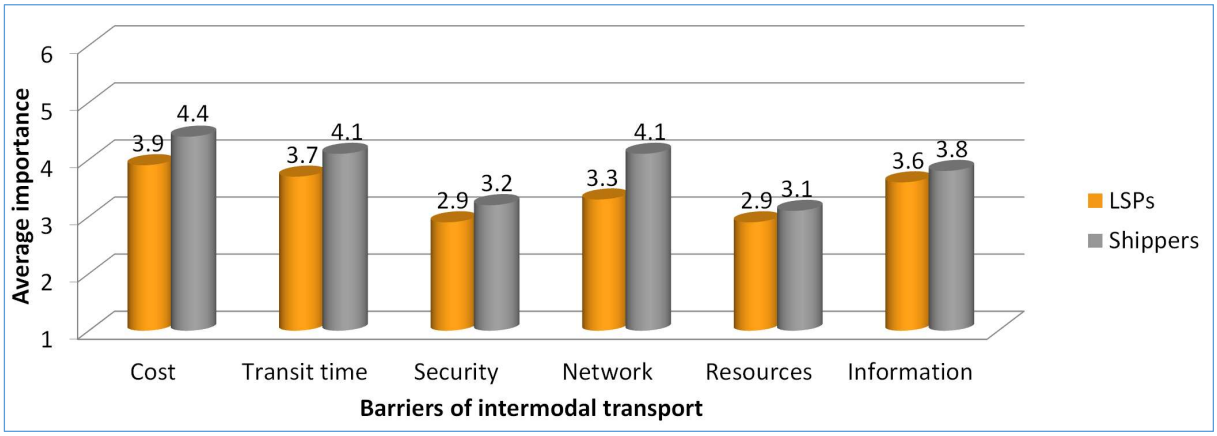

Figure 16: Importance of barriers to LSPs and shippers

Table 8 shows the average ratings of the categories of barriers of intermodal transport more detailed by the interviewees' roles in the supply chain. For each respective group of companies the most important barriers are marked red, the second most important barriers are orange and the third most important barriers are yellow. Looking more into details, we can see that only for container terminals (position 2) and road carriers (position 3) the price is not the most influencing factor. Considering that road carriers would more or less gain from higher prices of intermodal transport and the container terminals are not directly affected by increasing prices (because only their clients would suffer), this is not surprising. Although cost barriers are rated relatively high (3.7) by container terminals and road carriers the transit time is the most important barrier for them.

Barrier category	*Freight forwarder*	*Intermodal operator*	*Rail carrier*	*Container terminal*	*Road carrier*	*Shippers*
Cost	**4.2**	**4.0**	**4.0**	**3.7**	**3.7**	**4.4**
Transit time	3.7	3.0	3.1	**3.9**	**4.0**	**4.1**
Security	3.0	2.7	2.1	2.3	3.1	3.2
Network	**3.9**	**3.0**	**3.3**	2.6	---	**4.1**
Resources	---	2.8	3.0	---	---	3.1
Information	**3.8**	**3.1**	**3.6**	**3.3**	**3.7**	3.8

Table 8: Average ranking of barriers by companies' roles in the supply chain

Moreover, we can see that the transit time also plays a big role for freight forwarders (3.7) and shippers (4.1). This shows that it is crucial to offer intermodal services with compatible transit times. An efficient high speed railway infrastructure is prerequisite for this. A good intermodal network is also important especially for shippers (4.1) and freight forwarders (3.9). Looking at the detailed barriers of the network category in Table 7 we see that here also the infrastructure plays a big role as obviously the density of intermodal logistics centres and intermodal train relations are not sufficient for the target group. All in all, it is not surprising that cost, time and infrastructure are among the most important barriers of intermodal transport.

A more interesting result is the importance of information aspects. A separate analysis of the 2 under information grouped barriers "poor exchange of EDI messages" and "no information about intermodal connections" reveals that the latter is especially a problem for freight forwarders (4.0), road carriers (3.8) and shippers (3.8). These target groups need more information about the possibilities that

intermodal transport offers to them. The other target groups being definitely already active in intermodal transport have, of course, sufficient knowledge about it. Concerning the exchange of EDI messages only the intermodal operators have ranked this barrier relatively moderate (3.0). On the other side freight forwarders (4.0), rail carriers (4.1), container terminals (3.8) as well as road carriers (3.8) see substantial problems in this field.[4]

LSPs	GER	POL	LIT	LAT	EST	FIN
Cost	3.9	4.1	3.9	3.3	4.6	3.9
Transit time	3.8	4.0	4.1	2.9	3.6	3.7
Security	3.5	3.0	3.1	2.2	2.6	2.5
Network	3.5	3.3	2.8	3.1	4.1	3.6
Resources	2.4	3.0	2.8	2.3	5.7	---
Information	4.1	4.0	3.5	3.3	3.0	3.3

Table 9: LSPs' ranking of barriers by country

Shippers	GER	POL	LIT	LAT	EST	FIN
Cost	4.1	4.3	5.2	4.6	3.8	4.6
Transit time	4.3	4.1	4.6	3.8	3.9	4.0
Security	2.9	2.7	4.2	3.7	3.1	2.4
Network	4.6	4.2	4.4	3.5	4.3	3.0
Resources	2.7	3.3	4.7	3.2	2.5	1.4
Information	4.1	3.6	4.5	4.7	2.9	3.0

Table 10: Shippers' ranking of barriers by country

The results of the barriers ranking for each partner country are illustrated in Table 9 (for LSPs) and Table 10 (for shippers). In most cases, the tendencies are in line with the average rankings across all countries. Here, we will look at the most noticeable deviations. The high ranking of the resources by Estonian LSPs (5.7) is likely resulting from the small sample of only 3 LSPs (2 rail carriers and 1 container terminal) which have been asked about the resources.[5] In Finland neither rail carriers nor container terminals could have been interviewed. On the other hand the quite low ranking of resources by the shippers from Finland (1.4) is due to the fact that exclusively large enterprises were among interviewed shippers in Finland who have no problems getting a critical volume of goods for using intermodal transport. Another remarkable ranking is that for the cost barrier by Lithuanian shippers (5.2). On one hand the Lithuanian road transport has very attractive prices so that it is convenient for shippers to use this transport mode. On the other hand we can see from Table 10 that Lithuanian shippers are very critical towards each category of barriers of intermodal transport. This can also be seen when we compare the Lithuanian shippers' ranking of the overall low rated categories security (4.2) and resources (4.7) to the other countries. In contrast, we can see from Table 9 that Latvian LSPs are less critical over all categories.

Shippers did also have the chance to note further barriers that are not given in their questionnaire. The most frequently (five times) mentioned barriers have to do with last mile or door-to-door solutions. Some shippers simply have a lack of information about these solutions and do not know how to get the goods from the container terminal to their facilities. Some stated that the cost for the last mile additionally necessary handlings in case they have no own rail access would be too expensive. Further four shippers stated that their industry and the used types of cargo are not suitable for intermodal transport or that their whole manufacturing process would need to be changed if they want to use rail transport. These shippers are active in the fields of wood and metal industries. Another four shippers complained about missing or inadequate access of intermodal transport to hinterland and peripheral regions.

