

A. Taisarinova¹, G. Kenzhebaeva², S. Badambaeva³

¹ German Kazakh University, Almaty, Kazakhstan

² Kazakh Railway University, Almaty, Kazakhstan

³ Academy of logistics and transport, Almaty, Kazakhstan

E-mail: taisarinova@gmail.com

FORMATION OF A REGIONAL LOGISTICS DEVELOPMENT INDEX FOR PAINLESS JOINING THE INTERNATIONAL CORRIDOR

Abstract. The purpose of the study is to pay attention to the regional aspect of Kazakhstan logistics formation with the connection to international “Western Europe – Western China” corridor. The article analyzed Kazakhstan regions, assessed the potential, identified weak chains. Identified area with more potential. Proposed information-gathering scheme to form a regional development index, which will help reduce risks when connected to the corridor. Offered, scheme can be used by decision-makers to assess the level of regional logistic development. This article will be useful to persons engaged in research in the field of regional logistics.

Keywords. Western Europe-Western China (WE-WC), BRI (Belt Silk Road), GDP growth, transport corridor, regional transport infrastructure, road, freight turnover, regional logistic, Regional Capability Index (RCI).

Introduction.

The concept of creating a BRI corridor (Belt Road Initiative), in later versions of «One Belt - One Road», «Belt and Road» and later sources published under the name - «Economic Silk», the belt requires the construction of economic corridors. The «Western Europe-Western China» trade corridor (WE-WC), which is part of the land route of the BRI (Belt Silk Road), recently announced by China as a concept, passes through the territory of the Republic of Kazakhstan [1]. However, this corridor does not stimulate the economic development, as GDP growth in commodity areas such as Aktobe and Karaganda regions does not mean a high level of logistics.

The indicators of logistics impact such as logistic center, cargo turnover, and availability are evaluated after the reconstruction following the results before and after the implementation. The disadvantage lies in the difficulty of predicting the growth of these indicators. The economic impact indicators do not take into consideration flow connections as there are no statistics for collecting data on the corridor. Mostly it is limited to connections to export and import. A criteria-based evaluation is a more modern approach to impact evaluation and is related to the impact of several indicators. However, a challenge of collecting statistics arises: inaccurate official statistics can lead to overestimates. In recent years, it has become necessary to assess the region at the level of maturity of connection to the corridors.

Material and methods.

The authors used statistical data to analyze and synthesize the main factors affecting the development of regional logistics in Kazakhstan along the WE-WC corridor. Data on regional trade (export, import) were used as basic data.

To assess the region with higher capabilities, an analysis of data on the socio-economic and material and technical condition of the regions was carried out. Social status was assessed by the level of GDP, the technical condition of the transport infrastructure. Further, the results

obtained were divided into five periods (2003-2006, 2006-2009, 2009-2012, 2012-2015, 20015-2018). Periods and section of WE-WC international corridor was finished, which revealed the picture of the possible connection of the region to the work of the corridor.

The methods of modern visualization and chronological sequence were used in the work, which made it possible to present a reliable picture from the day the construction of the WE-WC corridor began to its completion.

For a more accurate description of the regions, the method of systematization and classification was applied. Further, the data obtained were combined in time periods corresponding to the completion of the reconstruction of the corridor section in each of the analyzed regions. By the method of grouping, the results obtained were combined into sections describing the flow of goods along the corridor. An analysis of indicators allowing to assess the level of readiness of the region to open the corridor is carried out.

Next step of analyze were revealed by the method of system analysis the reasons for the inaccuracies in the collection of statistical information. Based on the results of the analysis, an indicative assessment method was proposed, which most accurately describes the readiness of the region to connect to the corridor.

Results and discussion.

