

The features of logistics network structures and prospects for their transformation in the BRICS countries

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Abstract

The ongoing global transformation processes have led to changes in logistics systems that are now being restructured at a new technological level. The formation of new inter-country groupings and the leap in the volume and quality of infrastructure have a key impact on logistics parameters; the increases in risk and uncertainty make it necessary to diversify supply capabilities and create reserve capacities in order to balance unforeseen situations. The paper first examines the formation of new logistics networks and diversification of existing ones using the evidence both from the BRICS countries, primarily Russia, India and China, and from candidates for accession to this organization; then, it analyses the prospects of their integration in the new geopolitical and technological environment. The study is based on the systematic approach, using comparative analysis and statistical methods; it aims to assess the prospects for cooperation between Eurasian members of BRICS in the field of logistics systems and to identify the national specifics of their financing, design and formation. The paper systematizes information on industry, maritime, air and land transport, paying special attention to the shipping of hydrocarbons and developing of latitudinal and meridional corridors on a new technological basis. It also gives an overview of the benefits gained from complex integrated initiatives and transformation of the logistics industry as a whole.

Keywords

logistics infrastructure, latitudinal corridor, meridional corridor, maritime transport, gas hub, One Belt One Road initiative.

JEL: F14, F15, F17, F21.

Introduction

Formation and transformation of logistics networks within the BRICS group of countries are complex processes influenced by the interaction of many factors, one of the most important being the specific character of each country's economic development that determines the size of goods turnover and the need to create more efficient logistics systems. The BRICS countries, which have overtaken the G7 in total output, are rapidly developing and building their logistics networks. At the same time, each country has its own peculiarities and some of them may not be exactly beneficial. Despite these, however, the work is underway to develop and transform logistics networks. Given the increasing risks and uncertainty, it is deemed necessary to diversify the supply routes and introduce the agreed procedure of access to the BRICS infrastructure projects, together with the standards that should facilitate and simplify trade and boost the trade flows in the near future.

The regulation of international logistics relationships, participation in infrastructure design and construction together with control and documentation procedures are the responsibility of international organisations such as: International Freight Forwarders Association (FIATA), International Air Transport Association (IATA), International Chamber of Shipping (ICS), International Road Transport Union (IRU), International Union of Railways (UIC) and Ship Message Design Group (SMDG). These are mainly associations and unions of leading industry players operating as non-profit organizations. The development of logistics infrastructure can be undertaken by national government agencies as well as by large businesses with an interest in its operation.

Today's agenda is to change the direction, volume and structure of the transport serving the global supply chains. Given the duration of the operational cycles of infrastructure development, we can estimate the time lag between realizing the need for these projects and their actual implementation that will certainly require the member countries to resolve the contradictions arising primarily because of changes in the external environment. The paper seeks to identify the directions and specific features of the BRICS logistics infrastructure development at the present stage; the issue is indeed pressing as the prospects and growing scale of participation in the global economy of the BRICS member countries are no longer questioned. The study focuses on the problematic aspects of inter-country cooperation in building and rebuilding the latitudinal and meridional corridors, taking into account the existing infrastructural framework and the established international economic relations.

The aim of this paper is to identify the relevant short- and medium-term aspects of strategic cooperation and to assess the prospects for inter-country logistics connectivity in the context of sustainable development; it is therefore essential to:

- systematize the methodologies of assessing the national logistics complex;
- identify the prospects for the most relevant areas of industry logistics, primarily sea shipping and transport of hydrocarbons;
- consider the international integrated projects based on the use of innovative technologies.

Given the ongoing geopolitical transformation, there is an objective need to rebuild the existing infrastructure, especially logistics and digital infrastructure, for serving the newly emerging linkages based on value-added partnerships. The interaction of the largest BRICS countries on the Eurasian continent, that certainly include the Russian Federation, China and India, necessitates the creation of a strategic coalition and its progressive development over the coming decades. The best outcome in the long term is the emergence of a symbiotic web, on which interlinked network structures are to be based. Both cross-border territories and transcontinental transport corridors are planned to be covered. The density of the networks should vary depending on sector; it is important to take account of the parameters of logistical interaction that create opportunities to exploit emerging advantages as these facilitate raising investment in such projects. This can be illustrated by the large-scale infrastructure initiatives currently underway, including the construction of the high-speed Eurasia Highway (Russian railways, 2022), which will run along the Beijing-Astana-Moscow-Minsk-Berlin route, and the Air Silk Road, which connects the Belgian city of Liège and other European harbours with the airports of Taiyuan, Changsha and Chongqing, Xi'an, Shenyang and Tianjin. The difficult geopolitical situation is forcing the PRC to diversify the routes for potential shipping of its own goods, so in addition to the largest hub in Liège, the Air Silk Route also connects Chinese airports to Luxembourg; a significant share of this facility is owned by Chinese investors (Chinalogist, 2020).