[4] In activity 2.3 "ICT solutions for intermodal transport" of the NSB CoRe project this issue will be considered deeper.
[5] cf. Table 2 in conjunction with Table 7

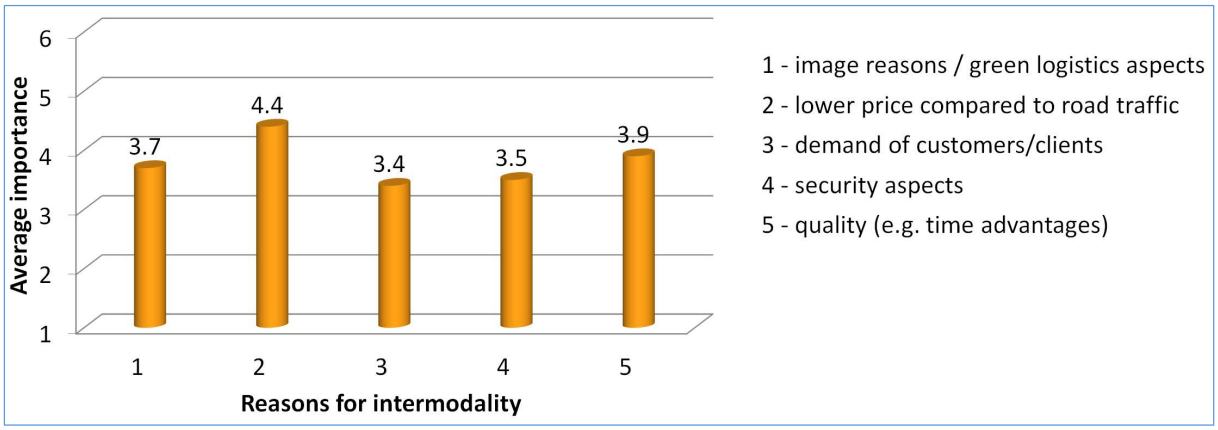

Figure 17: Importance of advantages of intermodal transport to shippers

In addition to the barriers, shippers have been asked to rank also some advantages of intermodal transport. The results are given in Figure 17. It can be seen that the price is by far the most important advantage. So all together the price is the most striking argument for or against intermodal transport. If the price is compatible to road transport prices companies will also use more rail transport. The quality and time is the second most important reason for shippers to use intermodal transport. As time is also ranked 2nd in barriers this shows again the importance of a good quality and service in intermodal transport. Interesting is also that image reasons or green logistics aspects are ranked relatively high (3.7). The reasons stated under the open question for other barriers take the same line: Time savings on rail due to the bad condition of the partly overcrowded road infrastructure had been mentioned most (four times). At least three shippers noted social responsibility or sustainability aspects to be also important things to consider.

Moreover, there had been some open / qualitative questions in the survey. Shippers have been asked what needs to be changed to shift more goods from road to combined transport, especially on future Rail Baltica. The results are given below, the number in brackets shows how often measures have been mentioned (multiple answers had been possible):

- Improve competitiveness in terms of prices / subsidisation (17)
- More flexibility / higher frequency of connections (17)
- Improve shipping times and handling times in terminals (16)
- More / better (local/inland) terminals and logistic centres with warehouse capacities (12)
- Improvement of access and infrastructure (10)
- Quality / services / better solutions for special goods and loading units / side loading of containers (9)
- Paucity of information: Improve awareness for the alternatives of combined transport also in terms of sustainability / More transparent information / lack of public information on Rail Baltica (8)

On the other side, LSPs have been asked about main trends and the future conditions of success and threats of intermodal transport, especially linking the markets of Western Europe with the Baltic States. The main results are as follows:

Trends:

- Intensive development of new transport corridors (Silk Road etc.)
- More types of services (swap bodies, trailers, piggyback, 45‘ containers)

Conditions of success:

- Improvement of terminal networks
- Effective EU transport policies

Possible threats:

- Lack of competitiveness due to very low rates in road transport
- Volume business is vulnerable for price fluctuations
- Self-driving trucks

Full analysis available in 2.1.2 Logistics requirement of shippers and their commitment for intermodal supply chains on NSB CoRe corridor (Output 2.1).

6.1.2 Challenges

Respondents, regardless of the nature of their activity, to the main barriers hindering the development of intermodal transport (though not as strongly as initially assumed) included:

- **high operating costs (including those related to the use of railway infrastructure),**
- **too long delivery time**.

Only in the case of the assessment of the importance of the underdeveloped network of inland container terminals was it noted that the opinions of the respondents are quite diversified depending on the type of business. It turns out that the above factors is a much more important development barrier for road hauliers and forwarders than for container terminal managers. It can be assumed that in the case of terminals there is a fear that the further development of point infrastructure (adding new locations) will lead to the appearance of alternative cooperation offers on the market, which will significantly exacerbate the current fight for the client.

In the light of the above, it is worth pointing out some additional weaknesses, which obviously limit the development potential of this market. We are talking here about both a small number of carriers who specialize in this type of service, as well as about the aforementioned high costs of their provision, especially in comparison to road transport. These two factors seem to be particularly important if we take into account the concerns raised by the Shippers themselves.

The study shows, that **the most important factors determining the use of intermodal transport are price competitiveness and delivery time as well as well-developed infrastructure**. These results provide clear guidance to stakeholders, which should be taken into account if the new infrastructure should be used to a large extent.

6.1.3 Recommendations

The competitive conditions for road and rail transport should be harmonized to facilitate the transition from road to rail. In addition, it is important to provide uncomplicated access to infrastructure for

potential users, such as consignor and logistics service providers. This could be facilitated by competitive infrastructure charges and financial support for intermodal transport and access points (Rail Road Terminals). As the Rail Baltica route crosses several national borders (in the case of intermodal transport) over relatively short distances, it is **inevitable to ensure interoperability between different national transport systems** in order to increase reliability and time benefits. **Lack of interoperability at border stations leads to a loss of time and unfavourable conditions of competition**.

Another important aspect is the **improvement of information flow in several directions**. On the one hand, it turned out that Shippers have no knowledge about intermodal transport. In particular, many of them do not know about specific train schedules and opportunities to overcome the first / last mile and door-to-door solutions. This can be improved by marketing activities of LSP or other intermodal transport stakeholders.

6.2 Nodal Point Infrastructure

This chapter is based on the work carried out in the activity 2.2: Nodal point infrastructure analysis. The following subchapters are the core of the research and conclusions, and the full description is included in Output 2.2.

6.2.1 State of the art analysis

The comparative analysis included 24 container terminals located in 6 Baltic states that belong to the North Sea Baltic Corridor: Germany, Poland, Lithuania, Latvia, Estonia and Finland. The terminals have been marked red on the map.