The Kazakhstan section of the WE-WC transport corridor includes rehabilitation of 2452 km [2] highways passing through the territory of Aktobe, Kyzylorda, Turkestan [3], Zhambyl, and Almaty regions of Kazakhstan, and Almaty and Shymkent cities having the status of regional importance:

The total length of the WE-WC transport corridor in the Aktobe region is 590.64 km. The main economic sector of the Aktobe region is the mining industry, whereas, most of the mined natural resources such as oil, chromium, copper, zinc, ferrous metals [4] are exported by railways. Due to the poor development of the agricultural sector, the imported products by the Aktobe region mainly include food products, such as meat, cheese and fruit.

The total length of the WE-WC transport corridor in the Kyzylorda region is 810 km [4]. The main economic sectors of the Kyzylorda region are mining and agriculture. The main minerals are oil, zinc, lead, uranium, gold, and silver [4]. The region has one of the world's largest deposits of vanadium [4] (salt and rice constitute the main share of exported products, about 90% of all Kazakhstani rice grown in Kyzylorda region.

The total length of the WE-WC transport corridor in the Zhambyl region is 427 km [4]. From the South the region borders with Kyrgyzstan. The mining sector is an important source of the region's economy and its main resources include minerals, phosphates, gold and gas [3]. Moreover, the region has great potential for the agricultural sector. The main cultivated products are grains, vegetables and sugar beets.

The total length of the WE-WC transport corridor in the Almaty region is 460 km [3]. The region borders with China and Kyrgyzstan. On the territory of Almaty region, there are many production companies producing beverages, juices, canned goods, cigarettes, etc. The region has a well-developed agricultural component. The area is the main supplier of onion, tomato, cucumber, fresh watermelons [5].

The total length of the WE-WC transport corridor in the Turkestan region is 294 km [3]. The region is located in the extreme south of the country, bordering Uzbekistan. The main economic sectors of the Turkestan region are mining and agriculture. Among exported natural reserves it is possible to highlight uranium and its compounds. The first export position is occupied by the fresh and chilled vegetables followed by untreated cotton. Imported goods in most of the timber, building materials [3]. The region has a favorable geographical and climatic position and is one of the most densely populated districts, thus having a great potential for trade.

Almaty city is the largest city of the country, its contribution to GDP is 20.9% [5]. About 15% of the Kazakhstan population is working in the city. The main transit flows are concentrated in Almaty; main offices of large international companies are predominantly located in the country's main economic powerhouse. These functions are underpinned by the presence of many warehouses for storing goods in the city. Unfortunately, the amount of equipment at these premises is rather problematic to identify with official statistics, as there is no database for information collection. Almaty is a leader in the purchase of breeding animals, agricultural machinery, building materials and energy equipment [6].

Shymkent is the third largest city in Kazakhstan [7]. Its advanced sectors include oil refinery and food industry [7]. The main export goods are aluminum, copper and black metals. Imports are mainly focused on the construction needs of the surrounding regions, such as timber, glass and furniture [7]. In view of the actively developing interregional trade in Shymkent in recent years, a strong logistics infrastructure has been built, and companies specializing in trade with Central Asia have established their regional centers here.

The main direction of China-Europe WE-WC (figure 1), passes through (Aktobe + Kyzylorda + Turkestan + Shymkent city + Jambyl + Almaty + Almaty city).

Figure 1 shows the fright turnover increase by 4 internal sections forming WE-WC corridor.

I section Russia-Uzbekistan (Aktobe + Kyzylorda + Turkestan + Shymkent).

II section China-Uzbekistan (Almaty + Almaty city + Jambyl + Turkestan + Shymkent).

III section China-Kyrgyzstan (Jambyl + Almaty + Almaty city).

IV section Russia-Kyrgyzstan (Aktobe + Kyzylorda + Turkestan + Shymkent + Jambyl).

