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International Trade and Logistics of Kazakhstan and Its Trading Partners: Contribution to Economic Growth and Distribution of Trade Flows*

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Abstract

Purpose: To investigate the intensity of bilateral international trade of the Silk Road Economic Belt (SREB) countries with Kazakhstan, its relationship with logistics (LPI), to assess their contribution to economic growth and distribution of commodity flows. **Research design, data, and methodology:** The method of analyzing the bilateral trade flow was applied by using the trade intensity index (TII) and a multidimensional regression model describing the relationship between LPI and its components, TII, the volume of exports and imports, GDP. **Results:** The nature and directions of the relationship between TII and the key components of logistics, the positive impact of LPI on the intensity of trade are established. It is revealed that the intensity of trade between the countries in the direction of the EAEU-Kazakhstan has a greater impact on the growth of LPI than in the opposite direction. At the same time, the higher the level of trade integration and the volume of GDP, the stronger their impact on the efficiency of logistics and distribution of commodity flows. **Conclusions:** Effective distribution of commodity flows will require the development of logistics components based on the direction of bilateral trade and the size of countries, the intensification of state reforms in the field of international trade and distribution logistics.

Keywords: Trade Intensity Index, Logistics Performance Index (LPI), Bilateral Trade, Silk Road Economic Belt, Logistics, Distribution

JEL Classification Code: N70, F10, F14, Q37, L91

1. Introduction

In the last decade, trade between China and the countries located along the "One Belt, One Road" (OBOR) continued to develop. According to Trade Map data, in 2022 the world exports amounted to $24.4 trillion and imports to $25.0 trillion (Trade Map, 2023). Of these, the share of the leading countries of the Silk Road Economic Belt (SREB) accounts for 5.7 trillion dollars of exports (or 23.7% of all world exports) and 4.8 trillion dollars of imports (or 19.2% of all world imports).

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The multiple growth of trade turnover between the countries in the coming years can only be realized with significant development and improvement of logistics performance. The study of the mutual influence of logistics and trade intensity is related to the following circumstances.

International trade and logistics performance are the driving forces of economic growth, increasing the competitiveness of countries and improving the well-being and quality of life of citizens (Chow et al., 1994; Vilko et al., 2011; Kokurin & Nazin, 2011; Katrakylidis & Madas, 2020; Nguyen et al., 2021).

The increase in trade leads to increased demand for logistics and transport services in countries linked by regional trade unions (Chang et al., 2020). A high level of regional integration ensures a high level of trade intensity (Sawhney & Kiran, 2019) due to logistics factors.

The analysis of logistics factors affecting the development of international trade in the countries located along the Silk Road makes it possible to analyze the effectiveness of logistics development in the country, identify problems and trends, conduct a comparative analysis, and give practical recommendations for improvement.

The main factor of sustainable economic growth is the use of the advantages of economic integration in various fields of activity (transport, tourism, industrial, and others) of countries located along transport routes. Studies by Cinar et al. (2016), Ma et al. (2017), Raimbekov et al. (2018), Nazarko et al. (2017), and Cheng et al. (2019) confirm the growing trend of the need for economic integration of the countries participating in the OBOR project to solve problems of economic growth and development.

In this regard, it is essential to comprehensively study the question of how the implementation of the SREB concept and Kazakhstan's participation in the project will impact the country's economy. First of all, in those regions through which the SREB passes.

This article attempts to study the trade and logistics profile of the SREB countries (EAEU, CAR, Republic of Transcaucasia) and large countries of the region.

The group of these countries includes those directly interested in the revival of the Great Silk Road. In particular, they are classified as following:

- EAEU countries (Kazakhstan, Russia, Belarus, Kyrgyzstan, Armenia);
- Central Asian countries (CAR) (Uzbekistan, Tajikistan, Turkmenistan);
- Transcaucasian countries (Azerbaijan, Georgia);
- European CIS countries (Ukraine, Moldova);
- major countries of the region (China, India, Iran, Turkey, Pakistan).

The main prospect of expanding Kazakhstan's mutual trade with the SREB countries is associated with the possible formation of a free trade zone between these groups of countries and a more efficient distribution of commodity flows.

In this regard, for the development of the SREB, it is necessary to consider the intensity of bilateral trade between Kazakhstan and these countries, to determine the comparative advantages of the logistics performance of a group of countries, to identify the relationship between the intensity of trade with the logistics performance index and their contribution to international trade and economic growth.

Currently, there are numerous studies of bilateral trade among the countries participating in the SREB project. However, there is a limited amount of research that allows us to gain a holistic understanding of the mutual impact of trade intensity and logistics performance in the countries participating in the SREB project, as well as the distribution of trade flows.

Therefore, the importance and necessity of this study is to establish the relationship between the intensity of trade and logistics performance; to determine their contribution to economic growth, and, in the future, to the efficiency of the distribution of commodity flows.

The article focuses on analyzing trade and logistics potential based on the impact of indicators of the intensity of bilateral trade and logistics performance, their contribution to GDP, and recommendations for improvement.

This research consists of a literary review, generalizing scientific views on trade and logistics potential and their contribution to economic growth. The research methodology and data are described. The analytical part consists of two parts. As a result, the conclusions, policy recommendations, and future research are presented in the work.

2. Literature Review

The "Belt and Road Initiative" (BRI) put forward by China will play an essential role in world trade and tourism, cargo transportation, international cross-border cooperation, industrial cooperation, as well as spatial development of territories, the formation of poles of growth, the development of regions in the conditions of modern globalization.

The results show that many of China's Silk Road trading partners have not yet realized all the potential benefits of economic growth. This gap may be limited by various institutional, logistical, transport, and trade barriers that need to be overcome (Cinar et al., 2016).