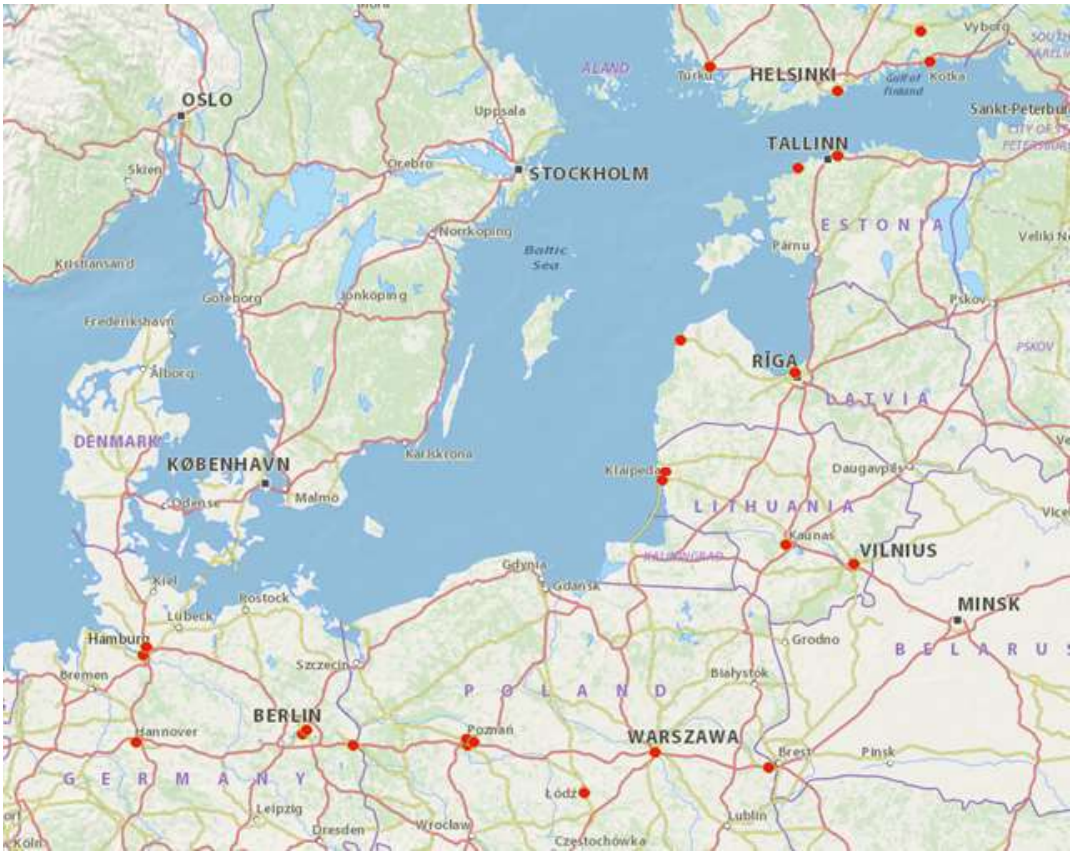

Figure 18: Location of analysed container terminals on a map, ILIM's study based on a Viamichelin map

The selection of terminals for analysis was based on the "Nodal point infrastructure analysis as is analysis report", Activity 2.2.1, and on remarks of NSB CoRe project partners. There are six terminals in Germany, six in Poland, four in Finland, four in Lithuania, two in Latvia and two in Estonia. The following table presents a list of locations with names of specific container terminals. The first column provides the country in which the terminal is located. The remaining columns include information such as the city, the name of the terminal and whether the terminal is a part of the North Sea Baltic transport corridor.

Country	Location	Name	NSB CoRe
Germany	Berlin Großbeeren	GVZ Berlin Großbeeren	yes/no
	Berlin	Berlin Westhafen	yes
	Frankfurt/ Oder	Terminal Frankfurt (Oder)	yes
	Hannover	Hannover CTH - Nordhafen	yes
	Hamburg	DUSS-Terminal Hamburg-Billwerder	yes
	Hamburg	Hamburg Container Terminal Altenwerder CTA	yes
Poland	Gądki	POLZUG INTERMODAL POLSKA Sp. z o.o. HUB Terminal Poznań	yes
	Swarzędz	CLIP Terminal	yes
	Małaszewicze	Małaszewicze Logistics Center	yes
	Poznań	Franowo Container Terminal	yes

	Warsaw	Terminal Kontenerowy Warszawa	yes
	Łódź	Spedcont Łódź	yes
Lithuania	Kaunas	Kaunas Intermodal Terminal	yes
	Vilnius	Vilnius Intermodal Terminal	yes
	Klaipeda	Klaipeda Container Terminal (KKT)	yes
	Klaipeda	Klaipedos Smelte (MSC)	yes
Latvia	Ventspils	Noord Natie Ventspils Terminals	yes
	Riga	SIA Baltic Container Terminal	yes
Estonia	Harju / Tallin	Muuga Container Terminal	yes
	Paldiski	Paldiski South Harbour - Esteve Terminal AS	no
Finland	Kouvola	Cargo East Terminal (CET) Kouvola	no
	Helsinki	Vuosaari Container Terminal	yes
	Kotka	Mussalo Container Terminal-Kotka	no
	Turku	Turku Container Terminal	no

Table 11 List of analysed container terminals (NSB CoRe study 2.2)

Analysis of container terminals within the NSB CoRe corridor was based on predefined indicators and criteria for assessing the infrastructure of reloading nodes prepared as part of executing Activity 2.2.3 it was clustered under three aspects: infrastructure and equipment, operation, and logistics services and quality.

The infrastructure and equipment aspect were considered by looking at the following KPIs: accessibility, proximity to the market, terminal area, storage capacity, truck parking spaces, cranes and rail tracks. The operation aspect was considered by looking at the following KPIs: emissions, opening hours, utilisation rate, terminal capacity, service frequency and production system, and further important KPIs for terminal operation. The last aspect of logistics services and quality was considered by looking at the following KPIs: safety and security standards, value-added services, staff qualification, and further important KPIs for logistics services and quality. When an intermodal terminal is linked to a sea port, the KPI 'accessibility' can also be described as 'intermodal connectivity indicator'.

Storage capacity (m^2 and or Twenty Foot Equivalent Unit (TEU)) - Available for reefer (yes / no or number of reefer plugs available) - Dangerous Goods (DG) cargo (yes / no, or number of possible TEUs to be stored)	Transhipment volume / throughput of Intermodal Transport Units (ITUs) or TEUs
Number or rail tracks[*1.3] - Length of tracks in meter - Track gauge (EU-, wide-, small-standard)	Number of buffer tracks[*1.5]
Terminal productivity	Utilisation rate
Cranes[*1.4] - Number available - Crane load possible (weight in tons or kg) - Average crane rate (moves per hour) - Average movement time / distance between yards and crane	Transhipment cost per ITU
Total terminal cost per ITU	Truck area in meter or m^2 - For waiting[*1.2,1.8] - Gate-in / gate-out (Considering "Lang-LKW", Euro- and Semitrailer?)
Driving / waiting time ratio (minutes)	Emission per ITU[*2.2]
Energy use per ITU or tkm[*2.2]	Noise emission (acceptability of terminal / terminal expansion)[*2.2]

Table 12 Quantitative Indicators (*comment link to *(Corridor, Rail Baltica Growth, 2013, S. 6-7)*) (HHM, 2017)

Due to the limited possibility to obtain data for the analysis (only one terminal agreed to provide access to detailed data), the terminals were compared on the basic of publicly available data published on the Internet.