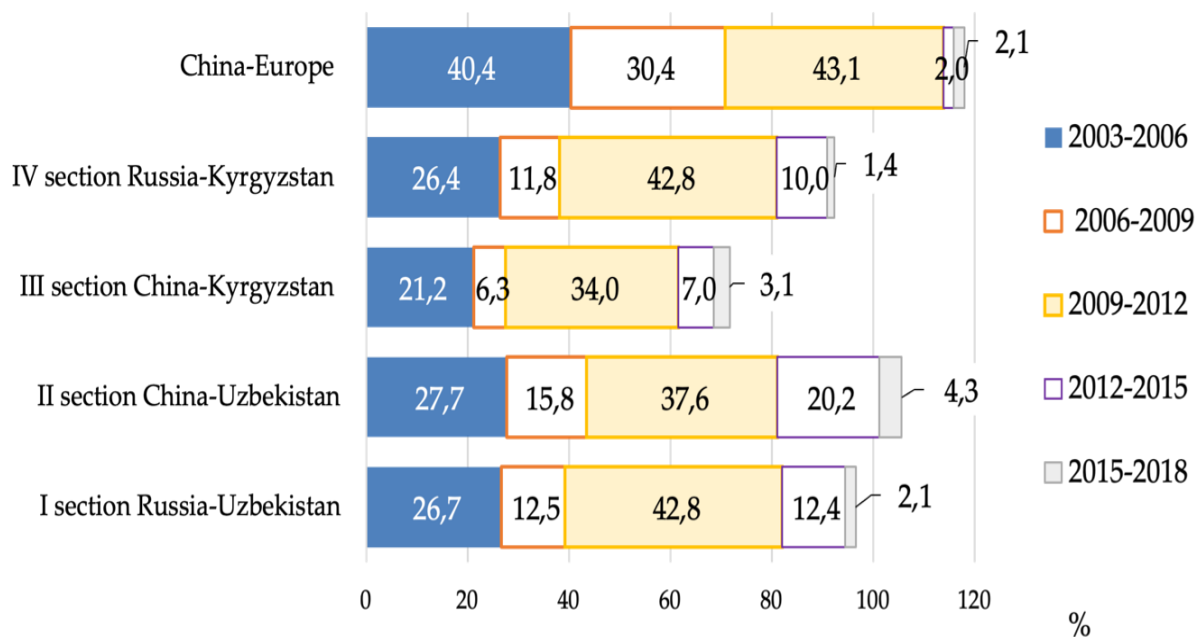


Figure 1 - Fright turnover increase by 4 sections

Compiled by the authors on the basis of data analysis of the Committee on Statistics of the Republic of Kazakhstan [7]

The period of corridor reconstruction is about 12 years from 2006 to 2018 years. For analysis convenience we divided it into 5 stages (3 years), which correspond to the completion of the main sections (Table 1).

Table 1 - Corridor conditions

	2003 – 2006	2006-2009	2009-2012	2012-2015	2015-2018
Aktobe region	Aktobe-Karabutak- (273 km)	Development of the road rehabilitation design projects, including technical and feasibility study, social and environmental assessment	Karabutak-Kyzylorda (215 km)	Martuk -Aktobe (102 km)	-
Kyzylorda region	-		-	Aktobe-Kyzylorda-Shymkent (1062 km)	-
Turkestan region and Shymkent city	-		-	Kyzylorda-Shymkent (203 km)	-
Jambyl region	-		Jambyl-Taraz (480 km)	Taraz-Shymkent-Jambyl (203 km)	-
Almaty region	-		-	-	Almaty-Horgos (480 km), Almaty-Bishkek (154 km)

Compiled by the authors on the basis of data analysis of the Committee on Statistics of the Republic of Kazakhstan [7]

First section Aktobe-Karabutak (273 km) was built period between 2003-2006 years, when the national government initiate the WE-WC corridor. This part of the road was impetuses for connecting Russia with the countries of Central Asia. The most active started working section Russia - Uzbekistan, the increase in cargo turnover was (26.7%), China - Uzbekistan (25.3%), China - Kyrgyzstan (23.5%), Russia - Kyrgyzstan (25.2%). China-Europe cargo turnover changes was less significant (18.1%).

