



# **Logistic performance development of the countries on the northern corridor of the new silk road**

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## **Abstract**

Asia and Europe plan to improve interconnectivity thanks to initiative of building the new silk road. The northern branch of this route leads through following countries: China, Kazakhstan, Russia, Belarus, Poland and Germany. Logistical performance vary from country to country and moreover is dynamic in its nature. Many factors influences the speed and costs of transportation operations performed in specific environment. Additionally local strategies to improve logistic performance are shaped by changing economic environment. The efficient land connection between Europe and Asia is an great opportunity for international supply chains to improve agility and responsiveness to market needs. The purpose of this paper is to present the changes over time, measured by the logistic performance index. That helps to create the path of progress in achieving the desired performance. The result visualize a potential to improve in each country and effectively may improve an efficiency of the whole northern route.

*Keywords:* International logistics, Transportation, LPI index.

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## **1. Introduction**

Development of European and Asian regions implicate improving of communication between them. Exchange effectiveness requires logistical support in transport infrastructure and applied regulations. Fast and effective transportation operations are a critical for improving international supply chains. Asian industry capable to source many international supply chains needs Europe as an important market and consumption center. Asia is also still an important trade partner for EU counties and seen as an potential opportunity for growth in trade and investment strategy (Malmström, 2015). Such strategy may allow UE to strengthening presence in Asia and speed up the EU-China investment agreement.

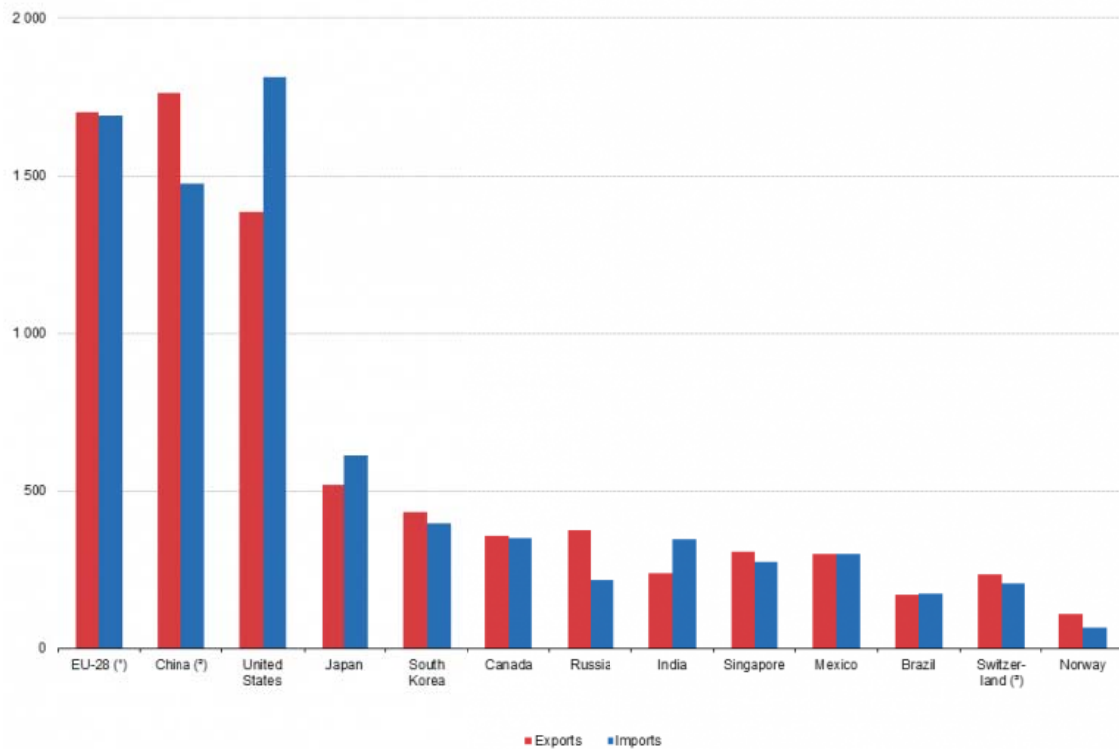
Time competitiveness increase speed and search for security of logistic operations. Creating effective connections between Europe and Asia allows business partners to cooperate in more efficient way. Efficiency of transportation operations in long international supply chain is an important strategic factor. Connection from Shanghai to Hamburg takes 45-60 days for transport operation using maritime logistics. That creates opportunity for other means of transportation. For example railway transport from the time of loading in Chengdu (Sichuan province) to the rail terminal in Lodz (Poland)

takes 14 days (Michalik K, 2016). It is then a matter of few days to distribute merchandise among other UE members.

Thanks to the World Bank observations it is possible to examine the northern corridor of planned new silk route. Logistic performance index assesses many logistical factors involved in creating actual performance of particular country. To name them all: customs, infrastructure, international shipments, logistics competence, tracking & tracing, timeliness. All of them makes reliable transport operation possible or difficult to realize and to control. In modern supply chain, risk of delays influences strongly the efficiency and furthermore delivery to final customer. In markets where lifetime of a product is constantly shorter, such delays transform into cost of operations and increase the risk of logistics operations between international partners. Connecting Europe and Asia involves many countries within. Therefore problems in maintaining certain level of logistic performance in one country may quickly influence the outcome of transportation operations in both directions. Observing and comparing an outcome of achieving logistic performance in each country along the corridor helps to focus attention on critical points. That also promotes a successful strategies to improve existing infrastructure and other fundamental factors for reliability and efficiency of Europe-Asia route.