This subchapter include description of researched terminals and KPI factors, and full benchmarking analysis of nodal points is presented in report 2.2.4 Nodal Points benchmarking analysis.

6.2.2 Challenges

Intermodal terminals have so far been built, which is well-understood, in places with large flows of cargo. Intermodal transport operators carried out a number of investments, which secured their current needs, but led to the fragmentation and, at the same time, consolidation of terminal infrastructure only in several most industrialised places in our part of Europe. Some of the terminals were built as provisional places for loading and unloading of intermodal units. Their quality does meet European standards. Terminals most frequently have short tracks and small, poor-quality storage yards. An element integrating the activity of terminals should be a network of cooperating intermodal terminals covering the entire North Sea Baltic transport corridor.

As a result of considerations and analyses, **the following conclusions have been formulated**:

- Half of analysed terminals have no access to a river or sea, and their growth depends to a large degree on the development of land infrastructure.
- The majority of terminals is available 24 hours a day or provide for a possibility to be available 24 hours a days after prior arrangements.
- Most of the terminals have capacity for expansion.
- Access to electrified tracks is poor, but there are plans the provide for their electrification.
- Storage capacity and cargo handling capacity are quite diversified. Prevalent capacity is 1000-2000 TEU, and prevalent cargo handling capacity is 50-100 thousand TEU.
- Terminals provide a broad variety of additional services, most of them being able to handle dangerous goods and reefers.
- The NSB CoRe corridor intermodal hubs have been built in different years and are also very diverse in terms of surface area, handling capacity, technical condition and technology
- Intermodal terminals have so far been built in uncoordinated manner, in places where large streams of cargo occur (the case of Poland).
- The growth of intermodal traffic is possible provided that there is an efficient and coordinated transport infrastructure, both linear (Rail Baltica) and points infrastructure - container terminal
- There is a need for an integrated and coordinated strategy for terminal development not on the local level but on the level of the entire corridor.
- Key elements that are important for intermodal transport development along the NSB corridor include the improvement of terminal networks through open access, digitalisation of exchanged information and cooperation between intermodal operators.

6.2.3 Recommendations

Container terminals within the NSB CoRe corridor should aim at the optimisation of transport and maximum effectiveness by **creating dynamic changes in the sector, in order to be able to serve an increased number of ships, trains and lorries**. Execution of investment projects related to areas such as dredging quays, purchasing equipment making it possible to serve units with greater capacity and improving reloading processes is a necessary step. **Sustainable management of the growth of container terminals located in ports and in inland areas, as well as the development of rail infrastructure, are of key significance**. Container carriers may push the terminals unable to keep up with current trends to the sidelines. It should also be borne in mind that **contemporary container terminals are not just infrastructure and equipment, but that they also involve automation and information technology**. **Tendencies** related to the development of the reloading system observed in container terminals **are directed mainly towards improving processes, their automation and streamlining the exchange of information**.

6.3 ICT for intermodal transport

This chapter is based on the work carried out in the activity 2.3: ICT solutions for intermodal transport. The following subchapters are the core of the research and conclusions, and the full description is included in Output 2.3.

6.3.1 State of the art analysis

The transport market is very dynamic and increased competition in the market requires the companies to search for innovative solutions to support the supply chain and increase the level of customer service as a value-added service to the customer and differentiation possibility. The customer requirements (e.g. shipper's requirements) are increasing – along with technological progress and complexity of supply chains in a globalised world. **Information and Communication Technologies (ICT) tools support the communication between the stakeholders of a supply chain** and can constitute a barrier, but also an opportunity for intermodal transport development. Therefore, an analysis of existing ICT solutions supporting intermodal transport was carried out and the level usage of ICT tools to support decision making in transport, Frequency of offering truck & trace services and level of satisfaction with the exchange of information between supply chain participans.

Use of ICT tools to support decision making in transport

Respondents answering a question related to the use of ICT tools supporting the decision-making process related to transport, had the opportunity to choose one of three answers:

- YES,
- YES-con (applicable to container transport),

- NO.

The questions that the respondents answered were dependent on the nature of their business.

The figure presents the questions to which **freight forwarders** responded with the percentage contribution of each of the selected answers. The test results are characterized by a low degree of diversity. About half of the respondents confirmed that they use ICT tools for cooperation with other LSP at ports (Port Community System), consolidation from shipments, and presenting own services (data bases of delivery planning tools), (freight exchange). Most often, ICT tools are used by the freight forwarder to collecting orders form the marker by own page more than 70% and by freight exchange more than 60%.

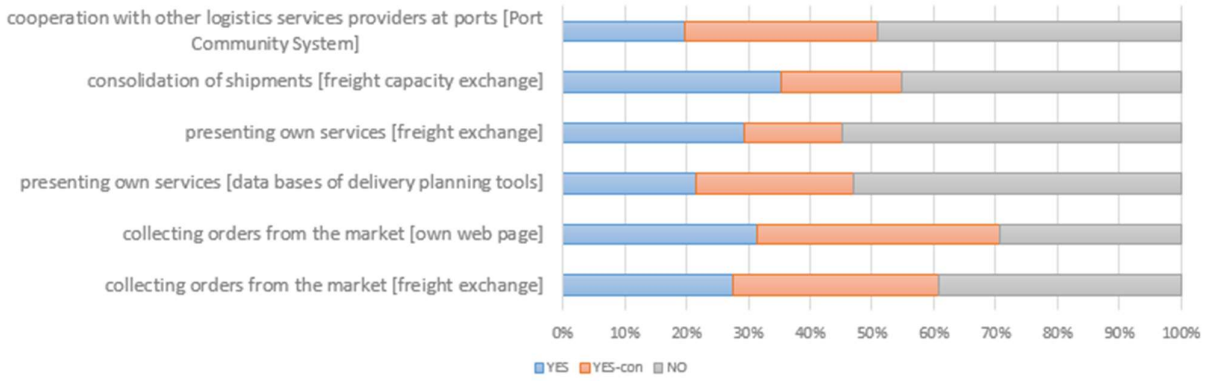

Figure 19 – Usage of ICT tools by freight forwarder (NSB CoRe study 2.3)

The figure below presents the questions to which **intermodal operators** responded together with the percentage share of each of the selected responses. The test results are characterized by an average degree of differentiation. About half of the respondents confirmed that they use ICT tools for cooperation with other LSP at sea ports (Port Community System), consolidation of shipments. Most often, ICT tools are used to presenting own services (data bases of delivery planning tools) more than 70%, collecting orders form the marker by own page also more than 70% and by freight exchange more than 60%. The least is, however to presenting own services (freight exchange), about 35% responders chose that answer.