2006-2009 years the period of the first site completion. This period interesting, because in 2009 yea there was a global crisis, which affected all sites by a sharp drop in cargo turnover by an average of 1.7 times.

During 2009-2012 years period were built the main sections of the road Karabutak-Kyzylorda (215 km), Jambyl-Taraz (480 km). It caused cargo turnover increase Russia - Uzbekistan (42,8%), Russia - Kyrgyzstan (42%), China - Uzbekistan (35.2%), China - Kyrgyzstan (28.5%). It is worth noting that in this period is activated the full route China-Europe (32,1%).

The most active period of reconstruction was 2012-2015 years. Were launched sections Martuk-Aktobe (102 km), Aktobe-Kyzylorda-Shymkent (1062 km), Kyzylorda-Shymkent (203 km), Taraz-Shymkent-Jambyl (203 km). As plots are connected, the southern areas are activated China-Uzbekistan (18.3%), China-Kyrgyzstan (15.1%), followed by Russia-Uzbekistan (12.4%), Russia-Kyrgyzstan (12.2%). Moreover, the most noticeable changes occurred in the previously lagging Jambyl region by 3 times. Leading Almaty region showed an increase of 2.3 times.

2015-2018 years completion period, Almaty-Khorgos (480 km). The Almaty-Bishkek site (154 km) is under reconstruction at the beginning of 2020 year. It was assumed that the corridor should be finally completed in 2017 year. But, unfortunately, some sections of the road are still being reconstructed. In this regard, we see a predicted drop in cargo turnover in 2012-2017 years. The government expects that the situation should stabilize by 2020 year, when the reconstruction of WE-WC corridor will have been completed (figure 2).

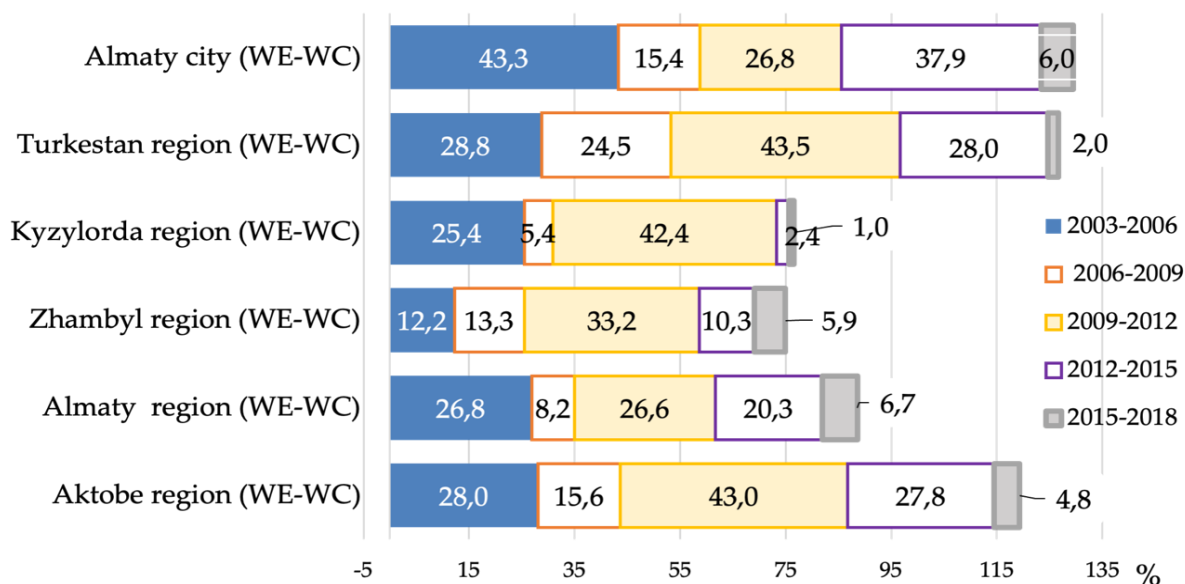


Figure 2 - Freight turnover increase in 5 involved regions
 Compiled by the authors on the basis of data analysis of the Committee on Statistics of the Republic of Kazakhstan [7]