## **2.Euro-Asian cooperation**

International trade comparison made in 2014, point out a group of main competitors: Europe, China and USA. Europe represented by EU-28 takes first significant place in this comparison (fig.1). As a producer of technologically advanced products is still a viable partner for international supply chains. Thanks to that it shows a moderate trade balance. The second largest power in this comparison China represents Asia. When China works as a production hub allowing to assemble imported components and then export as finished products, companies from Japan, Taiwan, Hong-Kong, and South Korea play a dominant role in China's processing trade. European Commission and Chinese government signed a Memorandum of Understanding on the EU-China Connectivity Platform. That may be helpful to enhance synergies between China's "One Belt One Road" initiative and the EU's connectivity initiatives as for example the Trans-European Transport Network policy. (EU Commission, 2014). Investment Plan for Europe will promote cooperation in areas such as equipment infrastructure, technologies and standards. That may be an important stimulus for development business opportunities. Moreover helps promote employment, growth and development for both trade partners. China's Silk Road Fund and European Investment Bank will cooperate to support progress in this matter. Understanding potential of common cooperation is a starting point to increase effort to open markets and to create improved connectivity between Europe and Asia. Observing changes in global trade it becomes clear that promotion of export in China is a national strategy which in fact is successful. With its stress on export, China surpassed an EU-28 export for the first time UE was founded (Eurostat, 2016). Third place belongs to US showing the largest annual deficit. Ties between Euro and Asia come from long history of developing globally dispersed supply chains.



(\*) External trade flows with extra EU-28.  
 (†) Excluding Hong Kong.  
 (‡) Including Liechtenstein.  
 Source: Eurostat (online data codes: ext\_it\_intrale and ext\_it\_intercc)

Figure 1 Main players for international trade, 2014 (billion EUR).

Source: Eurostat, 2016.

Cooperation between business partners relay of searching an competitive advantage in the process of value creating. Asia promotes export as an country with lower production cost. EU imports from China are dominated by industrial and consumer goods such as machinery and equipment, footwear and clothing, furniture and toys. EU exports to China are concentrated on machinery and equipment, motor vehicles, aircraft, and chemicals. Such exchange is also profitable for Europe as an supplier of advanced technology and equipment who needs profitable markets. The profile of exchange changes in time but the main differences allows to gain interest from both side. As data in 2015 indicate, China is second largest trade partners for Eu-28. In last year the highest growth rate was recorded for exports to China. That signifies importance of intercontinental corridors for transport. From the import point of view China is responsible for 20% of share of extra EU-28 imports. That translates for additional importance of maintaining the efficient transport connections for Asia. That argument alone supports the need to develop projects for improving intercontinental exchange like promoted new silk route.

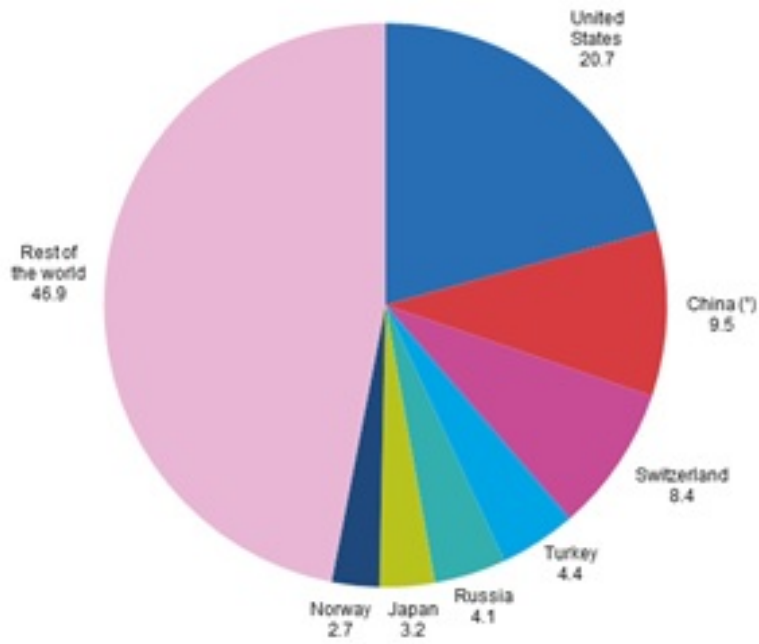


Figure 2 Main trading partners for exports, EU-28, 2015 (% share of extra EU-28 exports).  
Source: (Eurostat, 2016)

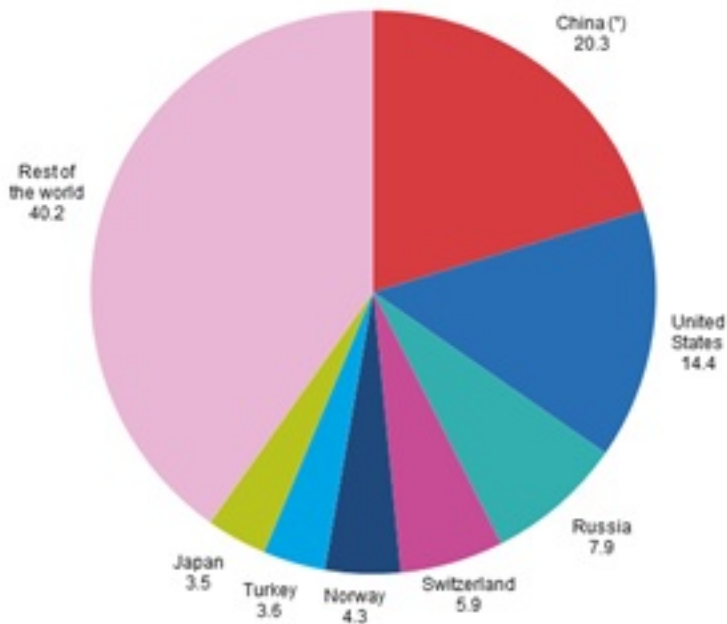


Figure 3 Main trading partners for imports, EU-28, 2015 (% share of extra EU-28 imports).