The multidirectional interests of the participants in the association form the basis for building a complex interdependent dynamic system, the successful operation of which may become a condition for medium- and long-term sustainable development (Malkov et al., 2022) that will create additional potential for a scenario-based approach in forecasting. The scale and extent of BRICS participation in the global economic system makes it necessary to take into account the prospects of vertical integration processes that promote efficiency and leverage multi-level planning capabilities (Chassagnon, 2014), as illustrated by e-government systems in China and by successful practices of multinational corporations. The implementation of innovative approaches largely driven by the ongoing digitalization processes will cause adjustments in the development of science and education, which will have a positive impact on the dynamics of human capital in the BRICS countries (Kovalev & Shcherbakova, 2019). As part of the implementation of integrated initiatives, socioeconomic changes will take place, which may further lead to a change in the directions of migration flows on the basis of the newly built complex infrastructure.

The main obstacles to achieving the stated goals are contradictions in various spheres that exist, first, within the BRICS group, second, between its members and the candidates for membership in this association and, third, between the candidates. Given its size, population and geographical location, the positive impact of economies of scale can be realized by optimizing the activities of networks in different sectors. This will require both transformation of existing systems and development of tools to diversify logistics and financial flows. The process is also hampered by divisions, some of which historical, as individual countries have not fully resolved their internal

conflicts. Besides, the redistribution of spheres of global influence and the changing role of the 'global south' create imbalances in the existing structure that affect the prospects for transformation. Moreover, the leaders of the current global order are interested in maintaining the status quo thus reducing the speed of objectively determined processes.

1. Methods for assessing national logistics systems

The Logistics Performance Index (LPI) is most commonly used to monitor the performance of a national logistics system, but it is not a completely objective indicator, as it is based on subjective assessments by industry operators (The World Bank, 2023). Six sub-indices are used in the calculation process, describing:

1. *Customs Score*
2. *Infrastructure Score*
3. *International shipments Score*
4. *Logistics competence Score*
5. *Tracking & tracing Score*
6. *Timeliness Score*

China and South Africa can be considered the BRICS leaders by this indicator, with an LPI score of 3.7 in Table 1, which leaves room for further strong development of infrastructure projects, seen in China's One Belt, One Road initiative, as well as the railways construction underway on the African continent. This applies in particular to the prospects of building a branch line from Addis Ababa to Cape Town. On this indicator, India is lagging significantly behind the PRC (3.4 versus 3.7 respectively) due to the deterioration of logistics equipment, which is characterised by the second sub-index (3.2 versus 4 respectively). The rest of India's indicators are comparable to their PRC counterparts, so the infrastructure needs to be improved first. It can be done through the construction of high-speed railways, the first of which on the Mumbai-Ahmedabat route financed with the help of Japanese investors (JICA) is currently under construction (Zdmira, 2021).

The process of redefining spheres of influence that occurs against the backdrop of geopolitical transformations is also evident in the construction and modernization of port maritime infrastructure. Both Brazil and the Russian Federation lag behind the other BRICS members in terms of LPI (3.6 and 2.6 respectively). These characteristics of the Russian logistics system can be explained by the specific choice of respondents among which the share of the world's largest carriers is high, and by the routes which the Western community has been most intensively developing. The recent years have seen reorientation of logistics flows to the south and east, active design and construction of new routes, and creation of universal integrated logistics systems with a digital component, for which the experience of both Chinese e-government and the developments of National Public Information Platform for Transportation and Logistics (LOGINK) and European Logistics Platform (ELP) can be used.

The BRICS candidate countries such as the UAE have a very high LPI score (4) thanks to their compact location, proximity to major trade routes, and innovative infrastructure developed as part of a single project. Saudi Arabia and Egypt, on the other hand, have lower scores because of their governments' planning priorities. Egypt's largest transport hubs (Port Said and Suez) provide an expeditious passage of ships through the Suez Canal, while the other logistics destinations are of lower importance. Of all the BRICS members and candidates, Iran has the lowest LPI, due to the longstanding sanctions regime that significantly limits production capacity and project speed; even so, the country is actively involved in building the North-South Corridor on its territory, clearly aware of the benefits of cooperation.