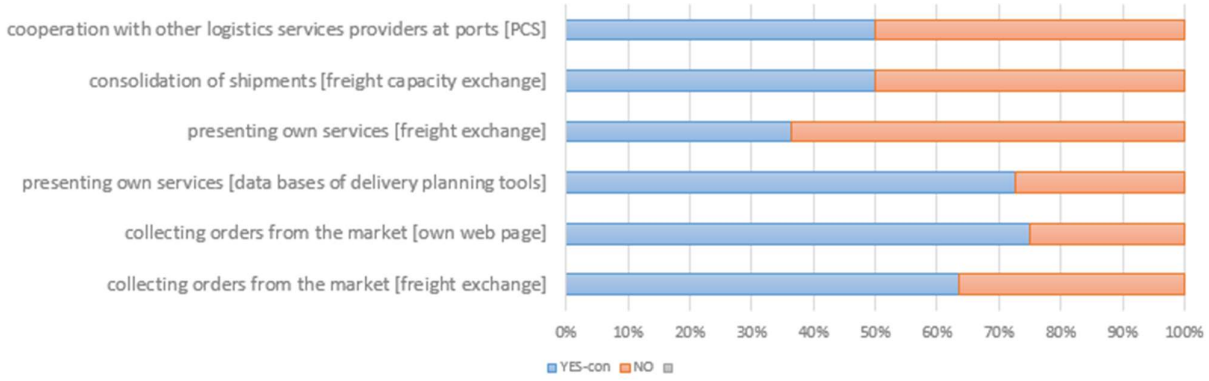

Figure 20 – Usage of ICT tools by intermodal operator (NSB CoRe study 2.3)

The next figure presents the questions on which **railway carriers** responded, together with the percentage share, of each of the selected responses. The test results are characterized by a low degree of differentiation. It is worth noting a very high percentage of using ICT tools to support decisions related to the implementation of the transport process. Almost 75% -88% of respondents gave an affirmative answer to all questions.

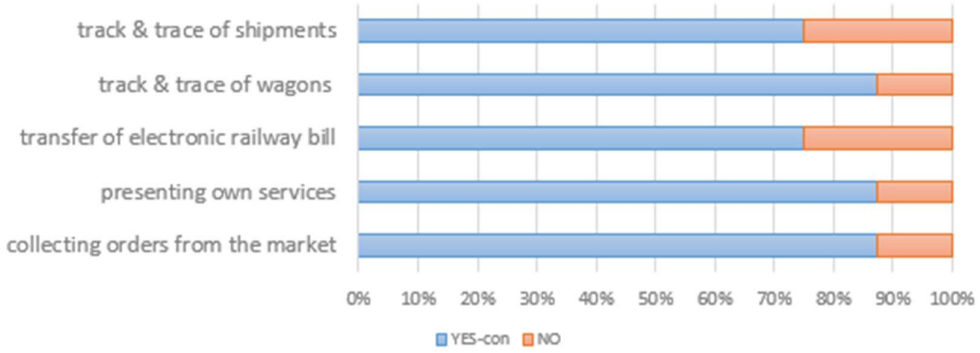

Figure 21 – Usage of ICT tools by rail carrier (NSB CoRe study 2.3)

The figure below presents the questions to which representatives of **container terminals** responded, with the percentage share, of each of the selected answers. The test results are characterized by a low degree of differentiation. About 75% of the respondents indicated that they use ICT tools to cooperation with other logistics services providers at ports [Logistics info exchange (e.g. electronic messages and documents)] and presenting own services. For all other questions about 55% of respondents made the answer in the affirmative.

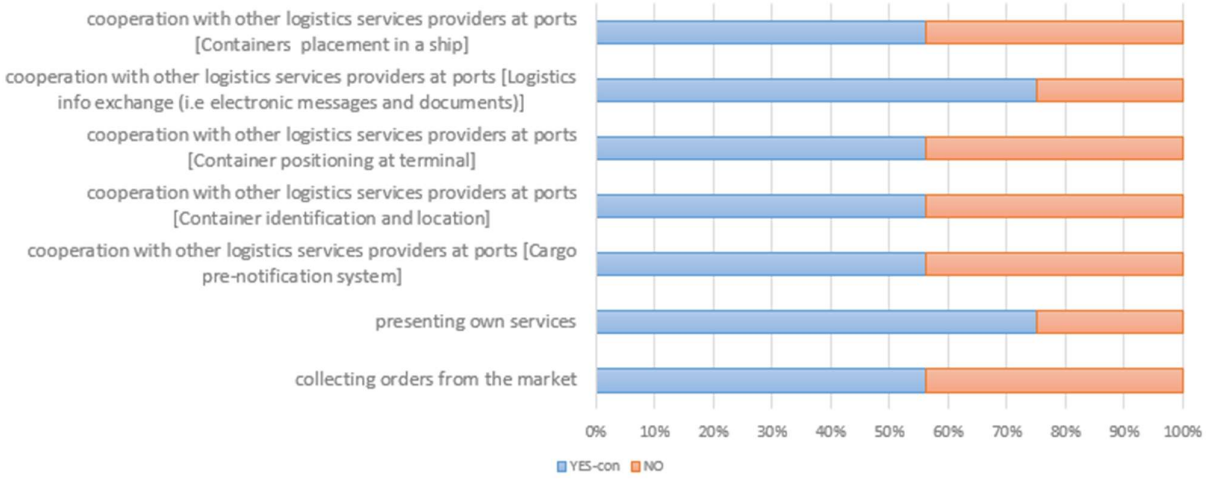

Figure 22 – Usage of ICT tools by container terminal (NSB CoRe study 2.3)

In the conducted research, it can be noted that respondents show frequent use of ICT tools to support decision-making processes related to transport. To the greatest extent, as much as around 80% in the case of a railway carrier, while the responses given by the remaining respondents are characterized by diversification ranging from approx. 35% - 90% with a majority of responses above 50%.

Frequency of offering truck & trace services

The question regarding the offer of cargo tracking service during the delivery was given to respondents representing freight forwarders and intermodal operators. The forwarders responded to three questions, while intermodal operators responded to one query, with the option of choosing one of two answers: YES, NO.

In most cases, the parcel tracking service is offered by the forwarding agent on the section realized via road transport over 80% of cases, and less often on the section carried out by railway transport - less than 50%. The figure below shows the full juxtaposition.

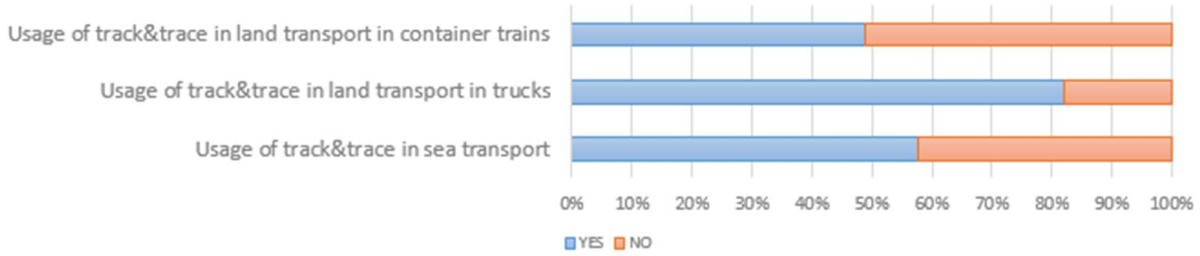

Figure 23 – Frequency of offering truck & trace services by freight forwarder (NSB CoRe study 2.3)

The graph below shows the frequency of the intermodal operator's ability to track the load to its clients, 57% of respondents confirmed the availability of this service.

