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RESEARCH ARTICLE
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Formation of Industrial and Logistics Hub in the Border Areas of Kazakhstan and Uzbekistan

Gulmira Bodaubayeva[1]* | **Kulyash A. Turkeeva[2]**

[1] Almaty Management University, Almaty, Kazakhstan

[2] Institute of Economics Science Committee MSHE RK, Almaty, Kazakhstan

Corresponding author:
*** Gulmira Bodaubayeva -** Cand. Sc. (Econ.), Associate Professor, Almaty Management University, Almaty, Kazakhstan. Email: g.bodaubayeva@gmail.com

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Abstract

Central Asia is a strategic region of the China-Europe continental bridge. The conflict between Russia and Ukraine has seriously affected international supply chains, which has led to the intensification of the development of alternative corridors and the construction of new regional logistics hubs along them. The purpose of the research is to determine, on the basis of these sources, the factors of the formation of industrial and logistics hubs, as well as the directions of their development on the example of the border regions of Kazakhstan and Uzbekistan. In preparing this article, a mixed research strategy was used, which implies quantitative and qualitative methods. It consists not only of the systematic study of the literature on the research topic and statistical information but also involves the implementation of theoretical studies, comparison, generalization and analysis of the results, argumentation and formulation of conclusions. The study identified the main constraining factors for the development of such centres delays in customs inspection, inconsistency in the legal framework of the transportation process, underdevelopment of infrastructure, low level of digitalization and the use of information systems, the use of non-tariff barriers, low level of digitalization and the use of information systems. The creation and development of integrated transport services based on a digital platform will speed up this process. In addition, taking into account these factors, the components of an industrial and logistics hub are proposed: an industrial zone, a logistics zone, a trading zone, a certification zone with appropriate services, as well as a digital platform as a link between all components.

Keywords: Economic, Logistics, Logistics Hub, Industrial Hub, Border Area, Kazakhstan, Uzbekistan

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1. INTRODUCTION

As part of the One Belt, One Road initiative, further growth in demand for the development of logistics infrastructure along the China-Europe continental bridge, of which Central Asia is a strategic part, is predicted. Regionalization in Central Asia will inevitably occur under the influence of the main "power centers" operating here - Russia, China and the United States. The conflict between Russia and Ukraine has seriously affected global supply chains, which has led to the intensification of alternative corridors and the construction of new regional logistics hubs along them. Thus, global changes give new impetus to soften foreign economic interaction in new directions. For Kazakhstan, Uzbekistan has recently become such a direction. Having common borders, Kazakhstan and Uzbekistan have all the prerequisites for deepening cross-border cooperation. Cross-border infrastructure projects play an important role in allocating resources, promoting sustainable development, increasing the profitability of transport corridors, and obtaining new markets for goods and services.

In this context, Kazakhstan's proposal to Uzbekistan to participate in the development of the Trans-Caspian International Transport Route (TITR) is of interest. Another initiative in the region is the formation of the Shymkent-Tashkent-Khujand Economic Corridor (STKEC), under which ADB funded a feasibility study to establish an International Industrial Cooperation Center (IICC) between Kazakhstan and Uzbekistan. There are many reasons why this geographical area can become a dynamic economic corridor. Among them: a) advantageous location and spatial features of the region; b) high population density; c) high economic activity in the region; d) close historical, cultural and ethnic ties. Due to its geographical location, only Kazakhstan can provide Uzbekistan with transit to the north, and important transport arteries from Kazakhstan to the south pass-through Uzbekistan. Currently, more than 50% of the trade turnover of Uzbekistan passes through the territory of Kazakhstan.

The development of transport and logistics hubs in the border areas of Kazakhstan and Uzbekistan will contribute to developing trade in the region, creating joint ventures, and improving the quality of transport and logistics services. Through the center, it is planned to carry out cooperation projects in the field of agricultural products, automotive, electronics, pharmaceuticals, and building materials and export them to foreign markets through the border industrial and logistics hub. The center is offered to be in the area of the international checkpoints "Atameken" - "Gulistan". In 2021, Uzbekistan ratified the ESCAP Agreement on dry ports, designed to simplify the transportation of international cargo, allowing it to be registered as a land port of international importance in the future. Central Asia is considered one of the world's regions with higher logistics costs, averaging 20% of GDP compared to 9% in OECD countries (ITF, 2019). Thus, trade and logistics services and production clusters can provide cooperative ties with the international market. The purpose of the study is to determine, based on these sources, the factors for the formation of industrial and logistics centers, as well as the directions of their development on the example of the border regions of Kazakhstan and Uzbekistan.