Source: (Eurostat, 2016)

The silk route initiative promotes achieving easy access to the markets of the countries involved. Drawing the corridor between Europe and Asia connect two from three important trade regions in the world. Thanks to investment and support of the project there is a great chance to build modern infrastructure for transport and logistic operations. Helping supply chains to control and efficiently move its resources means to reduce cost and uncertainty of delivery. That may influence competitiveness on final markets where customers appreciate timeliness and cost of products.

### **3. Countries of the northern corridor of the New Silk Road**

Countries which territories lie on the northern corridor of the New Silk Road are China, Kazakhstan, Russian Federation, Belarus, Poland and Germany. Data presented by World Bank allows to examine changes in logistic performance made by particular country along the corridor. First diagnosis publicized in 2007 to recent research in 2014 serves as an measurement of potential accomplishment in the logistic performance of the country. Possibilities for improvement vary country to country. Some countries try to develop an logistic strategy around this intercontinental project. There are also countries which can't cope with stronger partners in the corridor. The effort in improving logistic performance is the observed in six categories. From building an transportation infrastructure to changes in law helping logistic operators operate quickly without delays. Such an aggregated information about logistic potential of certain location is rather important for investors aiming in high logistic performance of prospected facility. Looking at the corridor as an interconnected chain brings realization that maintaining comparable performance among countries is critical. Any weak link in the chain will decrease efficiency of long international logistic operations. To achieve an balanced level of logistic performance along the route it is critical to point out potential threats and locate it on map of the corridor. Thanks to that general view it is possible to help improve an observed logistic performance in particular underachieving place.

An important junction station of the corridor - Horgos located on China border opens new perspective for economic development of western part of this country. Ready to use high-speed Lanxin railway, linking Urumqi in Xinjiang with Xining in Qinghai along the New Silk Road is sign of advanced development in this area (Hsu S., 2015). Better access to ports and international marine trade routes forced Chinese industry clusters to locate in east coast. That created imbalance in spatial development of China. Therefore advance in building the new silk route as an land route to Europe may in plans draw bigger attention of investors in locations in middle and west part of this country. Moreover opening an route in western part of China decrease necessity to use two different modes of transportation as it is popular now. Many producers transport finished goods firstly to the ports using trains or trucks and then reload it on transoceanic ships. In comparison of transshipment costs the western land route may be faster and still cost effective. The region located at the Kazakhstan border focus attention thanks to its logistic development. Creating special economic zone with cross-

border transport hub will ease access to the corridor especially that northern and central path may use this passage. Kazakhstan government finance this project with total cost 1249 m\$. Plans include logistics infrastructure 200 m\$, dry port for 226 m\$ and private investment estimated on 823 m\$. That should allow increase traffic through the junction to expected 4,4 m tons in year 2020 (Alpysbayev, 2015). Industrial clusters in Hohhot, Lanzhou and Urumqi may increase the tempo of growth with easy access to land connection to Europe. China and Kazakhstan agreement create the Horgos International Border Cooperation Centre. The free land port of Horgos facilitates customs procedures. The integrated trade center covers 1,85 square km on the Kazakh side and 3,43 square km on the Chinese side. Additionally traders can use 30 days visa free stay in the border cooperation center. Construction of logistics centers, highways, railways and passenger terminals are a part of development in this region.

Table 1 Development in Kazakhstan LPI index 2014-2007.

<i>Kazakhstan</i>	<i>LPI</i>		<i>International</i>						
	<i>Rank</i>	<i>Score</i>	<i>Customs</i>	<i>Infrastructure</i>	<i>shipments</i>	<i>Logisticcompetence</i>	<i>Tracking&amp;tracing</i>	<i>Timeliness</i>	
2014	88	2,7	2,33	2,38	2,68	2,72	2,83	3,24	
2007	133	2,12	1,91	1,86	2,1	2,05	2,19	2,65	
<b>Δ lpi</b>	<b>-45</b>	<b>0,58</b>	<b>0,42</b>	<b>0,52</b>	<b>0,58</b>	<b>0,67</b>	<b>0,64</b>	<b>0,59</b>	

Source: lpi.worldbank.org.

Joining the Eurasian Economic Union is an influencing factor for development of Kazakhstan. Signing the treaty in 2015 awakes hopes that this will help the economy and improve its logistic performance. The main increase over period of seven years is noted in logistic competence. The smallest increase in score shows in customs. In the perspective of joining WTO this factors may change for better (Rajabova S., 2015). Rail system in Kazakhstan was part of Soviet Union. Till this day existing connections make shipment of freight possible throughout the Eurasia. To gain access to markets in Europe it is necessary to pass through the territory of Russia. On the other hand Kazakhstan's highway system is in a poor state of maintenance. Despite that, the highway system connects all bordering countries what makes this means of transport very popular. To improve the transport infrastructure there is carried out construction of the highway. That will connect following cities: Astana, Karaganda, Almaty, Astana, Pavlodar, Ust, Kamieniogorsk, Almaty, Kapczagaj, Ust and Kamienogorsk. There are also plans to establish The Single Eurasian Sky program, similar to the European Union's Single European Sky. That would help unify and help decrease formalities inside the EEU. Domestic Logistics, shaped similar to the international quality standards, exists only in the region of the city of Almaty, where function warehouses of class A. Therefore in all regions of the country rise demand for high quality logistics services. New strategy of 3A, will create a uniform system of the three largest transport hubs: Aktobe, Astana and in Almaty. These modern industrial and logistics complexes placed in key locations are being built to improve dynamics of trade in the country and to help reach west and east business partners. (Gdowska K.Z., Sala D., Dospaeva S., 2014). Thanks to the effort of this country, Kazakhstan moved up 45 places in the world ranking. Improvement discovered in the analysed time period gives Kazakhstan a leading role in development of LPI.