The freight turnover of automobile transport is the most flexible sensitive to the woes of the regional economy. Noteworthy that in regions involved in WE-WC, cargo turnover has grown rapidly only at the borders Aktobe (39%), Turkestan region (40.4%) and Almaty city (76.3%). The most active of the four sections is China - Uzbekistan and Russia - Kyrgyzstan.

In 2009, 2012 years the rate of cargo turnover growth fell by an average of 2.5 times in all directions, this is due to the global crisis, which affected not only Kazakhstan, but also neighboring states.

The increase in cargo turnover is closely related to the periods of sections construction of the corridor WE-WE. For all regions involved in the corridor as a whole during the period of construction of the corridor, the turnover increased by 67.7%.

Noteworthy that the corridor led to an explosion of economic activity even for such weak regions as Jambyl. In 2011-year, cargo growth was observed in all 5 regions. On average, not less than 30% and this record figure can be associated in the policy of transition to a new stage of economic development. Involved in the competition of major participants in the game, such as China, the United States and Russia, the Central Asian states should not forget about reducing transport costs, which determine the main task of creating such corridors [8,9].

Often, internal flows formed over the years change their direction thanks to the strategy of these same major players. Uzbek fruits exported to Europe and caused by the increase in prices for them in the region [10]. Flows of raw materials from Kyrgyzstan to China, exported by sea, despite the shortest distance through Kazakhstan, etc. Price growth in the countries of neighboring countries. «Uzbek agricultural producers supply products not only to the countries of the region. Recently, they have started supplying fresh cherries to China and Korea [11].

The diversification index (RCI) tests the region's ability to develop. The corridor impact criterion, expressed in the dynamic growth of freight turnover, will assess the risks and benefits after connecting to the corridor. The advantage of the proposed index is a deeper assessment with Regional Capability Index (RCI) and Corridor Impact Index (CII). The next step of assessing the region should be the formation of a strategic development plan. Moreover, the plan of the agricultural region will be very different from the raw material region.

The most important objective of this criteria is to develop mechanisms to monitor the reaction of a rapidly changing economy at the regional level and to develop a strategy painless connection to the corridor. Implementation of the proposed indicators in planning, in our opinion, will expand the information base of state regulation of the economy of the Republic of Kazakhstan and Central Asia as a whole.

As it turned out, there are different models for the formation of regional logistics. However, there is a prevailing need to understand what is the role of this transit corridor in the development of regions of Kazakhstan. The cargo turnover of Almaty, Aktobe, Zhambyl, Kyzylorda and Turkestan regions have started to increase after the reconstruction and commissioning of 'Western Europe – Western China' transit road. Moreover, it can be argued that the Almaty region is the most developed in the logistic plan and can be considered the leading potentially ready for the development of the region

Inside the corridor for each region has a common connection, the picture is not homogeneous, despite the exact they all belong to «Western Europe-western China». The proposed indicators will reveal growth points for all regions attached to the corridor. The criteria should include real information on the state of regional links based on a survey of experts, since official statistics for a transparent picture will not be enough.

According to a 2014 study by the EBRD, all regions of Kazakhstan can be divided into groups with high potential, medium, and low. The study showed that the development of a sustainable development strategy should be described as diversifying each region. Below, (Table 2) shows the RCI results. This study is of particular value because it was carried out at the time of the corridor launch.