The relevance of this research is substantiated by the fact that today the level of development of logistics in Kazakhstan needs to be improved. For example, according to the logistics performance index (LPI), Kazakhstan 2023 took 79th place in the world, 8 points lower than in 2018. At the same time, Uzbekistan took the 88th position. If we compare the sub-indices, we can see that the worst indicators for Kazakhstan were "timeliness" and "international transportation", while for Uzbekistan, these were "timeliness" and "cargo tracking". In connection with the preceding, it is necessary to study the features associated with the development of transport corridors in which both states participate, their advantages, disadvantages, and reasons for the low level of logistics development indicators in order to determine the factors, components and directions for the development of an industrial and logistics hub in the border region between Kazakhstan and Uzbekistan.

2. LITERATURE REVIEW

Dry ports, logistics parks, cargo villages, inland terminals, and intermodal terminals are several terms at different operational levels that are used in other countries and regions to describe logistics centers (Wagener, 2017). According to the European Association of Logistics Platforms (Europlatforms EIGG1), logistics centers are areas that include all types of logistics activities and have intermodal transport capabilities managed by legal entities to ensure European standards and quality for sustainability. Moreover, because multimodal transport has some disadvantages and the need to overcome these problems, new concepts of synchronous modality are emerging (Dong et al., 2018; Qu. et al., 2019), where it was possible to find a new solution for more flexible and integrated freight transport. The level of integration, i.e. the ability to integrate different modes of transport to ensure the efficient and economical use of the transport system, is an essential attribute of freight villages. More companies allow for more efficient use of terminals in terms of economies of scale (Uygun & Niyayesh, 2022). A significant reduction in logistics costs to the best - optimal - level is possible through effective management and coordination of internal processes of individual supply chains controlled by logistics centers. This, in turn, leads to the creation of additional values (profits) for all the entities that make up this center (Świerszcz & Ćwik, 2018). The directions for the future development of logistics centers are mainly related to the implementation of IT systems and data transmission systems (Kostrzewski et al., 2021).

Although logistics centers were created to facilitate and enhance domestic cargo flow, they are connected to the business generators due to globalization, changing processes, the need for an efficient supply chain, and economic and environmental consequences (Yang et al., 2017). Accordingly, they must keep up with the times and consider the new problem-solving paradigm. Thus, the new concepts of industrial and logistics centers must be explained in detail.

The new industrial paradigm has enabled LCs to meet new logistics needs and achieve competitive advantages. LCs must evolve automated systems if they desire to remain part of operations (Taliaferro et al., 2016). Kazakhstan has an opportunity to increase the attractiveness of its logistics services through its digital transformation. Digital innovation materialized in most cases by a digital platform.

A study conducted by McKinsey Quarterly with the participation of 1600C-suite executives in companies from different sectors and key regions shows that 43% of digital players on the platform and 52% work on third-party platforms, leaving only 5% of digital players without an explicit platform (Bughin et al., 2019). In the platform business model, digital actors play the role of intermediaries, offering a digital platform on which users can connect and make transactions with suppliers (Katz, 2015). There are now logistics platforms worldwide, such as the European Logistics Platform, under which DHL, P&G, Volvo, Michelin, the European Rail Freight Association and others operate.

Other papers also address the challenges facing the global value chain, such as the effects of I4.0 re-localization or changes in the interaction and power relations between participants in the value chain (Dachs et al., 2019; Strange & Zucchella, 2017). A key research topic of logistics platforms is that they see as an organizational structure that promotes coordination and communication throughout the supply chain to ensure smooth transport links and coordination with various modes of transport (Varella & Buss Goncalves, 2013). Consequently, in some studies, they called intermodal logistics platforms, the purpose of which is to ensure the integration of different supply chain agents in the same physical location (Cambra-Fierro & Ruiz-Benitez, 2009). They usually become regional logistics platforms capable of stimulating and facilitating logistics activities, business exchanges and urban development in a specific geographical region (Boudoin et al., 2014; Silva & Leyte, 2019).