A comparison of data on the intensity of global trade integration of Eastern European countries made it possible to assess the possible negative consequences of countries'

non-participation in the New Silk Road (NSR). The high indicators presented for the six logistics components (LPI) do not mean that they immediately receive a significant effect from participating in the NSR (Nazarko et al., 2017). Nevertheless, considering the intensity of trade, the analysis allowed us to answer the question about the most promising options for developing NSR.

The work of Ma et al. (2017) shows that the development of logistics has significantly contributed to the growth of trade between China and the countries located along the SREB. The impact of the level of logistics development on trade was different for international and intraregional. There is an increase in this indicator after the initiative of the BRI proposal.

The influence of logistics performance on global bilateral trade has been studied using a gravity model (Puertas et al., 2014; Hausman et al., 2013), which shows that logistics performance is statistically significantly related to the volume of bilateral trade.

The positive impact of logistics on international trade results by increased competitiveness, economic growth, and job creation (Ojenya & Mohammadreza, 2013; Jouili & Khemissi, 2019).

The study of the intensity index of bilateral trade (Islam & Nath, 2023) and the intensity index of intraregional trade of Asian countries (Khalid, 2023) showed their values above one, which means a high trade intensity. That is mainly manifested in trade outside the country than within the country.

The intensity of trade between trading partners in the BRICS and EU countries (Zuev et al., 2023) is influenced by regional trade agreements (RTAs). The countries that signed the RTA had a smaller reduction in trade during the crisis than those that did not.

Exogenous variables, including GDP, GDP per capita, trade freedom, exchange rate, and trade intensity index, have a substantial side effect on bilateral exports of manufactured goods in Saudi Arabia (Gouider & Haddad, 2020).

In developing countries, trade facilitation measures may be underdeveloped, which leads to increased trade costs and hinders the efficient movement of goods across borders due to infrastructure, complex customs procedures, and excessive bureaucracy between government agencies (Arvis et al., 2016). According to Yeo and Deng (2020), underdeveloped and low-income developing countries need more practical measures in trade logistics to facilitate and change import and export processes and optimize the supply chain.

Logistics performance manifests in different ways on changes in the intensity of trade and economic growth, depending on the degree of development of countries. According to the Logistics Performance Index (LPI), the logistics ranking is dominated by high-income countries, and the worst indicators are for countries with underdeveloped economies, which are often landlocked countries (Yeo & Deng, 2020). However, logistics performance is determined not only by the level of per capita income since many countries perform better than others in different income groups.

The benefits of improved logistics performance are tremendous in poorer countries (Wiederer, 2019). The improvement of logistics provides greater access to markets and, thus, could contribute to the development of trade.

The work of Maswana (2020) shows that, depending on the level of the logistics index and Chinese direct investment in Africa, economic growth is usually higher in countries with a higher index of trade intensity of exports of manufactured goods to China. However, the trade of African countries with China is restrained due to the poor quality of logistics.

The literature increasingly emphasizes the importance of international logistics to facilitate trade. Efficient logistics facilitates the procedure of international trade, thereby ensuring the growth of international trade (Green et al., 2008; Çelebi, 2019). Inefficient logistics increases costs (Martí & Puertas, 2017), delivery times, and financial resources (Hausman et al., 2005).

Gani (2017), Bugarčić (2020), using gravity models, have established a stable positive relationship between logistics performance with exports and imports in developing countries with a common maritime border. The importance of logistics components for international trade in exporting countries rather than in importing countries has been established (Selva et al., 2014).

It should be noted that the main disadvantage of the econometric gravity model as a tool for analyzing integration effects is the high volatility of estimates due to the model's sensitivity to a set of factors, the sample, and the evaluation method.

Other studies have used the LPI indicator to assess trade facilitation and its impact on exports (Behar et al., 2013; Martí & Puertas, 2017; Gani, 2017). Using LPI as an explanatory variable for trade, Korinek and Sourdin (2011) confirm that logistics has a noticeable impact on trade, especially where infrastructure is being improved, primarily in middle-income countries, and particularly in exporting countries. An increase in trade intensity positively affects bilateral trade activity (Drysdale & Ross, 1982; Umuhoza & Wang, 2021). To do that, increasing production capacity and improving logistics is necessary.

In addition to trade logistics, bilateral trade is influenced by specific components of logistics: transport and information infrastructure, information and communication technologies (ICT) (Tay, 2020), blockchain technologies (Goyat, et al., 2019), digitalization (Jaruwanakul, 2023).

Summing up, it can be said that increasing the

performance of logistics and logistics services positively affects the volume of international trade. Although there are similar studies of the intensity of trade, and evaluation of logistics performance, but studies of the relationship between them and their joint contribution to GDP have not been conducted before.

The article examines the mutual influence of the intensity of trade and LPI and their joint contribution to GDP for the SREB countries grouped, based on trade integration with Kazakhstan, by GDP size, geographical proximity to Kazakhstan, and membership in integration unions. The purpose of the article is to assess the impact of the intensity of bilateral trade of Kazakhstan with the countries participating in the SREB project on the performance of logistics of Kazakhstan and its trading partners, their contribution to economic growth, and recommendations on trade management and distribution of commodity flows.

3. Research Methods and Materials

There are various methods and interpretations for assessing the dynamics of changes in foreign trade (Islam & Nath, 2023).

To compare the share of regional trade in total foreign trade turnover, on the one hand, and the share of this region in world trade, on the other, the regional trade intensity index is used by the UN Conference on Trade and Development (Gurova, 2009).

In general, the Trade intensity index (TII) (bilateral trade flows) is calculated based on the trade of country "I" with its partner "j" according to formula 1:

$$I_{ij} = \frac{X_{ij}}{X_I} : \frac{M_j}{(M_w - M_i)} = \frac{X_{ij} \times (M_w - M_i)}{X_i \times M_j}, \quad (1)$$

where Iij – index of intensity of bilateral trade flows from country i to country j;
Xi – total exports of country i;
Xij – exporting country i to country j;
Mj – total import volume of country;
Mi – total imports of country i;
Mw – total world imports.