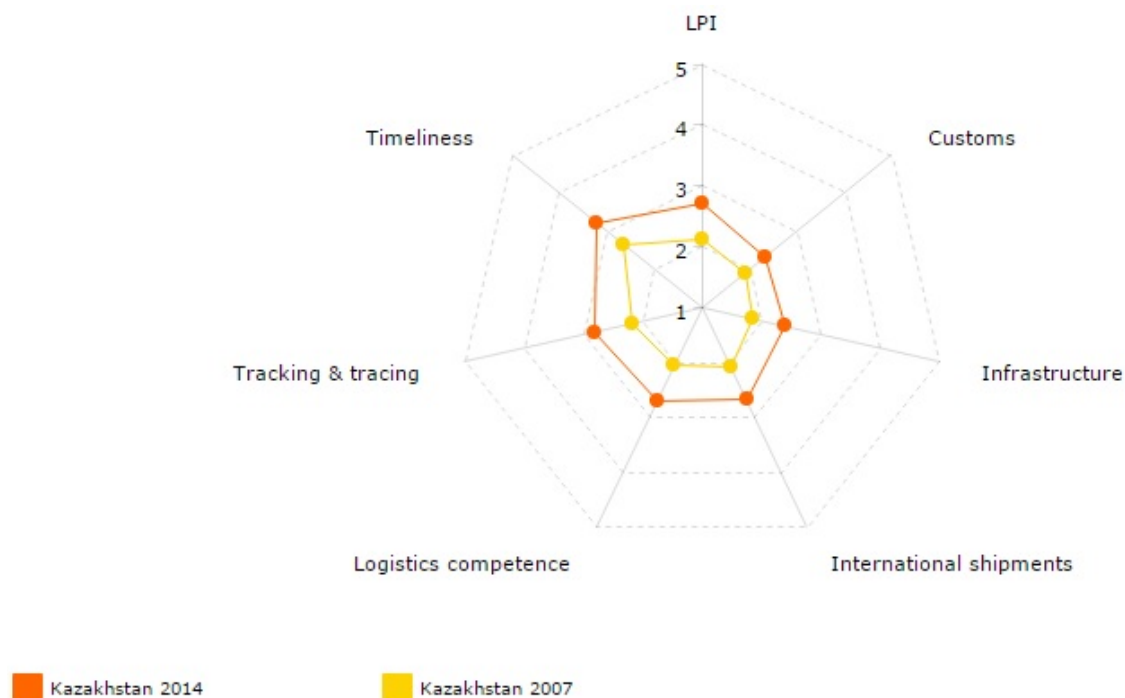


Figure 4 Development in Kazakhstan LPI index 2014-2007.  
 Source: lpi.worldbank.org.

Next stop in corridor belongs to Russian Federation. Chinese transport strategy is influenced here by increasing import from Russia. Next to Russia lie Belarus – another partner in the corridor. Those countries plan close cooperation and opening an economic zone of the Silk Road with industrial park clearly using Euro-Asian corridor as a catalyst for development (Pale, 2015). The exact path or the corridor may lead along existing Western Europe-Western China Project. The Kazakhstan cities connected beginning from the China border are: Almaty, Korday, Taraz, Shymkent, Kyzylorda, Aktobe. Russian path begins with Orenburg, Kazan then Nizny Novgorod and then capital of Russian Federation Moscow and Saint Petersburg or Minsk. The total length of the route is 8,445 kilometres, 2,233 kilometres of which run through the territory of Russia, 2,787 kilometres through Kazakhstan, and 3,425 kilometres on the territory of China (Turezhanova M., 2013). The transport infrastructure will consist of newly design roads and roadside infrastructure. Availability of internet access may improve control on the cargo and additionally weather forecast helping to adjust tempo of transport. With The World Bank loan of \$2.125 bn, it is expected that this project will be concluded in year 2017 (Fedorenko, 2013). The speed of transportation operations is a critical factor in comparing different routes connecting Europe and Asia. The cargo may reach Central Europe in 10 days in comparison with 14 days using Trans-Siberian Railway or 45 days by passing marine route through the Suez Canal. The tempo of transportation among the Eurasian Economic Union will be even higher which in fact is an additional argument for involving Russian Federation for supporting this project. Joining the Asian Bank of Infrastructure Investments, managing capital estimated on \$100 bn. will help to realize aforementioned plans especially because as a representative from Asia, Russian Federation receive privileged status (Pale, 2015).

Table 2 Development in Russian Federation’s LPI index 2014-2007.

Russian Federation	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistic competence	Tracking & tracing	Timeliness
2014	90	2,69	2,2	2,59	2,64	2,74	2,85	3,14
2007	99	2,37	1,94	2,23	2,48	2,46	2,17	2,94
<b>Δ lpi</b>	<b>-9</b>	<b>0,32</b>	<b>0,26</b>	<b>0,36</b>	<b>0,16</b>	<b>0,28</b>	<b>0,68</b>	<b>0,2</b>

Source: lpi.worldbank.org.

The changes in LPI index shows slow but constant improvement. The biggest change is registered in tracking & tracing section. The runner up is infrastructure. In general there is noted a positive change and promotion to a higher position in the ranking. The development of infrastructure in Russia is critical for interconnectivity of this big country which links Europe with Asia and borders 17 countries. To maintain existing infrastructure is important to realize that this big territory features: direct access to three out of four oceans with 53 sea ports, 43 thousand km long net of electrified railroads, airport hubs and pipelines leading to Germany, Poland, Turkey, Czech Republic. The nearness of Asia production hubs helps to deliver its products to Russia and sustain business cooperation.