The concept of the platform, including the principles of construction, its architecture, ecosystem, and methods of organization of interaction of all participants of the transport and logistics chain, should be created first. Only after that should we proceed to its implementation, otherwise, we will get the current chaos and duplication in the relationship "all with all" in the digital format. In addition, the platform will address the problem of interaction between the state authorities at the borders and private logistics structures. Despite the widespread adoption of platform strategy in the logistics sector attracting wide attention from academia and practitioners, developing knowledge about logistics platforms is still at an early stage. Strategy concepts often differ and depend on the context in which the strategy is implemented (Grzybowska & Gajsek, 2016).

Thus, it can be concluded that logistics hubs play an important role in ensuring the efficiency of the transport system and creating additional value for the participants. They must consider changing processes and new logistics needs brought about by globalization, supply chains and environmental factors. Digital platforms are becoming effective in improving logistics services and achieving competitive advantages.

3. METHODOLOGY

In preparing this article, a mixed research strategy was used, which implies quantitative and qualitative methods, the results of which will complement each other.

The main research questions were:

- What factors are essential in forming an industrial and logistics hub in the border areas of Kazakhstan and Uzbekistan? Based on this, what components are included in the model of the industrial and logistics hub?

- What are the development directions of the industrial and logistics center in the border areas of Kazakhstan and Uzbekistan?

This project uses a descriptive type of research. It consists not only of the systematic literature review on the research topic and statistical information but also involves the implementation of theoretical research, comparison, generalization and analysis of the results, argumentation and formulation of conclusions, practical recommendations, and suggestions.

The main stages of the study are:

(1) In the first stage, the factors of transport connectivity between Kazakhstan and Uzbekistan. Then, it was decided to investigate the transportation volumes and transit tariffs along the main international corridors to compare the potential of Kazakhstan and Uzbekistan and their opportunities in terms of price competition with the UTLC-ERA corridor. It was also decided to consider each country's interests when building its own policy for developing existing transport corridors.

(2) Analysis of statistical data. During the secondary research process, various secondary sources were used, such as reports from the World Bank, CAREC, Eurasian Economic Commission, and Committee on Statistics of the Republic of Kazakhstan, to identify and collect information for this research. Based on the study of sources, factors for developing international transportation between Kazakhstan and Uzbekistan were identified. In particular, the following criteria were used: time spent passing through the border crossing points (BCP), cost of passing through the BCP, cost of transportation along the corridor section, and speed of transportation along the CAREC corridors. Analyzing the dynamics of these indicators from 2015 to 2020, we can see progress or regression and the current status of trade facilitation indicators. Therefore, when considering these indicators, it was decided to focus more closely on the problems that caused the low indicators level. This made it possible to determine the factors for the development of international transportation between Kazakhstan and Uzbekistan in order to deepen the

economic integration of border regions.

(3) At the final stage, recommendations were developed for forming an industrial and logistics hub between Kazakhstan and Uzbekistan in terms of institutional, infrastructural, and process approaches. Also, at this stage, a study of the current state of the production and logistics infrastructure, existing transport corridors, and trade flows is being carried out. This allows you to identify potential areas for the development of the production and logistics center and highlight priority sectors for development and investment.

Thus, this research methodology provides a comprehensive analysis and answers the main research questions. This provides convincing results supported by arguments, conclusions and practical recommendations for the formation of an industrial and logistics hub in the border regions of Kazakhstan and Uzbekistan. Through these three steps, it will be clear what should be oriented towards achieving high rates of cargo movement along international transport corridors and technological integration of the hub into the international multimodal network.

4. FINDINGS AND DISCUSSION

In 2021, Kazakhstan's export to Uzbekistan decreased, while Uzbekistan's exports to Kazakhstan increased. The decrease in exports was due to a reduction in tonnage when transporting grain, scrap metal, oil products, and coal. The increase in Uzbekistan's exports to Kazakhstan was due to a rise in the transportation of building materials, chemicals, soda, and ferrous and non-ferrous metals. Transit is like the sum of imports and exports by rail, demonstrating the importance of transit trade. Currently, more than 50% of the trade turnover of Uzbekistan passes through the territory of Kazakhstan (Ionova, 2018).