The index takes a value equal to 1 if the countries of the regional group trade between each other with the same intensity as with other countries of the world. Exceeding the threshold value indicates the presence of a "geographical bias" i.e. regional preferences, which are explained by geographical proximity, lower transaction costs, historical and cultural ties (Gurova, 2009).

TII is of greater interest both in terms of the impact on the dynamics of trade changes and the impact of logistics or its components.

The initial data for calculating the TII for 2008-2022 are taken from the website of the International Trade Center (https://www.trademap.org). Calculations of the intensity index of bilateral trade flows of the SREB countries with Kazakhstan are estimated by groups of countries based on trade integration with Kazakhstan, geographical proximity to Kazakhstan, and the volume of the economy.

The LPI Logistics Performance Index characterizes the ease of delivery of goods and the state of trade logistics at the national and international levels (World Bank, 2023). The key components of LPI include (Arvis et al., 2016): "Customs" (efficiency of customs control and border management); "Infrastructure" (quality of trade and transport infrastructure related to transport, for example, ports, railways, roads, information technology); "International transportation" (ease of delivery at competitive prices); Competence and quality of logistics services (transport operators, customs brokers); Ability to track and control shipments; Timely delivery.

The empirical model of the impact of logistics on trade is represented by the formula (2):

$$TII_{it} = \alpha X_{it} + \beta LPI_{it} + \varepsilon_{it} \quad (2)$$

where TII_{it} – index of the intensity of trade between countries for a certain period of time (t);
X_{it} – dependent variables: export, import, GDP;
LPI_{it} – logistics performance index;
KP_LPI_{it} – key parameters *LPI*;
ε – error rate.

To analyze the LPI, the World Bank reports for 2007-2022 (World Bank, 2023) with the participation of more than 160 countries were used, which explain in detail the logistics indicators in these countries. LPI represents the weighted average value of logistics components according to a five-point system. More recent data from some countries (Pakistan, Azerbaijan, Turkmenistan) are unavailable on the World Bank website. However, the low LPI of these countries does not affect the overall result. The score for each of these elements is from 1 to 5 points, where 1 is the lowest and 5 is the highest.

4. Results and Discussion

4.1. Analysis of the Intensity of Kazakhstan's Foreign Trade with the SREB Countries

In the development of Kazakhstan's relations with the

SREB countries, despite the creation of the EAEU, and the SCO, there is a stable intensity of trade relations, as evidenced by an increase in the value of the trade intensity index (Table 1).

Table 1: Index of intensity of bilateral trade flows between Kazakhstan and the SREB states