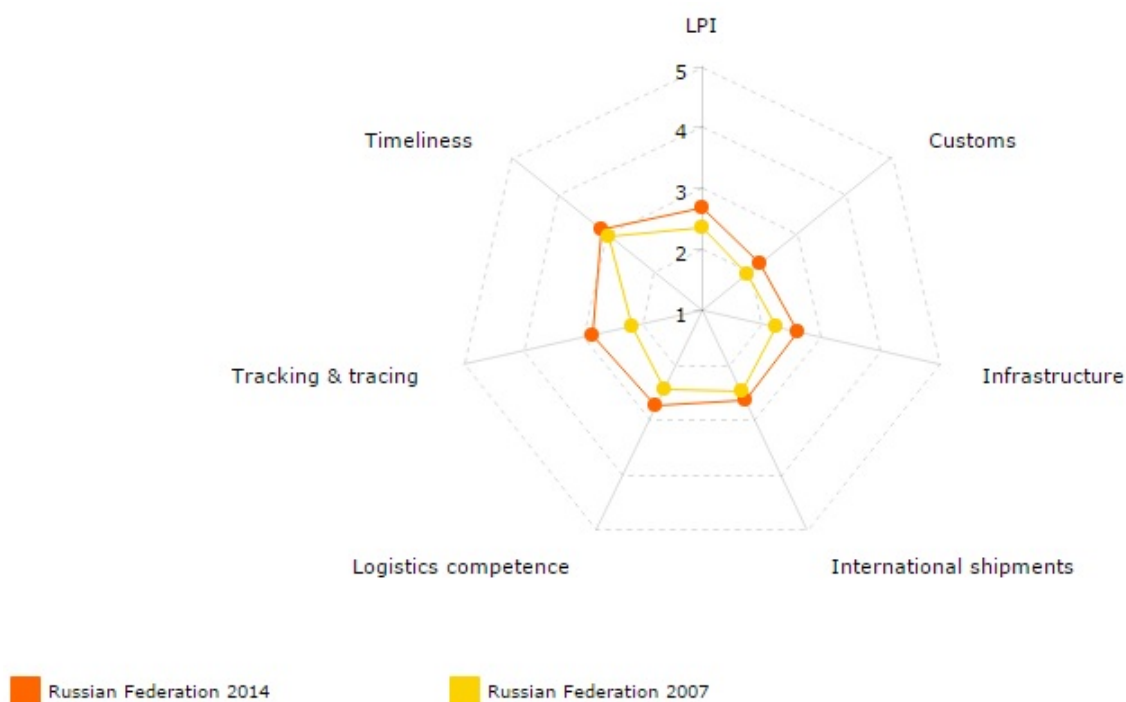


Figure 5 Development in Russian Federation LPI index 2014-2007.

Source: lpi.worldbank.org.

Investments for improving infrastructure are mostly located in the western part where is higher density of inhabitants and industrial development. Projects like the construction of the new M11 road between Moscow and St. Petersburg and a road to Tsem dolina that is part of the Novorossiysk transport hub or design, renovation and operation of an M1 Belarus Road are important from perspective of the New Eurasian Land Bridge.



Belarus as and close economy partner of Russia is a next step. Former logistics standards which shape connections between Soviet Union countries influence logistic performance till today. Since 2012 three countries Kazakhstan, Russia and Belarus usually perform better in scope of logistic performance then other countries in the Central Asian region (Avris, Rastogi, 2014). Cooperation between those countries influence the transportations needs and build pressure to improve interconnectivity. Realization of northern corridor may be then supported by common interest among these countries to improve logistic ties. Belarus is strategically well oriented area between vast Russian Market and industry concentrated areas in Western Europe. More than 75% of total exports of services account for transport services. That defines specialty of services helping to connect bordering countries (Niakrasava, 2016). Pan European transport corridors West-East and North –South cross Belarus. All means of transport are represented in this country. Accessibility to Western and Eastern Europe creates usage of transit position. Moreover, customs union between Belarus, Russia, and Kazakhstan improve trade cooperation in the region. There is insignificant progress in warehousing. Present 38 logistic centers improve national standard and 11 of them include temporary storage warehouses, customs warehouses and the customs clearance point. Eight modernized logistic centers are ready to perform multimodal operations (Niakrasava, 2016). Railway develops along critical directions. Projects as: Viking, the East Wind, Kazakhstan and Mongolian routes may improve significantly performance in the future.

Table 3 Development in Belarus LPI index 2014-2010.

Belarus	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistic competence	Tracking & tracing	Timeliness
2014	99	2,64	2,5	2,55	2,74	2,46	2,51	3,05
2007	74	2,53	2,67	2,62	2,12	2,12	2,71	3
<b>Δ lpi</b>	<b>25</b>	<b>0,11</b>	<b>-0,17</b>	<b>-0,07</b>	<b>0,62</b>	<b>0,34</b>	<b>-0,2</b>	<b>0,05</b>

Source: lpi.worldbank.org

The seven year period helped to increase Belarus's LPI score insignificantly. The most positive changes are noted in international shipments and increase of logistic competence. On the other hand both customs and infrastructure decreased its value. As the country develops and open for trade there is visible potential for improve (fall in global ranking by 25 places). There is unfortunately still much to do to achieve constant progress along all six measured factors in logistic performance. Niakrasava suggest improve in high level of outsourcing which may force specialisation among transport operators, building new rental space what decreases cost of warehousing and improve standard in the country and investment in providing modern ITC technologies supporting logistics. The last suggestion is a requirement for modern supply chain where the level of control is an critical advantage in demand driven trade structure.