Road transportation recovered significantly in 2021 after falling in 2020. Kazakhstan's exports to Uzbekistan and Uzbekistan's transit traffic through Kazakhstan showed strong double-digit growth. Goods moving in the direction from Kazakhstan to Uzbekistan included wood, and its products, rubber and its products, chemicals, apparatus, and equipment. In the opposite direction, goods such as consumer goods, fabrics, and textiles are sent by trucks. Volumes of transportation between Kazakhstan and Uzbekistan presents in Table 1.

TABLE 1. Volumes of transportation between Kazakhstan and Uzbekistan, million tons

Variable	Rail transportation			Road transport		
	2020	2021	Change, %	2020	2021	Change, %
From Kazakhstan to Uzbekistan	9.637	7.665	-20.5%	0.286	0.501	75%
From Uzbekistan to Kazakhstan	1.071	1.742	63%	0.759	0.815	7%
Transit	9.817	9.823	0.06%	1.143	1.623	42%
Total	20.525	19.230	-6.3%	2.188	2.939	34%
Note: compiled by authors						

Wagener (2017) has demonstrated the importance of logistics centers for international freight corridors. Moreover, because of the restriction of transportation within the territory of the Russian Federation Kazakhstan may face a decline in transit revenues. The country was the main beneficiary of the regular United Transport and Logistics Company (UTLC) freight container train from China to Europe, crossing Kazakhstan, Russia, Belarus and Poland. Traffic from China to Europe direction has grown rapidly, from 1,900 to 14,000 in 2021.

Currently, the Middle Corridor (TITR) is attracting considerable attention since there are no other competitive alternatives. Kazakhstan is a member of the TITR Association, within which,

since 2017 multimodal container transportation according to approved complex rates for transportation of goods through the ports of Kuryk/Aktau - Baku (Alyat) - Batumi/Poti, incl. to/from Kazakhstan and Central Asia, to/from China and Southeast Asia to/from Azerbaijan, Georgia, Uzbekistan, EU, Turkey. According to TITR, the number of TEUs from China to the Caucasus and Turkey increased from almost zero in 2017 to 15,000 in 2018 and 33,600 in 2022.

As shown in the following table, TITR rates per km are comparable to UTLC rates, although travel times are longer despite shorter distances. Perhaps this is related to additional operations required for maneuvering, loading, and ferries and transportation through the Caspian Sea, as well as waiting time.

Next, consider the data Comparison of TITR and UTLC tariffs in Table 2.

TABLE 2. Comparison of TITR and UTLC tariffs, 2022

Variable	Route	km	Tariff for transportation of a 40-foot container, $	$ /km	Time
TMTM	Altynkol-Poti	4500	3100	0.69	16-20 days
	Poti Altynkol		1550	0.34	16-20 days
UTLC	Altynkol-Brest	5200	2700-3000	0.52-0.58	8-10 days
	Brest-Altynkol		2400-2800	0.48-0.56	8-10 days
Note: compiled by authors					

Even though the fact that the efforts of both countries have recently been directed towards the development of transit corridors, it should be taken into account that the interests of Kazakhstan and Uzbekistan do not coincide in some areas. For example, Uzbekistan is actively lobbying for the China-Kyrgyzstan-Uzbekistan railway project, bypassing the territory of Kazakhstan. Kazakhstan has also supported the Uzbek project to build the Mazar-i-Sharif-Kabul-Peshawar railway as an opportunity to enter the future trans-Afghan corridor. But it will not be possible to realize it without serious investments and without the support of the Taliban and Pakistan, who must guarantee the safety of the railway. No less important for the countries of Central Asia is cooperation within the framework of the international North-South corridor with access to Iranian seaports, which is also of interest to India.

Theoretically, in case of its successful implementation, part of the flow can be redirected from the territory of Kazakhstan to this corridor. Nevertheless, it is important to consider all these and other projects in the context of regional interconnectedness and integration, and not in isolation from each other in a purely national framework.

According to OECD estimates, global connectivity in Central Asia averages less than 60 %. The components of this index include distance, transport costs including border crossing and handling, cost, travel time, and border crossing time. The cost of importing and exporting goods in Central Asia remains high, which undermines their competitiveness.

One of the main problems of low transport connectivity is differences in customs and trade regulations. Kazakhstan is a member of the WTO and the EAEU, while Uzbekistan has not yet joined the WTO and has observer status in the EAEU, which hinders border trade through visa requirements, informal fees, lengthy and expensive customs and border procedures, and restrictions on the movement of goods and entry of foreign vehicles.