	2008	2010	2012	2014	2016	2017	2018	2019	2020	2021	2022	average
with the EAEU countries												
Russia - Kazakhstan	16.9	12.8	10.4	11.6	12.2	16.1	18.2	20.1	21.2	20.4	22.5	16.6
Kazakhstan - Russia	3.5	4.7	4.3	5.7	4.3	8.5	8.1	7.3	7.0	8.6	9.7	6.5
Kazakhstan - Belarus	0.3	0.5	0.4	0.4	0.2	0.6	0.8	1.0	0.7	0.9	0.9	0.6
Belarus - Kazakhstan	11.7	8.8	7.2	9.3	10.9	10.7	11.3	12.3	14.0	13.1	13.0	6.1
Kazakhstan – Kyrgyzstan	35.2	31.9	26.9	32.7	41.3	46.1	44.3	43.1	42.2	47.3	48.9	40.0
Kyrgyzstan - Kazakhstan	77.8	82.6	99.9	95.3	90.6	86.1	82.7	80.4	78.5	82.0	83.4	85.4
Kazakhstan - Armenia	0.5	0.4	0.2	0.5	0.6	0.8	0.7	0.5	0.5	0.6	0.6	0.5
Armenia - Kazakhstan	1.7	1.6	1.1	1.3	1.4	1.8	2.0	2.2	2.5	2.3	2.3	1.8
Kazakhstan - EAEU, average	9.9	9.4	8.0	9.8	11.6	14.0	13.5	13.0	12.6	14.4	15.0	11.9
EAEU - Kazakhstan, average	27.0	26.4	29.7	29.4	28.8	28.7	28.5	28.8	29.0	29.5	30.3	28.7
with the CAR countries												
Kazakhstan - Uzbekistan	35.5	29.6	24.3	28.4	30.3	31.8	31.4	31.2	31.5	31.0	30.3	30.5
Uzbekistan - Kazakhstan	44.9	46.3	51.4	55.7	59.3	61.3	62.7	62.1	60.2	67.4	68.0	58.1
Kazakhstan - Tajikistan	40.2	39.3	43.7	45.6	41.2	44.3	46.5	49.5	53.3	52.1	51.3	46.1
Tajikistan - Kazakhstan	75.3	69.4	79.5	81.6	85.3	88.8	96.5	135.6	168.2	148.8	150.5	107.2
Kazakhstan – CAR, average	37.8	34.5	34.0	37.0	35.8	38.0	39.0	40.4	42.4	41.5	40.8	38.3
CAR - Kazakhstan, average	60.1	57.9	65.4	68.7	72.3	75.1	79.6	98.9	114.2	108.1	109.2	82.7
with the Transcaucasian countries												
Kazakhstan - Azerbaijan	3.5	3.7	4.0	4.1	4.1	4.3	6.5	6.9	7.2	7.4	7.3	5.4
Azerbaijan - Kazakhstan	0.3	0.3	0.3	0.4	0.4	0.5	0.7	0.9	1.0	1.0	1.0	0.6
Kazakhstan - Georgia	3.5	3.0	2.7	2.2	1.7	1.1	1.2	1.6	1.9	0.8	0.8	1.9
Georgia - Kazakhstan	19.0	15.6	10.9	12.3	13.2	11.1	14.2	15.8	16.3	13.9	12.5	14.1
Kazakhstan – Caucasian, average	3.5	3.3	3.4	3.2	2.9	2.7	3.9	4.2	4.5	4.1	4.1	3.6
Caucasian – Kazakhstan, average	9.6	8.0	5.6	6.3	6.8	5.8	7.4	8.3	8.7	7.4	6.8	7.3
with European CIS countries												
Kazakhstan - Ukraine	2.9	4.9	6.0	8.3	10.1	11.3	8.3	7.4	6.0	9.5	9.5	7.7
Ukraine - Kazakhstan	16.1	15.3	14.8	12.4	11.8	10.2	8.7	5.7	4.9	3.8	3.8	9.8
Kazakhstan – Moldova	0.2	0.2	0.2	0.3	0.3	0.2	0.0	0.2	0.3	0.3	0.3	0.2
Moldova – Kazakhstan	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.9	0.9	0.9	0.9	0.5
Kazakhstan – European CIS countries, average	1,5	2,5	3,1	4,3	5,2	5,7	4,2	3,8	3,2	4,9	4,9	3,9
European CIS countries – Kazakhstan, average	8.2	7.8	7.6	6.4	6.1	5.3	4.6	3.3	2.9	2.3	2.3	5.2
with major countries in the region												
Kazakhstan - China	1.9	1.9	1.8	1.7	1.3	1.2	1.1	1.0	0.9	0.7	0.8	1.3
China - Kazakhstan	3.4	3.2	2.2	2.2	2.2	2.0	2.5	2.5	2.2	2.2	2.2	2.4
Kazakhstan - India	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.5	0.6	0.6	0.6	0.3
India - Kazakhstan	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3
Kazakhstan - Iran	5.2	3.7	2.4	3.6	4.2	5.1	4.3	3.9	3.3	3.8	3.8	3.9
Iran - Kazakhstan	0.4	0.4	0.4	0.6	0.9	1.2	1.4	1.7	1.2	1.2	1.1	0.9
Kazakhstan - Pakistan	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pakistan - Kazakhstan	0.2	0.3	0.3	0.4	0.5	0.6	1.8	2.1	2.0	2.3	2.3	1.2
Kazakhstan - Türkiye	1.8	2.3	2.7	2.6	2.4	2.2	2.1	1.9	1.8	2.0	1.9	2.1
Türkiye - Kazakhstan	4.5	3.7	2.9	2.8	2.8	2.8	2.7	2.6	2.5	2.0	2.0	2.8
Kazakhstan - Major regional countries, average	1.8	1.6	1.4	1.6	1.6	1.7	1.6	1.5	1.3	1.4	1.4	1.5
Major regional countries - Kazakhstan, average	1.8	1.6	1.2	1.3	1.4	1.4	1.7	1.8	1.6	1.6	1.6	1.5

	2008	2010	2012	2014	2016	2017	2018	2019	2020	2021	2022	average
Kazakhstan - countries SREB, average	9.0	8.4	8.0	9.1	9.5	10.5	10.4	10.4	10.5	11.1	11.1	9.8
SREB countries - Kazakhstan, average	18.2	17.4	18.8	19.1	19.5	19.6	20.4	23.0	25.0	24.1	24.4	20.9

Source: Authors' results. data from the source ITC (https://www.trademap.org).

Analysis of the dynamics of the intensity of bilateral trade of the SREB countries indicates an increase in TII in all groups of countries. However, the most considerable growth is in Kazakhstan with the SREB countries, the EAEU, and the CAR. A substantial decrease in bilateral trade of Kazakhstan is observed with the Transcaucasian republics and European CIS countries and a slight decrease with large regional countries of the SREB.

The average values of the trade intensity coefficient between Kazakhstan and the EAEU countries show that these countries are more interested in increasing trade with Kazakhstan (Fig.1).

Kazakhstan is a vast sales market for the EAEU and CAR countries: the trade flow of the EAEU and CAR to Kazakhstan increased from 27.0 to 30.3 and from 60.1 to 109.2 in the period from 2008 to 2022, respectively (Table 1).

The EAEU countries are a sales market for Kazakhstan: the index of trade intensity in the directions of the EAEU - Kazakhstan increased from 9.9 to 15, and Kazakhstan - CAR from 37.8 to 40.8.

Kazakhstan has an average level of bilateral trade flow with Transcaucasian countries and European CIS countries. It has a low trade intensity indicator with large regional countries (1.5 in both directions).

The analysis of trade intensity for the period 2010-2022 shows that Russia, Belarus, Kyrgyzstan, Uzbekistan, Tajikistan, Ukraine, and Georgia have a very high intensity of trade with Kazakhstan (coefficient above 3); average intensity of trade with China and Turkey (coefficient from 2 to 3); low intensity of trade (coefficient from 0 to 2) - with Armenia, Azerbaijan, India, Iran, Pakistan.