As the integration processes develop in conditions of changing realities the transformation of existing logistics systems becomes indeed crucial, making it necessary to take advantage of the opportunities that are opening up. To implement the Russian Federation's operational plans it will be vital to intensify trade relations with Iran, the UAE and Saudi Arabia, which will be ensured through the construction of a logistics corridor with access to Mumbai and the Persian Gulf countries

Table 1. LPI for BRICS member and candidate countries*

Country	LPI Rank	LPI	Customs	Infrastructure	SCORE			
					Int.	Logistics competence	Tracking & tracing	Timeliness
Brazil	51	3,2	2,9	3,2	2,9	3,3	3,2	3,5
Russia	88	2,6	2,4	2,7	2,3	2,6	2,5	2,9
India	38	3,4	3	3,2	3,5	3,5	3,4	3,6
China	19	3,7	3,3	4	3,6	3,8	3,8	3,7
South Africa	19	3,7	3,3	3,6	3,6	3,8	3,8	3,8
BRICS member candidate								
UAE	7	4	3,7	4,1	3,8	4	4,1	4,2
Bahrain	34	3,5	3,3	3,6	3,1	3,3	3,4	4,1
Saudi Arabia	38	3,4	3	3,6	3,3	3,3	3,5	3,6
Egypt	57	3,1	2,8	3	3,2	2,9	2,9	3,6
Algeria	97	2,5	2,3	2,1	3	2,2	2,5	2,6
Iran	123	2,3	2,2	2,4	2,4	2,1	2,4	2,7

* Based on June 2023. Source: The World Bank. International LPI. <https://lpi.worldbank.org/international/global>

2. Transportation of hydrocarbons

Heavy dependence of industrial companies on hydrocarbons indicates the importance of the cheapest way of transporting them, i.e. pipelines. Network analysis methods are essential in the design and operation of this type of transport. When considering gas pipelines, it is possible to distinguish between, first, the main pipelines, the nodal points of which are primarily compressor stations and their network must be linked

with a set of temporary and additional gas pipelines, and, second, systems of facilities serving production in the fields and carrying out the fullest possible coverage of the territories, taking into account the needs of the network users.

Today, the pipeline system formed in Eurasia is mainly oriented towards transporting oil, gas and petrochemical and gas chemical products (ammonia pipelines). In the next decade, however, the need for hydrogen pipelines as well as facilities for freshwater pumping may emerge. The infrastructure was created to export hydrocarbons to Europe; it was served by the Yamal-Europe pipeline systems together with the complex including “Soyuz”, “Progress” and “Urengoy-Pomary-Uzhgorod”. Due to increasing geopolitical risks and the need to diversify supply directions, it has become evident that the new projects should focus on the booming Asian region. In doing so, the leaders, primarily China and India, are already implementing several alternative projects; for instance, China is cooperating with Russia in the construction of the Power of Siberia gas pipeline system and with Turkmenistan in the Line D project (Finam, 2023).

The Chinese policy of preserving national technological sovereignty does not always favour partnership value chains with foreign companies. For example, international cooperation in the construction of the West-East Gas Pipeline from Xinjiang to East China originally meant working with Royal Dutch Shell, ExxonMobil and Gazprom, but in the end the project had to be carried out exclusively by domestic producers (Neftegaz, 2021). Also, given the increasing share of LNG in international consumption, there is a need for special infrastructure at pipeline endpoints, such as liquefaction plants. The PRC can afford global investment costs of construction of LNG storage facilities that will create an additional reserve of hydrocarbons in case of supply disruptions. The reserves are indispensable for the proper functioning of energy-intensive clusters, so the Binhai LNG terminal in the Yancheng Binhai Port Industrial Park in the city of Yancheng is being reconstructed for this particular purpose (Neftegaz, 2022).

India is the key consumer of hydrocarbons in the region, being the 4th largest importer of LNG and, since 2009, the largest exporter of petroleum products in its region (Investindia, 2023). High prices on the LNG market have forced the country to look for cheaper and more stable pipeline alternative, which is complicated by the terrain and seismic hazards. The construction of gas pipelines along the Turkmenistan-Afghanistan-Pakistan-India (TAPI) route could be a possible solution to the problem despite unstable political situation in some of the countries. For Russia, however, participation in this project can only be possible in a limited format, i.e. providing technology and equipment supplies, so the Iran-Pakistan-India gas pipeline alternative (Nangs, 2023) is the country’s preferred option, as it involves the use of offshore pipe laying, which has been successfully tested in the construction of the Nord Stream branches. Russia also produces competitive compressor stations for this type of infrastructure. There are plans to create a gas hub involving the world’s three largest reserves holders: Russia, Iran and Qatar, as well as Turkmenistan, based on the North/South Pars field. The capacity of the Asaluye industrial area allows for the change in the

country of origin of the gas mixtures and minimizes the impact of sanctions on the consortium participants (Tasnim, 2023). The project is an alternative to that of a Turkish gas hub and targets the growing markets of Pakistan and India, competing with the TAPI currently under construction.

There are certain contradictions in the spatial planning of land transport infrastructure affecting both the financial interests of network project participants and the existing balance in the areas of influence, as a reduction in market power can lead to a reduction in the rate of return. Clearly, conflicts of interest may arise when real burdens are redistributed in an unstable environment. A striking example is the conflict between Russia and Kazakhstan in the operation of the Caspian Pipeline Consortium, which revealed contradictions between the users of the logistics transport infrastructure caused by conflicting interests of the participants (Forbes, 2022). Traditionally, the formation of latitudinal corridors has been accompanied by disagreements between countries located in different zones of geopolitical influence as it happened, for example, in the relationship between Pakistan, which actively cooperates with the US, and India – the two countries that have long had territorial contradictions.