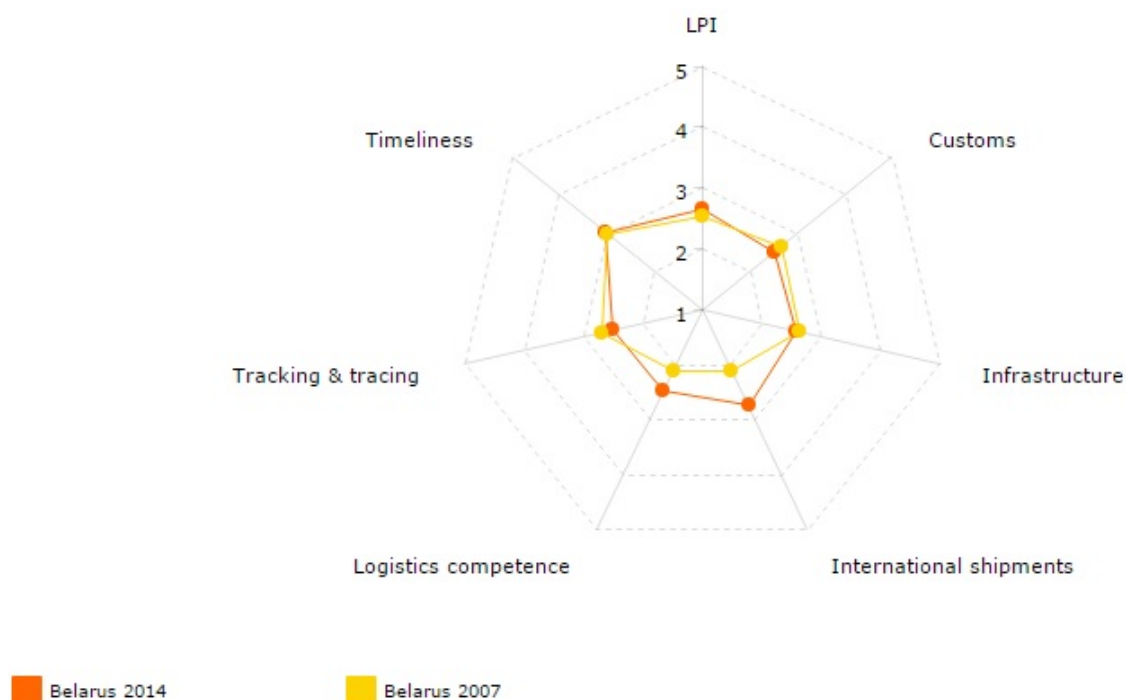


Figure 6 Development in Belarus LPI index 2014-2014.

Source: lpi.worldbank.org.

Poland as a member of European Union it has a free access to all 27 other members without any restrictions. Therefore is seen a country effectively closing northern corridor. Achievements of UE as free movement of goods, people and capital open new areas of exchange and enable the use of the economic potential of the European continent especially with open connections to Asia. Polish accession in 2004 added to the EU's economic body quite a large area of Central and Eastern Europe, which was a challenge in the construction of transport connections. Thanks to that Polish business entities became partners of European supply chains. That fact supported by European funds increased pressure on reconstructing infrastructure and improve any formalities concerning international shipments. The development of logistics intensive area within the Central East European countries illustrates the construction of logistics infrastructure. Ports, distribution centers and as well as linear transport infrastructure between them is a prerequisite for future economic development of the region. With the support of community funds and private investments there is a visible process of significant improvement of roads along designated by the European Commission corridors (Bentyn, 2016). They match transport routes planned for implementing northern corridor. On both sides of the Baltic-Adriatic corridor are fast growing container ports. Both organizations NAPA (North Adriatic Port Association) and BPA (Baltic Port Association) depends on supporting the development of the corridor mentioned as one of the ten corridors of the TEN-T which is foreseen for funding in the 2014-2020 period (Novakova, 2013). In the middle of Poland lies Stryków small city at the intersection of two very important transport corridors: East - West and North - South. Proximity of high-density demographic areas justifies building modern distribution centers. They gather transport operation quickly as fast developing regions in CEE requires better logistic services.

Table 4 Development in Poland LPI index 2014-2010.

Poland	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistic competence	Tracking & tracing	Timeliness
2014	31	3,49	3,26	3,08	3,46	3,47	3,54	4,13
2007	40	3,04	2,88	2,69	2,92	3,04	3,12	3,59
$\Delta$ lpi	-9	0,45	0,38	0,39	0,54	0,43	0,42	0,54

Source: lpi.worldbank.org

Expanding infrastructure and increase in logistics competence brought noticeable improvement of logistics performance. Thanks to improved conditions for transport and storage the investment attractiveness rise, especially for the areas along the international transport corridors. This facilitated implementation of international logistics operations. The progress in logistics performance is recorded in subsequent studies of the World Bank. Aiming for improving standards and performance is a necessity when a neighbouring country is Germany (global leader in LPI index). In fact many businesses investors from Germany applied their advanced logistical solutions. Territorial development of the EU taking place due to successive accessions involves successive joining of subsequent countries and logistic systems operating within their territories. The passing years of economic cooperation between operators of individual countries of the expanding union have improved transport infrastructure and increased the level of LPI (Bentyn, Majchrzak-Lepczyk, 2016). Growth of logistic performance is a positive indicator of the possible trend of development not only Poland but also Central and Eastern transport axis. Although the tempo of improving LPI was greater in the beginning and slower at the end of analysed period it was justified by the starting base of low logistic performance before 2007.