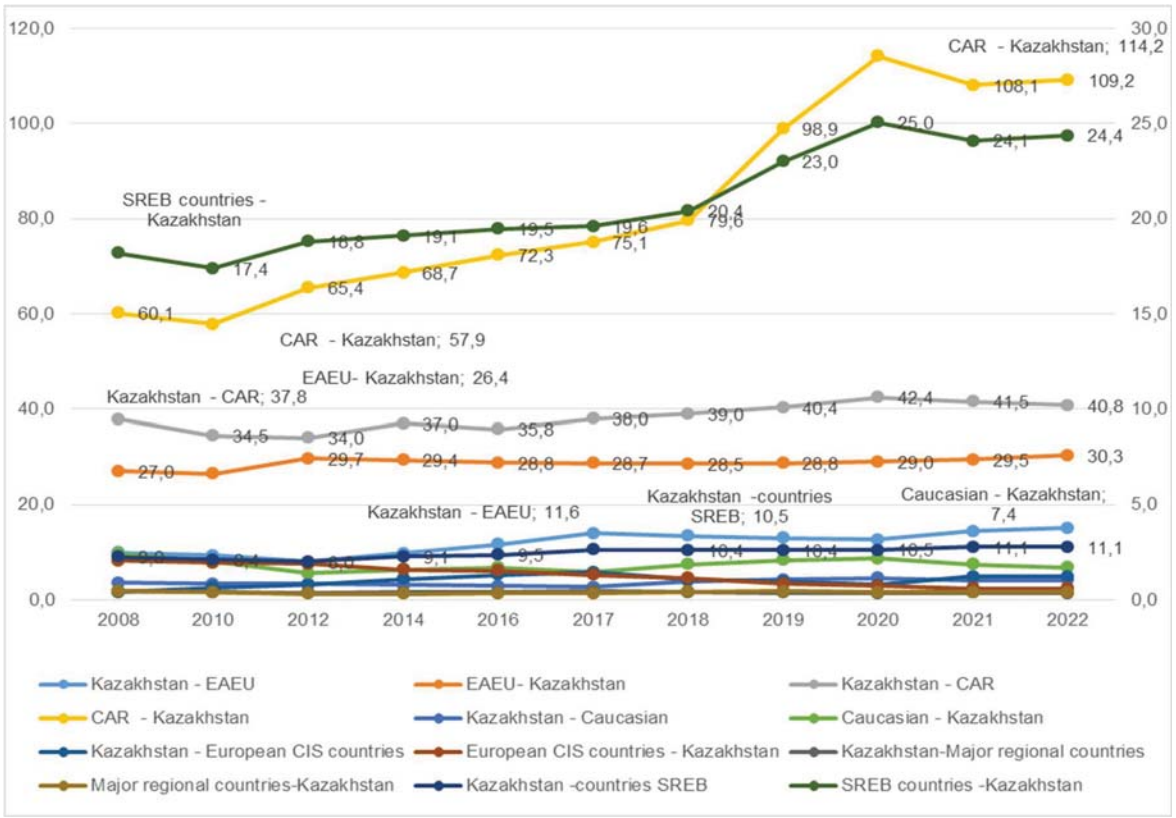

Figure 1: Average Values of the Intensity Index of Bilateral Trade between Kazakhstan and the SREB Countries

Note: The database is available on the website ITC (https://www.trademap.org)
Source: own evaluation.

When considering the indicator in detail by country, there is a tendency to slow down the growth of trade, as well as a decrease in the index in five directions: Kazakhstan-Armenia, Ukraine-Kazakhstan, Kazakhstan-Georgia, China-Kazakhstan, Kazakhstan-Iran, which, in turn, is not an indicator of the weakening of bilateral trade flows. However, there are characteristic annual fluctuations. Most likely, such a trend began to be traced with the systematic alignment of bilateral trade relations between these countries.

It could be noted that, despite a slight increase in the index for the rest of the SREB countries, trade relations between the SREB countries, the EAEU, large states, and Central Asian countries are in a higher priority state for further cooperation within the framework of trade integration and the creation of a free trade zone.

Thus, Kazakhstan's foreign trade with the SREB countries is characterized by stable interdependence. The analysis of the intensity coefficients of bilateral commodity flows between Kazakhstan and the countries of the SREB proves that there is a positive dynamics of trade growth, which is confirmed by the effectiveness of the EAEU free trade zone.

Based on all of the above, the following conclusions could be drawn.

Firstly, the assessment of the intensity of foreign trade of Kazakhstan, Russia, Belarus, and Armenia within the framework of the EAEU shows a gradual decrease in the effect of deviation and reorientation of trade flows both within the territory of the unified EAEU and within the SREB countries.

Secondly, the obtained indicators show that within the framework of trade with the SREB, the greatest interest in bilateral cooperation is traced between Kazakhstan-Kyrgyzstan, Uzbekistan-Kazakhstan, Kazakhstan-Tajikistan, that is, between the countries of the CAR.

The intensification of Kazakhstan's integration processes with the SREB countries contributes to the high efficiency of trade in these countries.

4.2. Study of the Relationship of Logistics with International Trade in the SREB Countries and Their Contribution to Economic Growth

It is crucial to determine how much the growing intensity of trade corresponds to the state of logistics development and whether the existing logistics of a group of countries could serve the foreign trade of these countries. In this context, it is necessary to study the logistical factors affecting the development not of a single country but of a group of countries located along the Silk Road routes.

Table 2 shows the average value of the LPI index and its components in the groups of countries through which the main routes of the SREB pass.

Table 2: Logistics Development Level (LPI index) in Groups of Countries Participating (including potentially) in the Silk Road Economic Belt Route, 2022, in points