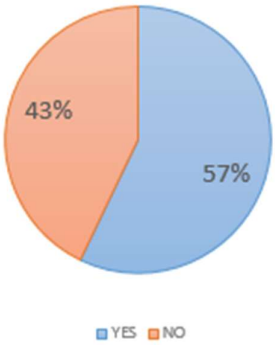

Figure 24 – Frequency of offering truck & trace services by intermodal operator (NSB CoRe study 2.3)

6.3.2 Challenges

In the conducted research, it can be noted that respondents show frequent use of ICT tools to support decision-making processes related to transport. To the greatest extent, as much as around 80% in the case of a railway carrier, while the responses given by the remaining respondents are characterized by diversification ranging from approx. 35% - 90% with a majority of responses above 50%.

In most cases, the parcel tracking service is offered by the forwarding agent on the leg realized via road transport over 80% of cases, and less often on the leg carried out by railway transport - less

than 50%. On the other hand intermodal operator offer track & trace service in 57%, given the increasing importance of integration and information circulation in supply chains, this is far too little, customers now expect this service to be fully accessible. Shippers want to be able to track their cargo in real time.

In the survey assessing the level of satisfaction with electronic data exchange, the participants of the supply chain (freight forwarder, container terminal, intermodal operator, rail carrier, road carrier) assessed the communication between them as unsatisfactory or non-existent in 11 cases, but only in 3 cases as satisfactory. In 4 cases, half of the respondents rated the data exchange positively, the other half rated it as unsatisfactory or non-exist. The survey results showed that the expectations of participants in intermodal supply chains with regard to electronic data exchange are not fulfilled and this area needs to be improved.

6.3.3 Recommendations

The efficiency and reliability of logistics processes of supply, production and distribution to a large stage depend on the speed and efficiency of information processing, which nowadays is determined primarily by the possibilities of modern IT technology.

It's important that individual links in the supply chain are characterized by a high level of integration. This significantly influences the application possibilities of the chosen technology and facilitating contacts with business partners and clients. The development of new distribution channels and the creation of products along with the development of ICT technologies are becoming the driving force for creating more and more effective innovative solutions, thus determining comprehensive approaches to supply chain management. **Increasing number of ICT tools providers, should be focus on offering, complex solutions, that allow efficient data exchange, and process integration, not only inside the enterprise, but also between members of the supply chain**. Actual many solutions are offered in the cloud, or with using electronic data exchange platforms. It's also important, that the software, need to be customize to user needs, and use of it, should be user friendly.

7 Business context and future outlook

As part of the work carried out during the NSB CoRe project, in each of the partner countries a **roundtable meeting** has been conducted. The overall structure of the meetings was mainly similar, but with some regional specialties in each country. Following some welcoming words the NSB CoRe project with its structure and aims was explained. Afterwards, the current status of Rail Baltica development was presented (by a member of RB Rail in most cases) as well as the results of the interviews with shippers and LSPs. After these introductions there was time for discussions and further remarks and wishes by the participants. The roundtable meetings served as feedback occasion and for validating purposes.

Figure 25 Roundtable Meeting in Munich, Germany

Figure 26 Roundtable Meeting in Riga, Latvia

The stakeholders identified the development and modernisation of **Rail Baltica** railway infrastructure as a key element in the context of the constant growth of intermodal transport volume in the BSR. The new railway between the Baltic Sea countries and the EU will have a positive impact on the sustainable development of the entire Central and Eastern Europe region and will positively influence the growth of Polish exports. They also have pointed out that it is **important to create a interconnectivity and interoperability rail system connecting Central and Eastern Europe with Scandinavia, CIS countries and China (via Silk Road)**, which will contribute to the creation of new industrial zones and communication nodes and will affect the development of distribution centres in national markets. It will also create conditions for the emergence of new business opportunities, such as the construction of an international hub for products imported from China via Silk Road in Poland. The positive impact of the investment on the environment, in particular as an alternative to existing road transport connections, has also been noticed.

Concerning the effect of the **New Silk Road** project it was underlined that **Poland is an attractive place for locating European hubs for products imported from China by land**, both due to geographical conditions (central location in Europe, accessibility to the Baltic Sea) as well as political conditions (neighbouring with Germany and other countries or be the external border of the European Union).

Especially that China's investments in Europe and the BSR will grow in the future and already have a significant impact on the development of intermodal transport as well as port activities, shipping and maritime industry. China's Belt and Road initiative and the Sino-Russian economic rapprochement open new perspectives to BSR countries in terms of transport connectivity and trade with Eastern Europe, Central Asia, and China. This is a special condition that opens up many

opportunities for countries along the NSB corridor. Therefore cities and regions of the NSB corridor should develop the rail connectivity between container terminals, taking care of the consistent development of nodal points. Railway networks, and the European core markets can also increase significantly their long-term competitive advantage. China and BSR countries share common goals in terms of innovation policy, which opens the way to research collaboration in priority areas for a sustainable economic development in the Baltic Sea region such as climate change, clean energy, clean shipping, networked and efficient logistics clusters, sustainable forest management and exploitation of marine resources.

Baltic States should take advantage of their geographic position at the crossroad between two major axes of communication: between Russia and Western Europe (North Sea - Baltic Corridor), and between Northern and Southern Europe (Baltic- Adriatic Corridor). But this requires the continuation of work on activities that affect the routing of the New Silk Road, that may limit the benefits of the geographical location of the Baltic countries, such as bottlenecks resulting from the lack of adequate infrastructure.

Meetings with business representatives bring many benefits, enable the transfer of knowledge, but also receive information which is important for enterprises to make intermodal supply chains attractive for them, further dissemination of knowledge in this way is recommended.

8 Summary

The transport sector is a key contributor to the economy in the European Union and with 11 million jobs in Europe a key sector that adds a gross overall value of 4.8 per cent, or € 548 billion, for the 28 EU countries. The sector is furthermore essential for the integration process and for the achievement of an internal market, providing economic growth and jobs. The 'Roadmap to a Single European Transport Area' outlines the goals for a **competitive and resource efficient transport system**. On the other hand, the transport sector is responsible for almost 25 per cent of Europe's GHG emissions and having increased the emissions – rather than reduced them in comparison to 1990. Naturally this is also due to the increased demand for transportation. This development, on the contrary, underlines the importance of a sustainable transport mode modal shift and the necessity for the greening of transportation.