3. Maritime transport

Historically, there have been differences between China and Japan, as well as between the PRC and South Korea, as the latter has occupied a significant segment of the global shipping market (UNCTAD, 2022). Today, the Celestial Empire with its intense economic development and strengthened sovereignty is interested in expanding its share of this market. The direction and volume of investment flows in the Asian region, which have largely shaped the countries' policies for promoting infrastructure projects in recent decades, play a significant role, too.

Ultimately, it is the networks ownership structure that influences the vectors of trade and economic relations in the region and globally. Chinese finance leaders are represented by the Asian Infrastructure Investment Bank, the BRICS Development Bank, the Silk Road Fund and others (Newmark, 2023). Traditional Western European investment destinations are driven, among others, by British interests in the region, as demonstrated by the involvement of the European Bank for Reconstruction and Development (EBRD), the Royal Bank of Scotland Group and others.

An example of a conflict of interest is the construction of ports on the African coast and in the Indian Ocean, through which China plans to improve and develop its logistics system. The deployment of China's first overseas military base in Djibouti was a hub for the development of a rail network based on Chinese investment in Africa. A 700 km long branch line to Addis Ababa has been built, with promising plans to extend the line south to South Africa and west to the Senegalese Atlantic coast (Kommersant, 2017). In some cases, the PRC's intensified efforts have been at odds with Indian interests. Another good example is the situation with the deep-sea port

of Hambantota in Sri Lanka, which was driven by an eight-billion-dollar debt (IMEMO, 2017). A similar policy is being pursued by the PRC in Europe, exemplified by the seaport in Serbia (VZ, 2021). This strategy of foreign investment has been deliberately pursued by China for decades, creating a set of preconditions for the growth of foreign debt, leading to an increase of indirect influence in many parts of the world. At present, its implementation can be considered a success, and, with the influence of Chinese reserves deployed around the world in an unstable environment, it provides some measure of safety margin.

Currently, among the world's top ten ports by cargo turnover, eight are in China, with the top three being Ningbo-Zhoushan, Shanghai and Tangshan (Shanghai International Shipping Institute, 2021). China's dependence on foreign large-capacity shipbuilding is high, since the largest container ships are manufactured in South Korea (Daewoo Shipbuilding&Marine Engineering Co.) on special order of Maersk, the world's leading shipping company (Morvesti, 2018). The Russian Federation in today's conditions is also interested in building deep-water ports with modern infrastructure, providing links with the Asian region, primarily focused on the export of raw materials, as exemplified by the construction of an LNG terminal in Bechevinskaya Bay, and a coal terminal in the port of Sukhodol in Primorsky Krai. At the same time, the importance of maritime logistics in the North-West region cannot be underestimated, as the development of complexes in Ust-Luga and Vysotsk form a maritime logistics cluster with good prospects (Morvesti, 2022).

4. One Belt One Road Initiative

The essence of the One Belt, One Road (OBOR) programme is to equalize levels of economic development in the region and reduce poverty to create potential markets: the objectives that can only be achieved through comprehensive initiatives (Karen et al, 2022). These began with the construction of six economic corridors, involving the design of highways, railways, seaports and airports, which were initiated both "from below", i.e. at the national level, and "from above", when the project was developed internationally. Because of the relevance of such undertakings, the Asian Development Bank has become deeply engaged in the development of basic connectivity theory, which studied the maximization of external effects of the most active integration projects in the region, such as the Greater Mekong and the Golden Quadrant in India. Central Asian regional cooperation programmes and the Central Asia Regional Economic Cooperation (Wang, 2019) have also been important. These sub-regional cooperation zones promote a convergence of economic development levels within the partnership areas, which is to have a complex effect on the national development of the participants. This practice has been in place for border areas since the late 1990s, Yunnan being an excellent illustration. Arrangements with major Asian countries play a special role, as the participation of India and Pakistan in SCO programmes is of great importance, since the alignment of development of the poorest Asian countries

with their demographic characteristics is impossible without a balanced impact on the national economic systems and the participation of the bordering states (Shanghai Cooperation Organisation, 2015).

One can also observe geopolitical influence of certain European countries, which determines the direction of transport network development, as exemplified by the active construction in Kazakhstan primarily aimed at serving PRC interest in an alternative trade corridor with the EU. The infrastructural baggage inherited from the Soviet Union poses certain problems for the growth of freight traffic, as railway gauge parameters differ between Kazakhstan (RK) and China, which significantly slows down the logistics turnover in this direction and overloads the dry port of Khorgos, which was created to intensify international cooperation (Sputnik, 2020). The high volume of transcontinental traffic going through the RK has made it possible to build the dedicated infrastructure in the dry port of Xi'an, which forms direct container trains in the European direction (Sputnik, 2023). The intensity of interaction can be illustrated by Figure 1, which shows that Kazakhstan's trade turnover with the EU countries has almost doubled, thanks to the implementation of parallel import programmes that mitigated the sanctions regime imposed on the Russian Federation.