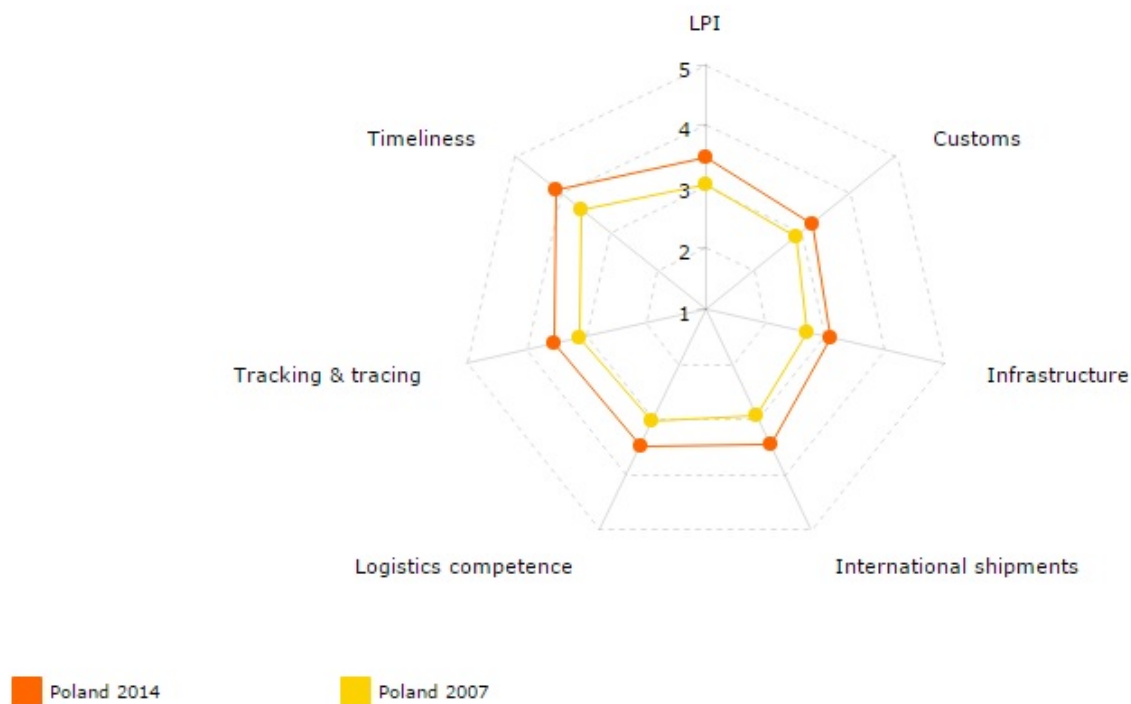


Figure 7 Development in Poland LPI index 2014-2010.

Source: lpi.worldbank.org.

### **3. Increase in the LPI performance of the countries along northern corridor.**

Improve of logistic performance is an important strategic goal for building an efficient corridor connecting Europe and Asia. That strategy of joining two continents may be beneficial for all countries involved in the process. Faster and more efficient connection for business partners in both continents, represented by the planned land bridge is critical in era of variable market conditions. To comply with that it is an necessary to improve several aspects of logistic performance. To do that it is crucial to start with infrastructure because time is an critical aspect in projecting and constructing planned tracks, roads, logistic centres. Some countries already represent higher standards and are prepared for another effort in other areas. In other countries there is a problem with infrastructure which should be addressed quickly. Advanced technologies in logistic require transfer of data along planned routes. Therefore tracking and tracing factor is important for international logistic chains. That is also another issue in some countries lacking of ITC infrastructure. The most promising part of logistic performance is customs. Along the corridor there are three countries collaborating in Eurasian Economic Union. That may help to achieve agreement and also represent interest of cooperating with EU. Understanding the need for building land bridge to Asia and opportunities for each country and region, may bring an effective argument for such cooperation. Timelines is also a factor in an efficient transportation operations. We can compare advance in Poland and Kazakhstan and stagnation in Belarus or Russian Federation. To see a change for better there is needed logistic competence which finally allow to use provided infrastructure and technical equipment. By comparing this factor along the corridor we see improvement in all countries involved. The dynamic approach presented in fig 8 show, much needed advance among countries of the corridor in the seven year period. The outcome of improve sets an ranking with Kazakhstan on first place. An impressive increase in logistic performance gives this country a serious advantage in the process of building the new Silk Road. The change in this country is a promise to develop an efficient corridor and help the economy to use it as an advantage. Runner up is Poland. Years of investment helped to show logistic competence of this country and additionally allows to create entrance to quickly developing region of Central East European countries. If focus attention on Germany and China there is visible little progress in mentioned time period. That is because already high logistic performance standard in these countries. Two countries, close to Germany and China represent biggest change for better. Poland and Kazakhstan improved greatly and in both cases because influence given by more developed neighbours. That draw attention on Russian Federation and Belarus where is a need for faster development. The investment plans and interest of private sector may be a key ingredient to effectively increase logistic performance in these countries.