The European Commission has paved the way towards a **'Single European Railway Area'**. With the legislative measures of 'railway packages', the creation of 'Rail Freight Corridors' that are corresponding to the TEN-T network, and the provision of various funding sources things have come a long way. However, there is still room for improvement to further the competitiveness and development of more efficient and up-to-date solutions to promote the railway sector and with that the intermodal transport sector. The alignment of these rail freight corridors to the TEN-T network ought to establish interconnectivity and interoperability. This can only be reached through the expansion of capacity through the removal of bottlenecks and bridging the still missing infrastructure links. The objective to complete the core network by 2030 and the comprehensive network by 2050 is complex, both financially and organisationally wise.

The activities undertaken in the 'NSB CoRe' project are co-financed through one of the Interregional Programme arms of the 'European Territorial Cooperation', which in turn is funded by the 'European Regional Development Fund' and part of the European Union Cohesion Policy. The project partners stress the importance of such funds and the cross-border cooperation to further the necessary progress in **intermodality, interoperability and sustainable transport and mobility** as such in Europe. There is no doubt that there is still some work to be done and where these kinds of projects have great added-value to help the European Commission and the Member States to fulfil their endeavour to reach the goals set by 2050. However, the current multiannual financial framework period is coming to an end and the United Kingdom's departure from the European Union is imminent. This provides the opportunity to modernise a framework that has been in place since 1998 on the one hand, but also leaves a 'hole' in the budget due to less funds available from now 27 instead of the previous 28 Member States.

The dissemination to the relevant stakeholders of the progress in intermodal transport and on the existing gaps remaining, is important. **Persuasive efforts and lobbying are necessary in various areas in intermodal transportation**. One of the most important areas for a single European railway network is that of data sharing. The 'chicken and egg' problem has been discussed for quite some time, but still hinders investments and cooperation between stakeholders. It furthermore also hinders the efficiency of intermodal logistics chains, as the tracing of cargo is not possible throughout the entire logistics chain within the customers' supply chain. A one-stop-shop offer development, which is currently offered in a fragmented manner for the differing transport modes at best, is also curbed through this. Another area of importance is the need **to raise awareness of railway infrastructure undertakings**. The long-term added-value to the general public and a region are often not well

known and on the business side a potential may not be seen as the focus of businesses is in the present, whilst the focus of major infrastructure projects is in the future.

'**Rail Baltica'** is a great example. **There is a huge potential for cargo flows**, however the works are not expected to be finished before the end of the next decade. 2030 is too far away for businesses. They focus on now and what business development they can drive in what direction. It is therefore important to foster the discussion, awareness and open-mindedness of all stakeholders involved and those who might use the infrastructure in the future. Bigger flexibility through an updated 'Combined Transport Directive' and more dissemination will be one element for a more sustainable transport sector. Another element will be progress made by the rail freight corridors, their cooperation and research and innovation coming from cooperation projects such as Shift2Rail and its examples of innovation that drive the competitiveness of intermodal / multimodal transportation compared to other modes of transport. The Shift2Rail 'playground' involves areas that can also be used for intermodal transportation. 'Cooperative-Intelligent Transport Systems', 'Internet of Things' and 'Big Data' are topics that are applicable to all modes of transport and can unfold even more potential when utilised in intermodal or multimodal transport. One other digitalisation potential that is transport mode overarching is the utilisation of e-documents in transportation.

The implementation of the 'Rail Baltica' will then ensure this advancement in rail infrastructure to be taken along the North Sea-Baltic Corridor up to the northern end of North Sea – Baltic Corridor. Furthermore, this infrastructure project will also ensure the interoperability of the railway network with the TEN-T and 'Rail Freight Corridors' and the utilisation of the 1435 mm railway gauge. Whilst most intermodal terminals will have to split these longer trains to handle them or extend the terminal rail infrastructure. The new terminals within the 'Rail Baltica' however, are constructed under the consideration of such longer trains and the Kaunas terminal even offers the connection of the European gauge with the Russian gauge. This will have the positive effect of being able to build upon the efforts between the European Union and China to foster the cooperation and implementation of the Eurasian Land Bridge and the **'Belt and Road Initiative'**. As a result additional routings of the cargo, aside from the currently mostly used Malaszewicze routing will be added. The 'Rail Baltica' will also create the infrastructure under the consideration of the 'European Railway Traffic Management System' and with that backing onto the efforts by Belgium, the Netherlands, Germany and Poland to provide ERTMS operation within the 'North Sea – Baltic Corridor.

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10 Appendix – WP2 Leaflet

Intermodal Logistics along the North Sea – Baltic Corridor

This leaflet provides an overview of the activities carried out within the Work Package (WP) 2 of the Interreg Baltic Sea Region Project “North Sea Baltic – Connector of Regions” (NSB CoRe). The intermodal logistics activities were part of the overall project effort to enhance regional development in the north-eastern Baltic Sea Region by improving the internal and external accessibility of the region along the North Sea Baltic TEN-T corridor.