Table 2 – Regional Capability Index (RCI)

Regions	Regional Economic Complexity Index (RECI)	Contribution to Services sector (SC)	Regional Revealed Comparative Advantage (number of RCA)	Contribution to Processing sector (PC)	Regional Capability Index (RCI)
Weights	25%	25%	25%	25%	$0.25*RECI+0.25*SC+0.25*nRCA+0.25*PC$
Almaty	100	22	60	44	81
Jambyl	74	7	38	36	52
Turkestan	30	6	26	48	33
Kyzylorda	15	13	1	1	1
Aktobe	15	8	4	24	9

Compiled by the authors based on [11]

According to calculations, Kazakhstan, like other countries involved in the construction of the corridor, needs to develop a strategy to solve the problem independence on natural

resources, not even distribution of investment. In addition, this approach will help to address the chaotic development of the services sector and bring regions to a new level of social economic development.

According to analyze the high intelligent export potential was found in Almaty, Jambul and Turkestan regions.

Conclusion.

The main goal of China is to use the BRI initiative as an instrument of economic growth, both for itself and for the acceding states. One of the reasons for launching BRI is the economic activity development in the western region. Inasmuch as this project will connect the landlocked Xinjiang province with energy-rich Central Asia and the Middle East by road and sea. In addition to developing transport infrastructure, the corridor is designed to form economic ties between regions and restructure existing trade relations between Asia and Europe. Which in turn are aimed at creating a platform for the sustainable development of countries in the framework of mutual cooperation.

The proposed model (Figure 3) will allow collecting data on the socio-economic state of the region not only in relation to countries, but also through the channels of goods promotion (strategically important goods, partners, participants in goods distribution, existing infrastructure, investments, etc.), it is important. These data will form an idea of the value chain relative to the channels of goods promotion.

To assess the impact of the corridor, specialists traditionally use gross domestic product (GDP) as a sensitive criterion of country's economy change. Regression usually is used as an analysis method. Her aim to show how closely exists the relationship between indicators. But this method does not reflect influence of each industry on the economy development as a whole.

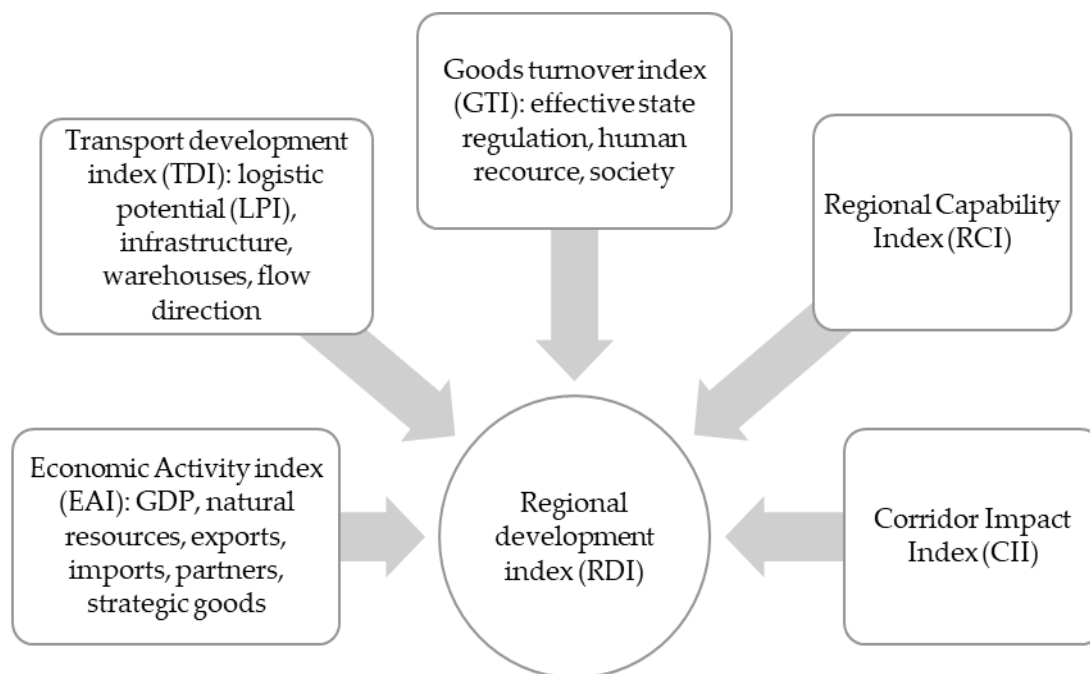


Figure 3 - The data to form an idea of the value chain in the region
Compiled by the authors based on [11, 12]