	Rank LPI	Score LPI	C	I	IT	CL	ATG	CDT	GDP
Big countries on a regional level									
China	19	3.70	3.30	4	3.6	3.8	3.7	3.8	18463.1
India	38	3.4	3	3.2	3.5	3.5	3.6	3.4	3250.1
Türkiye	38	3.4	3	3.4	3.4	3.5	3.6	3.5	844.5
Iran	123	2.3	2.2	2.4	2.4	2.1	2.7	2.4	1136.6
Pakistan (2018)*	122	2.4	2.12	2.2	2.63	2.59	2.27	2.66	282.3
average	68	3.04	2.72	3.04	3.6	3.1	3.17	3.15	4795.3
EAEU countries									
Kazakhstan	79	2.7	2.6	2.5	2.6	2.7	2.9	2.8	203.6
Russia	88	2.6	2.4	2.7	2.3	2.6	2.9	2.5	1703.6
Belarus	79	2.7	2.6	2.7	2.6	2.6	3.1	2.6	70.6
Armenia	97	2.5	2.5	2.6	2.2	2.6	2.7	2.3	15.1
Kyrgyzstan	123	2.3	2.2	2.4	2.4	2.2	2.4	2.3	8.9
average	93	2.56	2.46	2.58	2.42	2.54	2.8	2.5	400.3
European CIS countries									
Ukraine	79	2.7	2.4	2.4	2.8	2.6	3.1	2.6	203.9
Moldova	97	2.5	1.9	1.9	2.7	2.8	3	2.8	13.3
average	85	2.6	2.1	2.1	2.7	2.7	3.1	2.7	108.6
Central Asian countries									
Uzbekistan	88	2.6	2.6	2.4	2.6	2.6	2.8	2.4	72.7
Tajikistan	97	2.5	2.2	2.5	2.5	2.8	2.9	2	8.7

	Rank LPI	Score LPI	C	I	IT	CL	ATG	CDT	GDP
Turkmenistan (2018)*	126	2.41	2.35	2.23	2.29	2.31	2.56	2.72	60.2
average	103	2.5	2.38	2.37	2.46	2.57	2.75	2.37	47.2
Caucasian countries									
Azerbaijan (2014)*	125	2.45	2.57	2.71	2.57	2.14	2.14	2.57	54.7
Georgia	79	2.7	2.6	2.3	2.7	2.6	3.1	2.8	19.6
average	102	2.57	2.58	2.5	2.63	2.37	2.62	2.68	37.1
EU countries (main trading partners of Kazakhstan)									
Germany	3	4.1	3.9	4.3	3.7	4.2	4.1	4.2	4557.3
Netherlands	3	4.1	3.9	4.2	3.7	4.2	4	4.2	1070.7
Austria	7	4	3.7	3.9	3.8	4	4.3	4.2	520.3
Belgium	7	4	3.9	4.1	3.8	4.2	4.2	4	609.1
France	13	3.9	3.7	3.8	3.7	3.8	4.1	4.1	3140.0
Spain	13	3.9	3.6	3.8	3.7	3.9	4.2	4.06	1570.9
Italy	19	3.7	3.4	3.8	3.4	3.8	3.9	3.9	2272.2
United Kingdom	19	3.7	3.5	3.7	3.5	3.7	3.7	4	3442.2
Poland	26	3.6	3.4	3.5	3.3	3.6	3.9	3.8	720.3
average	12	3.8	3.7	3.9	3.6	3.9	4.04	4.05	1989.2
Worldwide average	66	3.00	2.80	2.92	2.93	3.03	3.24	3.05	99405.0

Note: LPI indicators: C - Customs, I - Infrastructure, IT - International transport, CL - Competence in logistics, ATG - Ability to track goods, CDT - Compliance with delivery terms, GDP- gross domestic product
* More recent data from these countries are not available on the World Bank website
Source: http://lpi.worldbank.org/international

The data in Table 2 show that in terms of logistics indicators for the LPI index and sub-indices for 2022, the largest EU countries with an average LPI score of 3.8 points (Germany, France, Spain and others) are the leaders among these groups of countries. Then there are large regional countries with an average LPI of 3.0 points. In third place are the EAEU countries, with an average LPI of 2.66 points. The countries of Central Asia (2.5 points) and the countries of Transcaucasia (2.57 points) have the worst indicators of logistics development. The EU countries and large regional countries have LPI indicators above the global average, and the remaining groups of countries have indicators below the global average (3.0 points).

It should be noted that Kazakhstan is one of the leaders among the closest trading partners in terms of the leading indicator of the LPI index for 2012-2022, ahead of all the countries of the EAEU, the CAR, and the European CIS countries. The level of development of logistics in Kazakhstan (79th place in the LPI rating in 2022) suggests that the logistics potential of the republic, as a transit country, is not being used enough.

Table 3 shows the relationship between LPI, bilateral trade, and the GDP of the SREB countries.

Table 3: The Impact of the LPI of the SREB Countries on Trade and GDP Indicators

Exogenous variable, X	Constant coefficient (⟨), (t-statistics)	Variable coefficient (β), (t-statistics)	Coefficient of determination
The intensity of trade of the countries of the SREB, average	3.141* (0.980)	0.0214* (3.812)	68.9%
Export of goods and services from the Republic of Kazakhstan to the SREB, million dollars	4.712* (1.433)	0.031* (1.824)	65.4%
Import of goods and services from the Republic of Kazakhstan to the SREB, million dollars	3.810* (1.652)	0.0037* (1.713)	63.3%
GDP of the SREB countries, billion dollars	3.051* (2.382)	0.00003* (2.720)	73.5%

Note: Calculated by the authors
*- 5% significance level

As can be seen from Table 3, there are links between logistics performance and the indicators under consideration, where all regression coefficients are statistically significant at p<=0.05. A higher coefficient of determination indicates a stronger dependence on the independent variable. In our case, GDP (63.3-73.5%) has a good relationship with the LPI index.

It was also determined that in the groups of countries under consideration (large countries, the EAEU, the Transcaucasian countries, and the CAR), LPI has a different

effect on the intensity of trade (see Table 4). In the table, countries are grouped with similar LPI indicators and ranked by the level of logistics performance from relatively high (large countries) to low (CAR).