Customs authorities inspect cargo when suspected of prohibited goods, such cases are defined as the “red corridor”, and it is estimated that in Kazakhstan from 2% to 3% of all deliveries pass through it. Uzbekistan customs reported that the share of shipments passing through the red corridor is 24%.

Corridor Performance Measurement and Monitoring (CPMM) conducted by ADB in the Central Asia Regional Economic Cooperation (CAREC) region shows that BCPs in Central Asia

are generally congested and carriers take longer to cross borders. Inadequate infrastructure, suboptimal layout, cumbersome control procedures, and inconsistent operations cause delays.

Next, Kazakhstan-trade facilitation indicators presents in Table 3.

TABLE 3. Kazakhstan-Trade Facilitation Indicators, 2015-2020

Kazakhstan	Road transport						Rail transportation					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Time taken to pass through the BCP (hour)	3.8	4.4	8.6	7.1	9.2	8.7	40.6	42.5	44.0	40.5	39.9	48.6
BCP Pass Costs ($)	104	113	124	96	115	123	333	369	381	332	327	341
Transportation costs along the corridor section ($ per 500 km, per 20 tons of cargo)	909	825	654	791	715	1850	1107	929	808	768	687	724
Travel speed along CAREC corridors (km/h)	30.6	31.5	28.8	30.5	30.7	29.2	17.6	17.2	17.5	19.9	18.1	15.3
Speed without delay (km/h)	47.8	52.0	53.9	56.3	53.2	52.9	51.8	5 3.6	56.4	53.2	67.8	65.2
Note: compiled by authors												

It is noted that border crossing times at rail checkpoints took longer than at road checkpoints and that leaving the BCP took longer than entering it. The border crossing time for rail transport was already high in 2015 (40.6 hours), and 2020 it increased to 48.6 hours. The inbound cargo was the primary source of longer delays. Border crossing costs for rail travel were higher than those for road transport, rising from $333 in 2015 to $341 in 2020. Slow border crossing times have offset some of the effects of the increase in average train speeds across Kazakhstan (from 51.8 km/h in 2015 to 65.2 km/h in 2020) and reduced the overall transit speed to 15.3 km/h in 2020 from 17.6 in 2015.

Further, Uzbekistan - trade facilitation indicators presents in Table 4.

TABLE 4. Uzbekistan - Trade Facilitation Indicators, 2015-2020

Uzbekistan	Road transport						Rail transportation					
	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020
Time taken to pass through the BCP (hour)	5.9	5.9	5.8	8.5	7.7	10.1	10.5	9.4	7.5	5.6	6.2	6.4
BCP Pass Costs ($)	89	99	88	73	87	102	97	103	98	99	99	100
Transportation costs along the corridor section ($ per 500 km, per 20 tons of cargo)	445	426	423	477	600	648	1710	1409	1138	971	778	671
Travel speed along CAREC corridors (km/h)	29.4	28.5	28.0	28.5	28.6	26.6	10.4	10.8	10.0	14.0	10.5	9.7

Speed without delay (km/h)	49.3	47.6	46.8	50.8	49.6	46.9	41.6	36.5	25.3	27.9	38.2	21.9
Note: compiled by authors												

From the tables it can be seen that the speed without delays is two, sometimes three times higher than the actual speed of transportation, that is, all the time that was saved on the way to reach the borders is lost as soon as the vehicle reaches the border.

There are a few problems and factors to the development of cross-border logistics centers:

1. *Delays during customs inspection.* As members of the CIS countries do not apply import tariffs, there are various non-tariff barriers between countries, such as sanitary and phytosanitary measures and technical standards. There is no coordination between control services at the border, which is why paper copies of documents are required in various departments. There is also no coordination between departments on the border and those inland, and the slightest error or typographical error causes a significant delay in obtaining an export permit. Cooperation between the customs services of Kazakhstan and Uzbekistan is insufficient. In 2018, the customs authorities of Kazakhstan and Uzbekistan signed an agreement on mutual recognition of customs control of certain types of goods and adopted a risk management system. However, the agreement only applies to a limited number of goods, and most shipments are subject to physical inspection. To do this, the container/wagon is delivered to a private railway marshalling yard, where the cargo is unloaded, checked, and reloaded. All vehicles undergo physical inspection on both sides of the border. This process increases the transit time and the cost of crossing the border. This can also be seen in the table. In Kazakhstan, the time and the cost of passing through the border point by rail is 48.6 hours and $341, respectively.