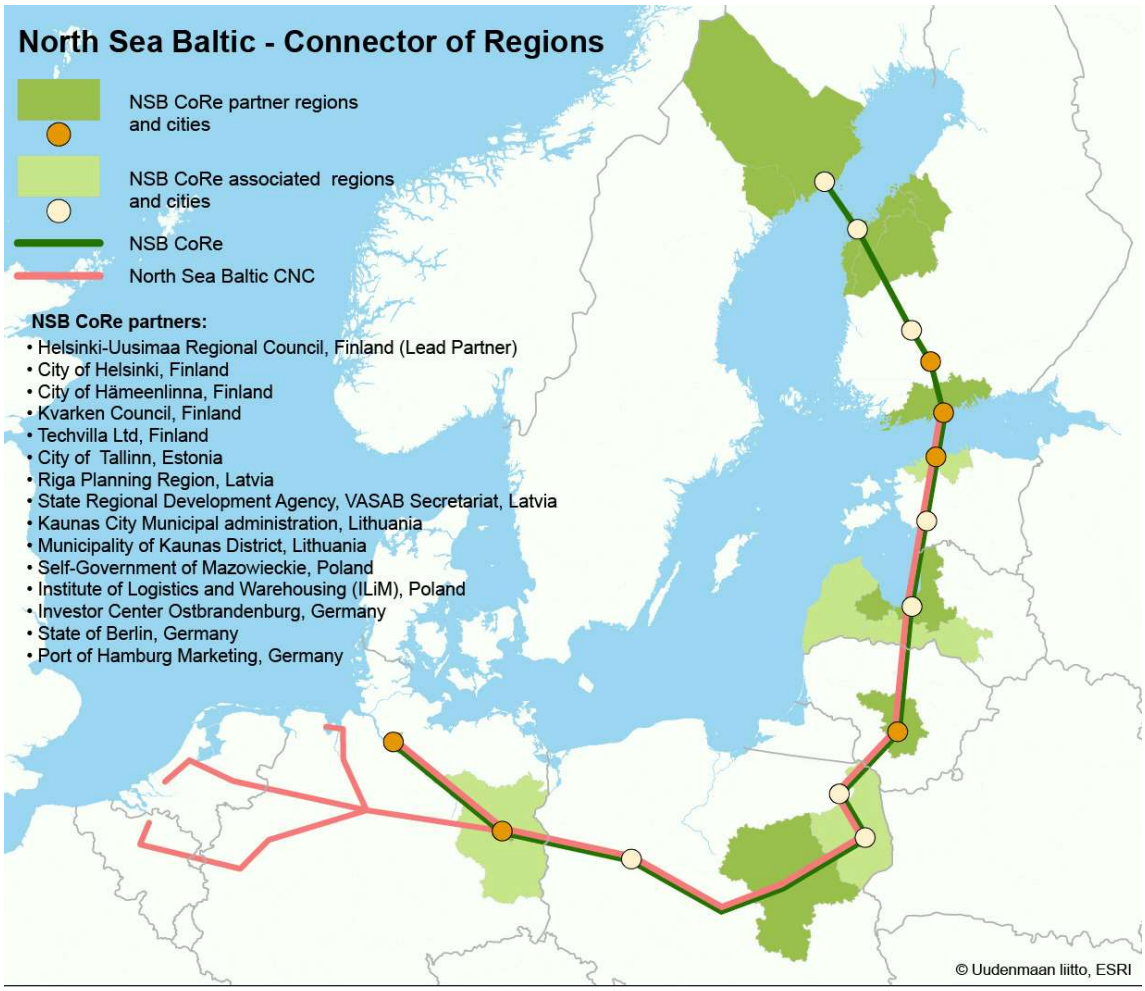

Figure 27: ‘NSB Core’ partner- and associated regions and cities along the North Sea Baltic Corridor

The activities within the WP 2 consider: logistics business requirements and networking needs, the nodal point infrastructure, and Information and Communication Technology (ICT) solutions for intermodal transport. This enabled the project to gather background knowledge and building up initial conditions for project's demonstration, evaluation and knowledge sharing activities, stronger networks between stakeholders and to make them work together regarding specific challenges.

Policy Background

The EU has the vision of a 'Single European Transport Area' and with it, a competitive and resource-efficient transport system. It is desired to move 30 per cent of freight going over distances of more than 300 km, from road to other modes of transports by 2030, and 50 per cent by 2050. Furthermore, the EU aspires the creation of a fully functional multimodal core Trans-European Transport Network (TEN-T) by 2030 and the completion of the high-speed rail network by 2050 and. The comprehensive network is to be completed by 2050. The TEN-T aims to fill the gaps, remove bottlenecks and technical barriers between transport networks of the EU Member States. The network further enables to strengthen the social-, economic- and territorial cohesion of the Union and contributes to the creation of a single European transport area. Nine core network corridors were identified to streamline and facilitate a coordinated development. The corridors are supervised by Coordinators, high-level personalities, with many years of experience in transport financing and European policy and are nominated by the European Commission. Catherine Trautmann is the Coordinator of the North Sea – Baltic Corridor.

In the Baltic Sea Region, a 'European Union Strategy for the Baltic Sea Region' was adopted, providing a framework to identify needs and adapt them to the available resources by coordinating appropriate policies. Activating and using the potential of the Baltic Sea Region. Thus, cooperation at many levels is at the core of the strategy.

The 'Rail Baltica' project is the most important project for the development of the North Sea – Baltic Corridor. The project comprises a new 1435 mm standard gauge rail connection from Warsaw to Tallinn linking four countries and their capitals in goods and passenger transport via rail. The construction works for 'Rail Baltica' are planned to begin in 2020 and to be completed in 2026 in the three Baltic States.

"Without the full implementation of the Rail Baltic line, the flow of goods and services from the rest of the Single Market cannot pass easily by rail into the Baltic States and on to Finland or vice versa. The Corridor cannot operate at its full potential if the situation of two different gauges would remain in place…" – Corridor Coordinator Catherine Trautmann

The volume of trade between China and the EU is increasing, influences international logistics chains, and new investments are made. The Eurasian region is becoming more and more important and offers additional possibilities in new service offerings for logistics chains.

Business Perspective

Within the activity of WP2, it was found that the shippers are more critical regarding intermodal logistics than logistics service providers. For both groups, the costs is the most critical barrier. The transit time and intermodal network are closely following as important barrier to choose intermodal transport solutions. The availability of information was also of high importance and a barrier to choosing intermodal transport solutions. Some shippers also mentioned the last mile or door-to-door solutions as a barrier. Further shippers mentioned missing or inadequate access of intermodal transport to hinterland and peripheral regions.

The shippers also outlined that, for a shift of goods towards combined transport, an improved competitiveness in terms of prices, more flexibility through higher frequency of connections, improved transit- and handling times in terminals, better local- and inland terminal and -logistics centres with warehouse capacities, improvements of access and infrastructure, the quality and services for special goods and loading units is needed. The paucity of information and the lack of information on 'Rail Baltica' were also an issue.

"…Let me explain why multimodality matters so much, today more than ever. First, to strengthen our efforts to decarbonise transport: Transport now accounts for ¼ of the EU's greenhouse gas emissions… Second, our roads are increasingly congested…Third, this is also in the interest of efficiency and therefore the competitiveness of EU manufacturers…And lastly, multimodality can support the emergence of new business models" – Commissioner for Transport, Violeta Bulc

Intermodal terminals have so far been built in places with large flows of cargo. The terminals most frequently have shorter tracks and small, poor-quality storage yards. A network of cooperating intermodal terminals covering the entire North Sea – Baltic Corridor should be considered and an integrated and coordinated strategy for terminal development considered. Most terminals are available 24 hours a day or provide a possibility to be available after prior arrangements. The terminals moreover have the capability to expand. The prevalent capacity is 1000 – 2000 twenty-foot equivalent units (TEU). The prevalent cargo handling capacity is 50 to 100 thousand TEUs. Access to electrified tracks is poor. The terminals provide a wide variety of additional services. The key elements for intermodal transport development along the corridor include open access, digitalisation of exchanged information and cooperation between intermodal terminal operators.

The transport market is very dynamic and increased competition in the market requires stakeholders to be innovative and support the supply chain. Through this the stakeholders

create an added-value to the customer and a differentiation possibility. The ICT tools support the communication between the stakeholders of a supply chain. The use of ICT tools in the transport decision-making progress is common as the integration of information circulation in supply chains is increasingly important. The stakeholders involved in intermodal transports clearly identified the communication amongst each other as unsatisfactory or non-existent. This issue needs to be elaborated further, as the efficiency and reliability of logistics processes of supply-, production-, and distribution, to a large extend, depend on the speed and efficiency of information processing.

Key Conclusions

It is important to create an interconnected and interoperable rail system that connects Central- and Eastern Europe with Scandinavia, the Commonwealth of Independent States and China. This will help to create new industrial zones and communication nodes, create conditions for emerging business opportunities and will affect the development of distribution centres in national markets.

Cities and regions should therefore develop rail connectivity between container terminals and take care of consistent nodal point development. The Baltic States can take advantage of their geographic position at the crossroad between the two major axis Russia and Western Europe and between North- and South Europe.

The dialogue and meetings with business representatives and other relevant stakeholders bring many benefits and enable the transfer of knowledge. Furthermore, providing relevant information that is important for enterprises and to increase the attractivity of intermodal supply chains to them. Thus, further dissemination of knowledge in this way is recommended.