Table 4: The impact of LPI on the intensity of trade between groups of countries

Exogenous variable, X	Constant coefficient (⟨), (t-statistics)	Variable coefficient (β), (t-statistics)	Coefficient of determination
Trade intensity: major countries	3.291*** (0.008)	-0.066 (0.155)	61.3%
Trade intensity: EAEU	2.872*** (0.007)	-0.011** (0.016)	62.5%
Trade intensity of European CIS countries	2,731*** (0.004)	-0,010 (0.103)	66,7%
Trade intensity: Transcaucasia	2.643*** (0.005)	-0,009 (0.173)	59.7%
Trade intensity: CAR	1.791*** (0.026)	0.0205** (0.023)	60.4%

*p < 0.10; ** p < 0.05; *** p < 0.01
Source: own research

An increase in trade intensity leads to a mutual increase in LPI. Increasing the LPI to constant values of regression coefficients (α) positively affects the intensity of trading. A further increase in the LPI does not affect the intensity of trade. That suggests that to move to a higher level of trade turnover and intensify trade flows, the groups of countries will also need to move to a higher level of logistics performance as was mentioned earlier.

We have found that the larger a country is in terms of GDP and trade volume, the more significant the impact on logistics performance is caused by changes in the intensity of trade of countries and vice versa. As can be seen from Table 6, a change in the intensity of trade by countries by 1% entails a change in logistics performance, and respectively, by countries (large countries, EAEU, European CIS countries, Transcaucasia) by 0.066; 0.011; 0.010 and 0.009 units.

5. Discussion

Differentiating priorities for developing foreign trade depending on the level of logistics performance remains relevant. The obtained values of the analysis of the trade intensity index and logistics performance in the SREB countries show the presence of gaps in the development of logistics and the increase in trade volume. Moreover, the smaller the country is in terms of economic potential, the more noticeable this gap is, which is confirmed by this study.

In general, the TII of the SREB, CAR, and EAEU countries with Kazakhstan is two times higher than the TII of Kazakhstan with these countries and is equal to one in both directions with large countries (Table 1). In this case, for these groups of countries, more attention should be paid to logistics to improve trade terms. On the contrary, the intensity of Kazakhstan's trade with the EAEU countries, the CAR, the Transcaucasian republics, and the SREB is lower by 0.41-0.49 units. That means that Kazakhstan should pay attention to the CIS countries, primarily Ukraine and Moldova, by finding optimal transportation routes due to the war in Ukraine with Russia. The data obtained are generally confirmed by the conclusions of the works (Cheng et al., 2019; Ma et al., 2021).

The intensity of Kazakhstan's trade with the countries: Belarus, Armenia, Georgia, China, India, Azerbaijan, and India in Kazakhstan, is less than 1, which indicates the insignificant importance of the markets of both sides for each other. The index of trade interaction between Kazakhstan and the EAEU countries, Transcaucasia, and the SREB is relatively high (7-12), with the CAR – high (82.7) in the direction of the EAEU, the CAR, and the SREB with Kazakhstan is very high (21-83). In this case, logistics performance should be mutually improved.

The low TII indicators of Kazakhstan with the Transcaucasian republics (3.6), the European CIS countries, and the two-way flow of Kazakhstan with the rest of the SREB countries (1.5) require focusing on the possibility of signing free trade zone agreements with some of the largest trading partners of Kazakhstan from the SREB states, such as China, India, and Iran, which is confirmed by research data from Raimbekov and others (2018).

In the Transcaucasian and CIS countries, barriers to the passage of goods across borders with large regional countries remain high. This process remains opaque, negatively affecting the qualitative improvement of logistics indicators.

The positive dynamics of the index for the SREB and the EAEU countries do not give grounds to consider them focused primarily on trade within the integration or the union. At the level of individual member countries, a high degree of trade integration with union partners is observed with the EAEU, the CAR, Transcaucasia, and large regional countries. However, the intensity of its trade within the union tends to slow down in the CAR, SREB, and European

CIS countries.

It was found that the volume of countries' GDP affects the intensity of trade and logistics performance: the higher the GDP, the higher the intensity of trade and the higher the logistics performance. In countries with low GDP, the intensity of trade is low, and the impact of logistics is also insignificant, which is confirmed by the heterogeneity of development (Ma et al., 2017).

The high intensity of trade in the direction of Kazakhstan with the EAEU, the CAR, the Transcaucasian republics, and the SREB with the effect of creating trade will require a focus on improving logistics performance within the unions.

Thus, an important conclusion is made that the high intensity of trade within the countries in the direction of the SREB-Kazakhstan and the relatively low intensity of trade in the direction of Kazakhstan-SREB indicate the need to increase the performance of logistics within the union as the intensity of trade increases. On the other hand, the low intensity of trade turnover in the countries will require the group of countries of the SREB and the EAEU to focus on the development of mutual logistics and logistics performance in third countries.

We found that the intensity of trade impacts the LPI (in the areas of trade) and GDP. In high-income countries (large regional countries, CIS countries, EAEU), logistics performance is higher; the worst indicators are in low-income countries (CAR, Transcaucasian countries). This provision is consistent with the work of Yeo and Deng (2020), confirming that high-income countries dominate the logistics ranking, and the worst indicators are for countries with underdeveloped economies.

Large countries at the regional level with a higher income level and Central Asia and Transcaucasia countries should carry out deep reforms to reduce barriers to the passage of goods across borders and make this process more transparent.

It is revealed that the more efficient logistics and larger the GDP of the countries included in the SREB project, the more stable is the intensity of trade, which is consistent with the work of Ma et al. (2021).

Perhaps the size of the country in terms of GDP does not substantially impact the intensity of trade. However, it was not determined. We will continue further studies as data accumulates.

It was also possible to determine the impact of various logistics components (infrastructure, customs) on trade and GDP, which means the need for continuous investment in logistics.

The proposal aimed at increasing investments in logistics and trade infrastructure (Gani, 2017) and reducing dependence on distant foreign suppliers (Javorcik, 2020) is gaining popularity. However, the sustainability of trade in the context of a pandemic indicates that such proposals are premature or erroneous (not entirely correct) (Antràs et al., 2023; Miroudot, 2020; Eppinger et al., 2021).