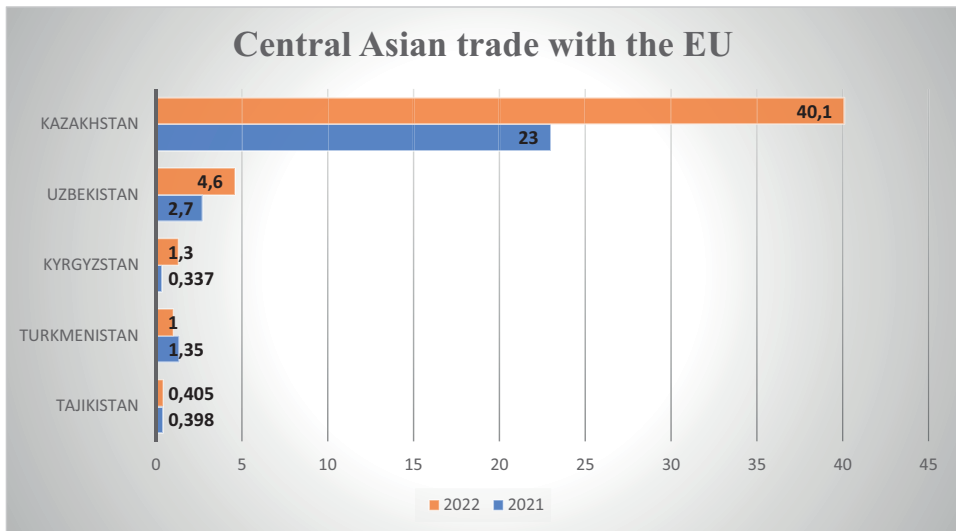


Figure 1. Central Asian trade with the EU in billion dollars. Source: European Commission. EU trade statistics. <https://trade.ec.europa.eu/access-to-markets/en/statistics>

Kazakhstan's geographical position dictates the existence of the two dominant centers of gravity: the Russian Federation and the PRC; the volume of investment correlates strongly with the political and social processes in the country, with Russia's share losing significantly in recent years to both China and European countries such as the Netherlands and the UK (Lexiutina, 2020). This position forces the Central Asian states to take into account the interests of their main investors,

thereby in some degree losing the possibility of making independent decisions, which cannot be ignored by Russia and is a source of potential concern. The arising tensions will be exacerbated by stricter compliance with Western requirements to counter parallel imports observed in recent months. This means that a full long-term strategic partnership cannot be counted on, as conflicting interests could lead to very significant investments in international projects being unjustified. The PRC’s non-adherence to the sanctions programmes has preserved the possibility of direct traffic to the Russian Federation, which is why Figure 2 does not show a brief increase in trade with Central Asian countries in 2022.

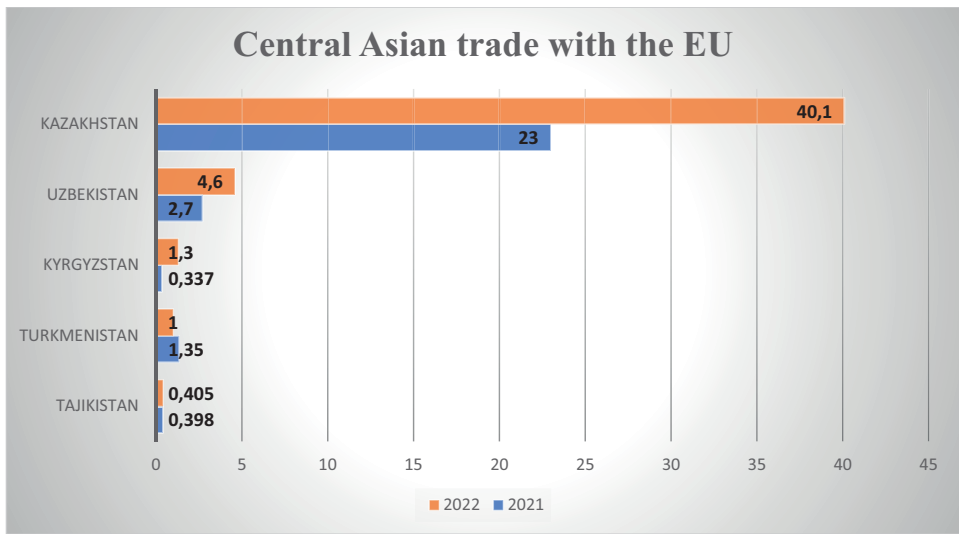


Figure 2. Central Asian countries’ trade with China in billions of dollars. Source: International trade center. Trade statistics. https://www.trademap.org/Country_SelProductCountry_TS.aspx?nypm=1%7c156%7c%7c%7c23%7cTOTAL%7c%7c%7c2%7c1%7c1%7c3%7c2%7c1%7c2%7c1%7c1%7c1