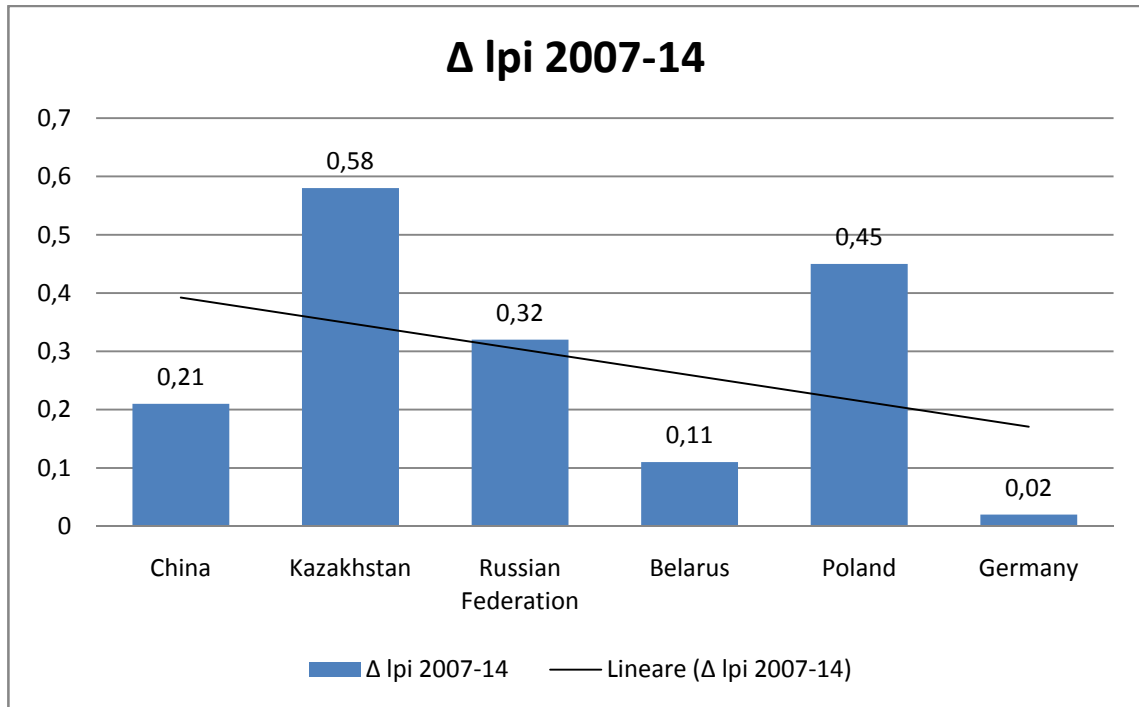


Figure 8 Development in increase of LPI index 2014-2017 along the path Kazakhstan, Russian Federation, Belarus, Poland, Germany.

Source: own composition.

The dynamic view may be supplemented by static level of LPI index in all countries along corridor fig.9. This comparison pin points the gap between Europe and Asia and focus attention on countries in the middle of corridor. To see how well they progress in building better performance it is crucial to compare it to dynamic change over 7 year period showed on fig .7.

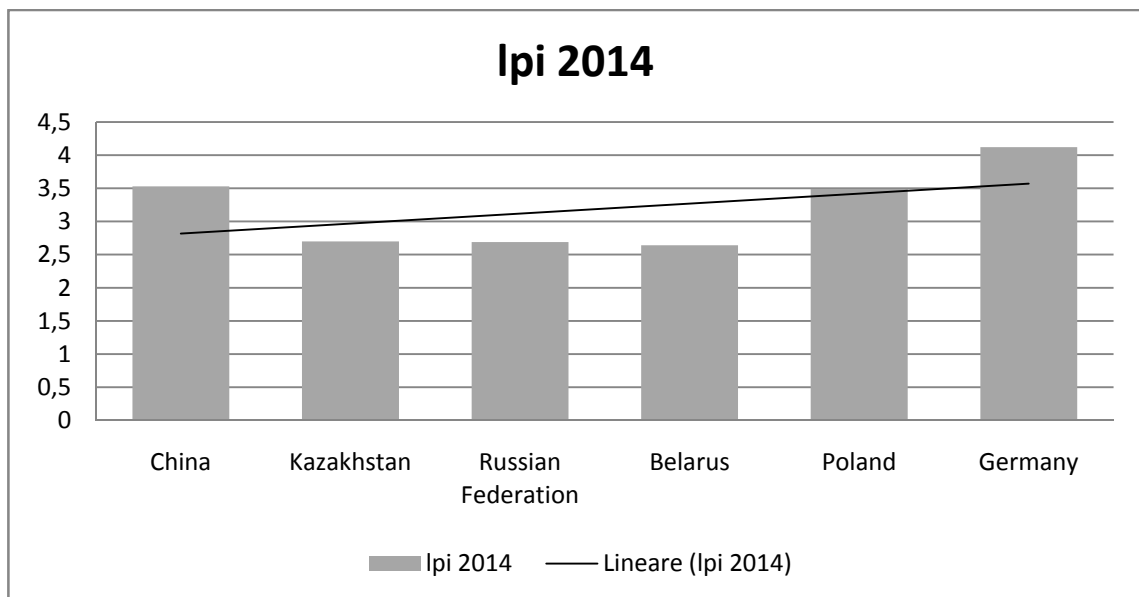


Figure 9 Static comparison of LPI index 2014 along the path Kazakhstan, Russian Federation, Belarus, Poland, Germany.

Source: own composition.

#### 4. Conclusion.

Building an efficient land connection between Europe and Asia needs a common effort of many countries. Analysing the north corridor leading through Kazakhstan, Russian Federation, Belarus and Poland helped to understand actual level of logistic performance in each of these countries. Additionally supplementing this vision by adding increase in lpi index noted in seven year period commented effort made by each country to improve its logistics performance. That concludes research focusing attention on critical nodes along the corridor. Effort taken and planned by countries united to build land bridge will be supported by the means of Asian Bank of Infrastructure Investments. That may also draw attention of private investors using opportunity to develop additional logistic infrastructure. The potential to improve is visible and comparable to opportunities promised after developing efficient land connection available for logistic partners in Europe and Asia.

Creating international logistical chains requires certain level of performance, especially in rapidly changing economy and arising market opportunities. Time competitiveness is one of the reasons such project may be developed. Investors from EU and from Asia, but mostly China, understand that and will support attempts of nations involved in the process. Additionally opening, in logistical meaning, of industries in countries along the route, may be beneficial for development and prosperity of nations. At least six factors included in logistic performance index create expected positive outcome. Moreover it takes investment, know-how, competence of human resources and time to make a tangible effect. Having that in mind it is worth saying that expected growth in trade between Europe and Asia will exert pressure to increase the tempo of creating an efficient and fast land corridor.

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