Solution:

- move from physical checks to a risk management system.
- establish joint customs, transport, and other types of control, and establish cross-border electronic data exchange between countries' "Single Windows".
- harmonization of data requirements for customs clearance of goods.
- to implement electronic license forms for trucks.
- to adopt standards for passing the state borders by a cargo vehicle.

2. Non-compliance with the legal framework of the transportation process. Document harmonization has not been completed. Translations and language barriers can be a problem at some borders.

Solution:

- to the maintenance of the electronic consignment note of the CMR.
- introduction of a multimodal waybill with international recognition and responsibility of the principal, which will allow you to follow in the transit mode when changing the mode of transport without the need for multiple transport documents.
- introduction of the electronic TIR system (eTIR), the ATA (Admission Temporaire/Temporary Admission) carnet system, and the CAREC Advanced Transit System (CATS-CATS)/Common Information Exchange (ICEIOI).

3. *Infrastructure underdevelopment*. The railway network in the region was built mainly during the Soviet period and many sections are in poor condition. The capacity of railway stations in the border area is insufficient for such a large volume of traffic. There is a lack of necessary equipment on the access roads for receiving/sending containers. Non-intrusive inspection equipment, such as X-ray machines, is either not available or is outdated and often breaks down, causing customs officials to conduct manual checks on vehicles and cargo. All of the above is the reason for their high costs and time to cross borders in the region. The shortage of freight wagons in Uzbekistan is causing delays in the return of wagons owned by other countries from

Uzbekistan. This increases the cost of delivering goods to Uzbekistan, as wagon owners in Kazakhstan are reluctant to rent out their wagons for shipment to Uzbekistan.

Solution: Adopt a financing program with a rate of up to 4% aimed at stimulating the purchase of saddle tractors and universal platforms for the transportation of containers.

4. *High rates*. Tariffs charged by the Kazakh railways for the transit transportation of goods are significantly higher than the tariffs for transportation to/from/within Kazakhstan. In this regard, goods transported to Uzbekistan are often reloaded from railway to road transport in the Turkestan region. Lack of economies of scale due to small volumes, because of which transit transportation through Kazakhstan is carried out using the technology of wagon shipments. It should also be mentioned that China subsidizes transportation to Europe but is less interested in transportation to/from Central Asia.

Solution:

- Transition to an open and transparent model for the formation of tariff and transit policies of transit countries. UTLC-ERA provides direct forwarding services. According to the same principle, organising an integrated company, including TITR participants - Kazakhstan, Azerbaijan, Georgia, and Uzbekistan is possible.
- Launch of a regular container train.
- Creation of large multimodal terminals (for example, by combining small ones), which will serve as the central transhipment hubs of the country. The scale of operation of such terminals (typically 200,000 TEUs per year) will make it possible to develop a schedule for the regular departure of block trains to Europe and Asia.

5. *Regional terrorism* is due to proximity to the borders of the Central Asian region.

Solution: Systems must be considered to ensure the security of transport and logistics activities and cooperate with specialized services partner countries.

6. *Low level of digitalization and application of information systems*. Due to the lack of information support, foreign carriers and service consumers cannot track their cargo and vehicles. Therefore they are suspicious of the transportation of goods through the territory of Kazakhstan and Uzbekistan.

Solution: Creation and development of integrated transport services based on a digital platform.

Thus, having considered the factors influencing the development of corridors between Kazakhstan and Uzbekistan, it is possible to determine the components that should be included in the model of an industrial and logistics hub in the border area (see Figure 1).

The planned industrial and logistics hub aims to strengthen cross-border cooperation with a focus on industrialization, where production and processing can be carried out in an integrated manner in one zone.

In world practice, to develop logistics hubs, it has regulatory support from the state - the organization of special economic zones with a preferential taxation regime, the presence of customs points with simplified and accelerated customs operations, and assistance in the acquisition of land. In this regard, the hub would be more attractive to investors and operators if it were given a status equivalent to the free economic zone. At the same time, this industrial and logistics hub should be different from other free economic zones, offering unique features for a cross-border hub, such as improving border crossing procedures and achieving economies of scale through Kazakhstan-Uzbekistan joint development, investment, and production.