For developing countries, the restructuring and transformation of maritime logistics networks is of great importance. They were originally formed on the basis of post-colonial economies, so all working partnerships were in one way or another initiated by Western countries in their own interests, in line with the strategic coalitions created. As countries like India and China have shown unprecedented economic growth in recent decades, they have had the opportunity to establish both maritime business networks and naval military infrastructure in the region (WTO, 2022). With signs of geopolitical transformation, for obvious reasons the proprietary logistics networks have begun to be designed in order to strengthen their own sovereignty, taking into account the long-term interests of these countries. Thus, China plans to create two branches of the 21st Century Maritime Silk Road, the nodes of which are to connect the ribs along the tracks: through the South China Sea to the South Pacific region, and to create a transportation

route from China's coastal areas to Europe, the South China Sea and the Indian Ocean (Titarenko et al, 2015). These routes will form the basis for the emergence of a symbiotic web with hubs in Southeast Asian countries, which do not themselves have sufficient resources and technological equipment to implement such projects. The duplication of routes in the networks creates the necessary capacity reserve, diversifies supply options and contributes to better coverage of the countries' territories by transport arteries, which in turn causes external effects that have a complex impact on regional development and increase the potential investment attractiveness of well-connected areas.

In addition to the routes in close proximity to the borders of India, China and South Africa, it is important for China to create a strategic coalition with Russia with a view to building a logistics network in the Arctic along the Northern Sea Route. The ice or Polar Silk Road should duplicate land transcontinental latitudinal corridors for China; this strategic initiative is enshrined in the documents of the OSDP programme and, besides the logistical tasks, implies China's participation in the Arctic shelf mining, exchange of engineering services, equipment and technology, which is certainly most promising for both countries. This corridor can make partner value chains more efficient as it will reduce the duration of shipping and thus optimize logistics routes not only for Russia, but also for European countries, whose trade turnover with Asian countries is enormous. Foreign trade between the EU and China in 2022 was USD 847.4 billion, while Russia's trade with China was USD 220.2 billion (RTVI, 2023). There are clearly growing challenges in the development of these networks in the Arctic region, as the division of interest occurs not only between the countries that own continental shelves in the region (USA, Canada, Finland, Denmark, Norway, Iceland, Sweden and Russia), but also between other actors willing to participate in partnership value chains, as the region is very rich in undiscovered natural resources (Australia).

Eurasian latitudinal corridors have significant prospects for development and increased network coverage; for example, the construction of the Northern Sea Route will provide an opportunity to combine logistics routes with the overland Northern Latitudinal Railway by building integrated infrastructure in the port of Sabetta, which in future will be the largest hub of the Northern Sea Route and all Arctic logistics. The traditional Trans-Siberian corridor, which links the European part of Russia with Vladivostok, is currently overloaded due to the reorientation of commodity flows to the Asian direction, raising questions about building additional branches in view of the growth potential of freight traffic and the development of a continental connectivity strategy. New railway construction technologies have made it possible to design two HSL lines: Changchun-Vladivostok (EastRussia, 2017) and Vladivostok-Mudanjiang (RG, 2018). The development of China's northeastern regions is currently a priority for the Chinese government, with Mudanjiang becoming a significant logistics hub and total investment in railway construction in 2018-2022 amounting to \$2.46 trillion USD (Red Spring, 2023).

China's comprehensive infrastructure project is called the Silk Road Economic Belt (SREB); it aims to form a single economic space linking China, Central and West Asia,

the Middle East and Europe. The main transport corridors should link China to India, Bangladesh and Myanmar, and China to Pakistan, while the two European-Chinese logistics routes are also important: via Russia and the Middle East. The PRC has placed great emphasis on developing domestic, manufacturing and logistics networks; it is the SREB that will create new hubs in China's depressed northern provinces, which are currently experiencing significant outflow to the southern, more economically advanced coastal areas, exacerbating imbalances in the country's development (Chernova, 2022). Successful construction ventures and integrated fiscal policy are likely to smooth out these contradictions and, in turn, have a positive impact on future infrastructure projects involving both Mongolia and the Russian Federation.

5. Meridional corridor

The Trans-Caspian corridor currently in use has capacity problems related to container transshipment and maritime transport across the Caspian Sea via the Aktau-Baku route, which complicates and slows down the pace of cargo movements. This could be remedied by the construction of alternative sections of the North-South logistics network, which would speed up and facilitate the movement of goods.