The diversification index (RCI) tests the region's ability to develop. The corridor impact criterion, expressed in the dynamic growth of freight turnover, will assess the risks and benefits after connecting to the corridor. The advantage of the proposed index is a deeper assessment with

Regional Capability Index (RCI) and Corridor Impact Index (CII). The next step of assessing the region should be the formation of a strategic development plan. Moreover, the plan of the agricultural region will be very different from the raw material region.

The most important objective of this model is to develop mechanisms to monitor the reaction of a rapidly changing economy at the regional level and to develop a strategy painless connection to the corridor. Implementation of the proposed indicators in planning, in our opinion, will expand the information base of state regulation of the economy of the Republic of Kazakhstan and Central Asia as a whole.

REFERENCES

[1] «President Xi Jinping proposes Silk Road economic belt // China Daily». 7 September 2013. URL: [On-line]. Available: http://www.chinadaily.com.cn/china/2013-xi_visit_center_asia/index.html. [Accessed: 14 Apr 2020];

[2] «Қазақстану принадлежить 2452 км дороги в рамках проекта коридора Западная Европа - Западный Китай». [On-line]. Available: <https://www.zakon.kz/4559922-Kazakhstan-prinadlezhit-2452-km-dorogi.html>. [Accessed: 06 Nov 2019];

[3] «О некоторых вопросах административно-территориального устройства Республики Казахстан - Официальный сайт Президента Республики Казахстан». [On-line]. Available: https://www.akorda.kz/ru/legal_acts/decrees/o-nekotoryh-voprosah-administrativno-territorialnogo-ustroistva-respubliki-kazahstan. [Accessed: 09 Mar 2020];

[4] «Ministry of Industry and Infrastructural Development of the Republic of Kazakhstan». [Online]. Available: <http://www.gov.kz/memleket/entities/miid?langen>. [Accessed: 09 Mar 2020];

[5] «Official internet resource of Almaty city». [Online]. Available: <https://almaty.gov.kz/page.php?lang=2>. [Accessed: 10 Mar 2020];

[6] «Kazakhstan tax main trends and areas for development - Forbes Kazakhstan». [On-line]. Available: https://forbes.kz/process/expertise/kazakhstan_tax_main_trends_and_areas_for_development/ [Accessed: 06 Nov 2022];

[7] «Kazakhstan Republic Statistics Committee». [On-line]. Available: <http://stat.gov.kz/>. [Accessed: 06 Nov 2022];

[8] K. A. Damoah, G. Giovannetti, and E. Marvasi, «Global Value Chain Trade along the Belt and Road and Projects Allocation,» 2019;

[9] «Sustainability | Free Full-Text | China's Belt and Road Initiative: A Global Model for an Evolving Approach to Sustainable Regional Development | HTML.» [On-line]. Available: <https://www.mdpi.com/2071-1050/10/11/4234/htm>. [Accessed: 06 Nov 2019];

[10] R. Aoyama, «One Belt, One Road»: China's New Global Strategy, *Journal of Contemporary East Asia Studies*, vol. 5, no. 2, pp. 3 – 22, Jan. 2016;

[11] V. Kummritz, D. Taglioni, and D. Winkler, *Economic Upgrading through Global Value Chain Participation: Which Policies Increase the Value-Added Gains?* The World Bank, 2017;

[12] «Diversification of Kazakhstan's economy: A capability-based approach,» [On-line]. Available: <https://www.ebrd.com/news/2015/new-study-urges-diversification-of-kazakhstans-economy.html>. [Accessed: 06 Nov 2022]

Айслу Тайсарина, магистр, Қазақ-Неміс университеті, Алматы, Қазақстан, taisarinova@gmail.com.