Regional cooperation should be based on complex industries (for example, the EU); it is very difficult or impossible to ensure collaboration based on the predominance of primary industries. It is necessary to identify basic projects with great potential to create new points of growth, construction, and development of the entire industrial zone. The hub could occupy an important niche of innovative technologies and support start-ups in developing and testing alternative

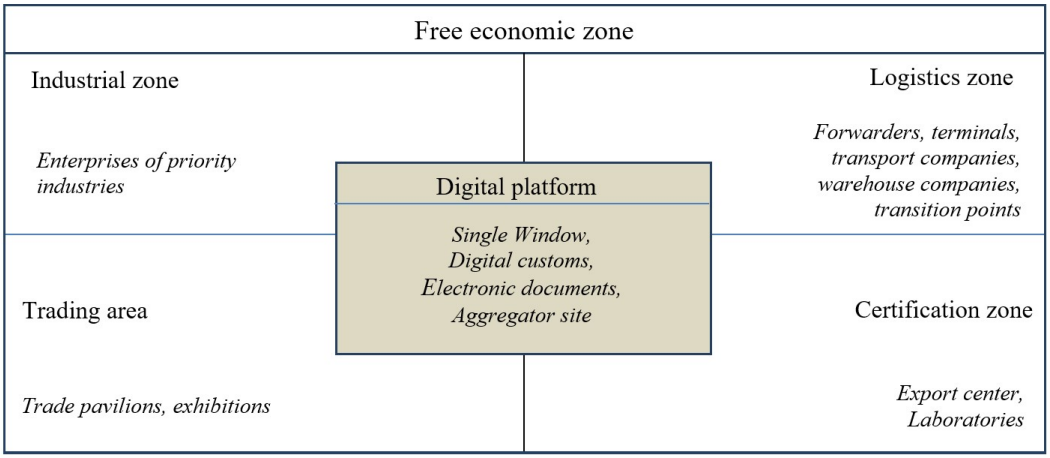

FIGURE 1. Components of the industrial and logistics hub model

Note: compiled by authors

energy sources and energy-saving technologies, thus becoming an analogue of Silicon Valley. As one of the critical areas, the development of the agro-industrial complex industry with an emphasis on producing ecological products can also be.

It is obligatory to have support measures, financial, and consulting to develop exports - for which it is necessary to include an export center. These measures also include interaction with government agencies, industry, and business organizations, on customs procedures, veterinary and quarantine services, and sanitary and epidemiological control.

A multidisciplinary laboratory for product certification will be able to carry out the entire range of product analyses following international standards, which will increase the export potential of countries. In this regard, it would be convenient to connect the e-certification service in the field of conformity assessment "E-certification", which provides for full traceability of the processes for issuing documents on conformity assessment in electronic form.

Digitalization of the logistics hub and creation of "Intelligent Dry Port " is an open and neutral platform connecting several systems, thus ensuring a secure and intelligent exchange of information between the various organizations that comprise the port community (CAREC, 2021).

Trade facilitation is essential for the development of cross-border trade. Currently, many digital services have been introduced into transport activities. Based on the best practices of foreign countries, it is possible to extract such areas of digitalization as:

- European Common Transit System (NCTS) allows you to check the goods before they arrive at the border, which reduces the time customs procedures and the cost of transporting goods;
- the Free and Secure Trade Lane freight program between Mexico and the US, and the US and Canada. The program ensures the free movement of trucks and pre-approved transportation and cargo;
- the Border Wizard provides essential information about cross-border traffic and offers alternative ways to manage traffic. System planning at border crossings has made border control more efficient;

- the Super Green Lane Plus (SGL+) program in the Philippines aims to provide priority customs clearance lanes. Companies with good to her reputation have an exemption from documentation, physical inspection, and exemption from post-clearance audit for three years.

There are already positive examples in the direction of digitalization of logistics processes. Kazakhstan has organized electronic data exchange in the IFTMIN format of the EDIFACT standard, since 2018 together with Russian Railways on certain transportation routes are carried out in electronic form using an enhanced digital signature. There was a time saving for employees of consignors, and consignees due to the use of templates, the coverage of several documents at once by one operation, the prompt correction of detected errors, the absence of the need to visit the station, reducing the downtime of loaded wagons and containers. The "Electronic Train" project ensures the acceleration of customs procedures at the border with the help of prior information.