The main administrative and legal obstacle to increasing cargo turnover between the EAEU countries, China, and the EU is the insufficient unification of accompanying documents and technical regulations (Vinokurov et al., 2018). It is necessary to expand the "bottlenecks" of the transport infrastructure, which requires limited capital investments: the construction of additional railway tracks, electrification of railway sections, and others.

Under these conditions, the data we have obtained allow us to diversify investments in logistics and trade based on the size of a country or group of countries, as well as the direction of their trade (export, import), their proximity to a trading partner, actively support public-private partnerships in logistics and trade, which can contribute to improving the efficiency of international trade and growth economy.

The applied significance of the work consists in recommending to state bodies to make changes in foreign trade policy, including the reorientation of the leading country trade directions, which can contribute to increasing foreign trade potential with the same volumes of domestic production and thereby give impetus to further development.

6. Conclusions and Recommendations

The study showed that the high-intensity indicators of Kazakhstan's trade with the countries under consideration are associated with existing economic ties and the country's vast economic potential and geographical location. The high intensity of trade turnover in various directions (export-import, geography of destinations) and the low performance of logistics (below the global average) emphasize the need for dynamic development of logistics infrastructure, reducing customs barriers and costs, improving the quality of training and service, which will affect the greater scalability (ability to work under increased loads) of transport and logistics, and increase their contribution to the economy.

Large countries mainly determine world trade and economic growth. However, public policy measures in logistics could help create a favorable environment and reduce the costs associated with expanding integration ties for other countries with low GDP, logistics, and trade indicators.

Based on the research results, the following recommendations are proposed in terms of improving the efficiency of trade and logistics, and increasing their contribution to economic growth and distribution of commodity flows of the EAEU and SREB countries.

1) In the field of political regulation. One of the apparent directions is the improvement of infrastructure: the

development and implementation of joint state projects and programs for the EAEU countries and the SREB countries in general in infrastructure and customs, as this is associated with high transport and trade infrastructure costs.

In order to equalize the intensity of trade, the remaining components of the LPI (training, infrastructure modernization, international transportation) should be transferred to the management of the private sector, where logistics activities are carried out more efficiently. That applies not only to Kazakhstan but, first of all, to the EAEU countries, perhaps through the creation of joint private companies or a public-private partnership mechanism.

To intensify trade and equalize it, the EAEU countries with their SREB trading partners should digitalize the sphere of foreign trade, transport, and logistics: creating a single ecosystem of digital transport corridors in the EAEU countries, the CAR and in the future - for all SREB countries.

In order to increase the attractiveness of Kazakhstan, together with the EAEU countries and the SREB, it is necessary to strive for coordination, perhaps even joint planning of logistics and international trade processes to increase performance indicators to the level of logistics of developed countries.

The reduction of customs barriers is expected by transferring the interaction of participants in foreign economic activity with customs and other regulatory state bodies into a digital format.

As part of improving trade cooperation between Kazakhstan and the SREB countries, special attention should be paid to diversifying transport corridors and logistics structures to enhance mutual trade.

It is necessary to increase the level of personnel training for the logistics industry, restructure the logistics systems of the EAEU countries and integrate them into the Eurasian Logistics System.

The future of the SREB countries depends on reducing non-tariff restrictions, deepening integration within the framework of unification of regulatory systems from the point of view of the foreign economic system, and improving the state of logistics components, based on the priority of their development.

In this regard, when making essential state decisions by the authorities of groups of countries participating in foreign economic activity or support in logistics and trade, it is necessary to approach differentially, taking into account the direction of bilateral trade and its intensity. The high intensity in the direction of the movement of trade flows requires greater activity in investments and in the regulation of foreign economic activity of participants.

2) In the field of supply chain work and distribution of trade flows. Reducing the costs of international transportation could give impetus to the rapprochement of trading partners located in the neighborhood, optimize the routes of vehicles, the construction of global logistics centers on the borders of the countries of the Russian Federation, Kazakhstan, and Belarus, increase the productivity of employees, the formation of prefabricated batches of products transported in two directions.

The transition to integrated logistics customer service is a complete “outsourcing” of transport and logistics services on the international market. To do that, it is advisable to create a joint logistics company between the EAEU countries, further - between the EAEU countries and the SREB, which will significantly expand the range of transport and logistics services (including planning, control, management, and delivery) with the active use of outsourcing logistics services (3PL technology) on the international market.

Also, to intensify trade, it is essential to improve the regulatory framework between groups of countries, based on the priority of the direction of trade, in particular, on interstate intermodal transport, on the unification of document flow, on the creation of a single and end-to-end tariff for cargo transportation and information services based on a single document flow.

Efforts are needed to implement a coordinated tariff policy and the unification of regulatory and technical regulations (rules for the transportation of various types of cargo, parameters of the rolling stock used, environmental standards, etc.).

7. Limitations and Further Study

There are some limitations to this study. Logistics performance index data are presented from 2007 to 2022 every two years, which may affect the quality of the study. Therefore, as the data increases, it would be possible to conduct similar research considering other indicators and other countries included in the OBOR project.

The data obtained are still being determined and require further inclusion of significant indicators and many countries for such kind research. However, the data obtained indicate the existing connections and the possibilities of using them as a basis for managerial decision-making.

Particular attention should be paid to developing a general strategy for developing logistics in the SREB countries by groups of countries based on the efficiency of trade, which may become the direction of future research.

Future research may also include an in-depth study of the impact of specific groups of trade goods on the development of logistics in the SREB (Nazarko et al., 2017). Another exciting area of research may be bottlenecks affecting the compatibility and effectiveness of the logistics and trade policies of the countries participating in the SREB project.

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