Demand for the additional North-South transport and logistics corridors will rise in the new economic environment (Vinokurov et al, 2022). Since 2000 this issue has been actively discussed in a trilateral format by Russia, India and Iran, but only recently has there been an accelerated development on this issue due to Azerbaijan's willingness to promote the construction of the Resht-Astara railway line, which is to connect the logistics complex of the former Soviet Union with that of Iran; the possibility of including the Chabahar port in the Eurasian continent's cooperative networks opens up great prospects for international trade. (RG, 2022).

The possibility of forming new hubs and penetration channels implies new opportunities for both current BRICS members and candidates planning to join this integration association. The construction of the meridional corridor will strengthen economic ties with the countries of the Middle East, especially Iran, the UAE and Saudi Arabia. In the process of forming the transport framework in the Asian region with the use of new generation technologies, additional competitive advantages will be created in relation to the existing infrastructure. The construction and development of the North-South Corridor will provide operational connectivity and convenient logistics to the major Indian ports of Mumbai, Kandla and Chennai, which will contribute to the industrialization and economic growth of countries in the region.

6. Sectoral integration processes

In today's digitized economy, it may be crucial to assess the prospects of complex ecosystems, without which competitive value-added partnerships cannot

be created. Hence the need to unify and integrate partner core platforms at the design and development stage of networks of all types as it was done in the case of the Russian-Chinese cooperation in customs sphere: the PRC has unprecedented long-term experience of implementing 12 “golden” network projects united in a single program in the field of e-government (Tadviser, 2023). The initial use of these developments should allow for adaptation in the operation of the networks, as national specifics as well as technological capabilities, funding levels and other conditions vary significantly across the participant countries and regions.

The obvious advantage of the integrated multi-level planning carried out by Chinese experts is the optimization of network structures at several levels (logistics, finance, digital and manufacturing), which will form stable strategic partnerships linked by value chains, where multinational corporations involved in projects form strategic groups that minimize costs and create competitive advantages (WTO, 2021) due to better financial results based on the use of transfer prices. At this stage, the Chinese technology leaders, such as Huawei, are forming focal strategic alliances, with assembly facilities in India, Vietnam, Malaysia and other countries in the region (Huawei, 2022), cementing the interconnections of emerging techno-economic blocs in the new geopolitical reality. The unprecedented throughput capacity in the most suitable territorial location will largely ensure the competitiveness of Chinese products. In the long term it may cause concern, but in the medium term it will definitely strengthen the economic power of the countries using this network, being particularly advantageous for small states that form the nodes in the network: they would never be able to build infrastructure of this scale on their own, even with borrowed funds.

The proximity of Russia and China raises the issue of forming strategic partnerships and creating a symbiotic web in the energy sector since Siberia and the Far East are energy surplus regions that produce hydro power at low cost; energy production facilities are located near the border with China making it easier to form working partnerships and value creation webs on a mutually beneficial basis. For example, the Bureyskaya HPP, located in the Amur region, exports to China almost half of the electricity it produces. Within BRICS, Russia is the undisputed leader in building nuclear power generating capacity; the focal member of the strategic alliance in this sector is Rosatom, which has unique technologies in the field of industrial engineering, fuel assembly development and nuclear fuel waste disposal. Against the backdrop of the successful cooperation that has taken place, nuclear power plants Xudapu and Tianwan are currently under construction in China and Kudankulam is being built in India (Rosatom, 2023). These working partnership relationships can be viewed as stable networks, and the experience of joint engineering activities in strategic coalition building can be illustrated by the joint work on the CEFR project (The China Experimental Fast Reactor). This cooperation continues along with the work of Chinese colleagues on fast neutron reactors using Russian expertise (RIA, 2020). Innovations in power line construction allow the PRC to form the Baikhetan-Jiangsu Latitudinal Corridor with a potential capacity of 8 million kW. Also, the achievements of Chinese engineering companies enable them to lay the groundwork for the full-scale implementation

of blockchain technology in the energy sector by building hybrid superconducting energy transport lines.

Digitalisation across all industries has irreversibly transformed the transport and logistics industry by introducing digital ecosystems and creating transport corridors that reduce transaction costs, increase trade turnover and freight turnover rates, setting the stage for the introduction of intelligent high-tech systems in transport and warehousing logistics. The world leaders in this field are Chinese platforms based on the integrator LOGINK (Korostelev, 2017), the most important element of which was the national open information platform for transport and logistics. The integration has accelerated the availability of up-to-date information from Chinese government agencies, which include: General Administration of Customs, Civil Aviation Administration, China Railway, Ministry of Industry and Information Technology, Ministry of Commerce, Ministry of Transport, Development and Reform Commission, giving a competitive advantage to ecosystem users and allowing them to work with an interconnected array of Bigdata in real time. The intensification of cross-border interoperability has led quite rapidly to the formation of the NEAL-NET regional Asian logistics management system using data from 52 national logistics systems, with China, Japan and South Korea as participants (Bukreeva, 2022). The functionalities of logistics ecosystems are diverse, but services are the basis, with standardization, exchange and information transfer as the main tasks. Ecosystem partners are both national (China National Railway Group) and global associations (ISO, ASEAN, ADB) along with private companies (COSCO Group, Xiaoshan Airport, TravelSky Technology Limited) (Barykin et al, 2022).