Thus, further directions for the development of digitalization can be:

- transition to electronic transportation documents and paperless workflow;
- development of interoperability formats with international electronic documents;
- systems for tracking the movement of goods using electronic navigation seals, infrastructure for reading and monitoring the passage of goods through transport hubs and logistics terminals;
- intelligent traffic analytics for modeling and optimizing transport corridors;
- creation and development of intelligent infrastructure in the format "Mobility as a Service" (Mobility as a Service/MaaS), allowing to digitize of the interaction processes between participants and electronic platforms for ordering logistics services;
- the possibility of implementing integrated “tickets” for multimodal transportation, selecting optimal routes for multimodal transportation, and will also create a tool for monitoring cargo flows in order to redistribute vehicles on routes and ensure connectivity between territories. Thus, an example of sites aggregating passenger tickets, the same service can be provided for container transportation;
- in issuing transport permits in digital form in the “single window” mode;
- digitalization and automation of customs control procedures;
- additional simplification and acceleration of customs procedures for carriers and cargo owners with a risk profile corresponding to a high level of reliability.

Another area for improvement in the countries under consideration is that it is difficult for carriers to find legal and practical information. For example, carriers and shippers often need to be made aware that their or a neighboring country has introduced or lifted import bans on certain goods. A digital portal with information about border crossing, insurance, and shipping rules can increase the efficiency of logistics activities. Online portals showing real-time border checkpoints can help carriers with route planning and governments with customs control.

In the future, there is great potential for the industrial and logistics hub to enter the markets of other countries by connecting to WLP hubs and increasing the connectivity of trade and transport systems. World Logistics Passport is an initiative to stimulate international trade through the first global loyalty program to simplify customs and trade operations and develop efficient multimodal corridors. This will speed up the movement of goods along international transport corridors and allow the hub to be technologically integrated into the international multimodal network.

5. CONCLUSIONS

Kazakhstan and Uzbekistan, being neighboring countries, have no access to the sea, but at the same time both countries are increasing their trade, export and transport potential. The study showed that this circumstance, despite the implementation of the countries of their own transport

policy, involves finding common ground on participation in international transport corridors. In the context of global challenges, the processes of cross-border interaction are deepening. Cross-border communications of countries on participation in existing international transport corridors will give impetus to the development of not only border areas but also national economies as a whole. The transport and trade infrastructure will be developed with the formation of transport and logistics centers that ensure the uninterrupted passage of goods across the border. Such centers can be created in the border areas of neighboring countries, improving their infrastructure and providing employment for the population. However, the study revealed the main constraining factors for the development of such centers, which were described in detail above. The most unsolvable at the moment are delays during a customs inspection, and discrepancies in the legal framework of the transportation process. Infrastructure underdevelopment. This issue requires a comprehensive solution at the government level. Low level of digitalization and application of information systems. The creation and development of integrated transport services based on a digital platform will speed up this process. In addition, the use of non-tariff barriers also causes concern. In this regard, it is necessary to switch to an open and transparent model for the formation of tariff and transit policies on the part of transit countries.

UTLC-ERA provides direct forwarding services, according to the same principle it is possible to organize an integrated company, including TMTM participants - Kazakhstan, Azerbaijan, Georgia, and Uzbekistan. Creation of large multimodal terminals (for example, by combining small ones), which will serve as the central transshipment hubs of the country. The scale of operation of such terminals (typically 200,000 TEUs per year) will make it possible to develop a schedule for the regular departure of block trains to Europe and Asia.

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AUTHOR BIOGRAPHIES

***Gulmira A. Bodaubayeva** – Cand. Sc. (Econ.), Associate Professor, Almaty Management University, Almaty, Kazakhstan. Email: g.bodaubayeva@gmail.com, ORCID ID: https://orcid.org/0000-0001-5697-4283

Kulyash A. Turkeeva – Cand. Sc. (Econ.), Associate Professor, Leading Researcher, Institute of Economics CS MSHE RK, Candidate of Economics sciences, Almaty, Kazakhstan. Email: turkeeva21@mail.ru, ORCID ID: https://orcid.org/0000-0001-9845-7751