Гауһар Кенжебаева, т.ғ.к., доцент, Қазақ қатынас жолдары университеті, Алматы, Қазақстан, kenzhebayeva.gaukhar.77@gmail.com

Салтанат Бадамбаева, сениор-лектор, Логистика және көлік академиясы, Алматы, Қазақстан, s.badambaieva@alt.edu.kz

ХАЛЫҚАРАЛЫҚ ДӘЛІЗГЕ АУЫРТПАЛЫҚСЫЗ ҚОСЫЛУ ҮШІН ЛОГИСТИКАЛЫҚ ДАМУДЫҢ ӨНІРЛІК ИНДЕКСІН ҚАЛЫПТАСТЫРУ

Аңдатпа. Зерттеудің мақсаты - «Батыс Еуропа-Батыс Қытай» халықаралық дәлізіне қосыла отырып, Қазақстанның логистикасын қалыптастырудың өңірлік аспектісіне назар аудару. Мақалада Қазақстанның өңірлері талданды, әлеуетке баға берілді, әлсіз тізбектер анықталды. Үлкен әлеуеті бар аймақ анықталды. Дәлізге қосылу кезінде тәуекелдерді азайтуға көмектесетін аймақтық даму индексін қалыптастыру үшін ақпарат жинаудың ұсынылған схемасы. Ұсынылған схеманы шешім қабылдаушылар аймақтық логистиканың даму деңгейін бағалау үшін қолдана алады. Бұл мақала аймақтық логистика саласындағы зерттеулермен айналысатын адамдарға пайдалы болады.

Түйінді сөздер. Батыс Еуропа-Батыс Қытай (БЕ-БК), BRI (Жібек жолы белдеуі), ЖІӨ өсімі, көлік дәлізі, аймақтық көлік инфрақұрылымы, жол, жүк айналымы, аймақтық логистика, аймақтық мүмкіндіктер индексі (RCI).

Айслу Тайсаринова, магистр, Казахстанско-Немецкий университет, Алматы, Казахстан, taisarinova@gmail.com.

Гаухар Кенжебаева, к.т.н., доцент, Казахский университет путей сообщения, Алматы, Казахстан, kenzhebayeva.gaukhar.77@gmail.com

Салтанат Бадамбаева, сениор-лектор, Академия логистики и транспорта, Алматы, Казахстан, s.badambaieva@alt.edu.kz

ФОРМИРОВАНИЕ РЕГИОНАЛЬНОГО ИНДЕКСА ЛОГИСТИЧЕСКОГО РАЗВИТИЯ ДЛЯ БЕЗБОЛЕЗНЕННОГО ПОДКЛЮЧЕНИЯ К МЕЖДУНАРОДНОМУ КОРИДОРУ

Аннотация. Цель данной статьи - обратить внимание на региональный аспект формирования логистики Казахстана с подключением к международному коридору «Западная Европа - Западный Китай». В статье проанализированы регионы Казахстана, дана оценка потенциала, выявлены слабые цепочки. Выявлена область с большим потенциалом. Предлагаемая схема сбора информации для формирования индекса регионального развития, который поможет снизить риски при подключении к коридору. Предлагаемая схема может быть использована лицами, принимающими решения, для оценки уровня развития региональной логистики. Эта статья будет полезна лицам, занимающимся исследованиями в области региональной логистики.

Ключевые слова. Западная Европа-Западный Китай (ЗЕ-ЗК), BRI (Пояс Шелкового пути), рост ВВП, транспортный коридор, региональная транспортная инфраструктура, дорога, грузооборот, региональная логистика, Индекс региональных возможностей (RCI).