The European counterpart of such a platform was primarily aimed at ensuring the competitiveness of EU member states. The European logistics platform (ELP) was set up for this purpose, in which the following companies cooperate: ACEA (Association of European Automobile Manufacturers), CER (Community of European Railway and Infrastructure Companies), CLECAT (European Freight Forwarding, Transport, Logistics and Customs Services Association), as well as national carriers: Deutsche Bahn (German railway operator) and Deutsche Post DHL Group. Maximizing the potential of the European logistics system is ensured by a fairly active use of short sea shipping. In the EAEU area they are currently prohibited, their authorization for individual members of the community is being worked out and a taxation system is being discussed to deal with the problem in general.

Recent advances in artificial intelligence have helped improve the dynamic management of logistics networks through the creation of digital twins that can identify bottlenecks in transport flows and propose alternative solutions to emerging problems with mathematical justification of resource and time costs. These technologies are being actively implemented in both transport and warehousing logistics and are an essential element in ensuring industry competitiveness (Formatkoda, 2023). The world leader in this industry is the US-based platform integration company, Cisco, with operations around the world.

A potential military conflict in the region caused by the rising tensions over the situation with Taiwan could slow down the implementation of all the international projects due to a decline in export flows to Western countries, which China is preparing to offset by increasing domestic demand, integrating its own networks and forming a strategic alliance with countries in the region. This can be seen in the intensified internationalization of currencies, with the share of the US dollar in regional payments declining sharply and the renminbi and rupee beginning to increase their share, despite emerging challenges. The digital dimension of integration in the financial sector is evident in the development and implementation of independent payment systems and other FinTech products, which central banks in the region are working on intensively. Despite significant progress, there will soon be problems in settlements with Western partners, the deliberate complication of the passage of financial transactions will be primarily related to the submission of an additional set of documents confirming the non-violation of the sanctions imposed. A sharp break in relations in the world economic system is highly undesirable at the moment, so participants will try to soften the transition to the new world order scheme.

The Russian Federation should implement comprehensive planning and forecasting programmes in order to create new latitudinal and meridional logistics corridors in the medium and long term to build a framework and strengthen interconnections along the West-East and North-South directions. The competitiveness of available technologies and the resource endowment of our country allow it to act as one of the leading members of the BRICS integration association and to gain absolute and relative advantages from attracting new members to this grouping, so that the geopolitical transformation can have a positive impact on the country's place in the world economic system. If the outcome is positive, the Russian enterprises will enter new markets, increase their international trade turnover and the pace of national economic development.

Conclusions

The analysis undertaken in this paper has shown that in the context of the geopolitical transformation the BRICS countries will fundamentally redefine their approach to the international logistics system; the main priority in this situation will be to ensure sovereignty in a number of areas, primarily in infrastructure, information and cybersecurity; the necessary strategies can be implemented through diversification of logistics and transport corridors together with introduction of different types of power generation and creation of power transmission and storage systems.

International experience in building comprehensive infrastructure on a new technological level should be analyzed with a view to creating an EAEU digital logistics platform, the most important basic element of which should be national traceability systems based on standardization protocols and information exchange on all logistics

operations of the integration union. The existing infrastructure provides opportunities for implementing this project in the coming years, but sufficiently large investments are needed to bring the digital platforms used by the EAEU member states to a common standard based on the instant exchange of relevant information. A promising area for cooperation should be partial integration in a number of areas with the BRICS member countries, especially China, which already has sufficient experience and expertise in the area.

Cross-country integration of developing countries allows the benefits of central planning to be realized. Joint development programmes were previously inaccessible because of limited access to financial resources and national interests may have been lopsidedly taken into account when determining investment vectors. Today, the redistribution of financial flows allows the Asian leaders to pursue integrated sustainable development programmes, enabling the full use of a wide range of instruments as part of the flexible and relatively independent economic policies.

The advantages of network structures help to optimize redistribution and exchange processes based on the diversification of logistics routes and improve the spatial location of production structures, which is the key to the development of BRICS countries with their relatively young populations and growing technological capabilities. A certain flexibility of networks provides opportunities to redistribute the nodes of the structure, which is necessary to accelerate the convergence of development levels between different regions, taking into account the imbalances that have developed historically. The situation of recent years does not allow the global community to ignore the logistical opportunities and the development prospects of the BRICS countries, which will undoubtedly be linked to the set of activities they are undertaking in different areas.

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