The Logistics Divide in Post-Soviet Space: Infrastructure Gaps, Performance Patterns, and Regional Integration Prospects

Meruzhan Markosyan¹, Ashot Markosyan^{2,3}, Elyanora Matevosyan² and Vilen Khachatryan³

¹ National Academy of Sciences, Institute of Economics after M. Kotanyan, Armenia

² "AMBERD" Research Center of Armenian State University of Economics, Armenia

³Public Administration Academy, Armenia

markosyan844@gmail.com, ashotmarkos@rambler.ru, eleonora_matevosyan@ysu.am, vilen.khachatryan@paara.am

Abstract. This study analyzes the Logistics Performance Index (LPI) of post-Soviet countries with special focus on the South Caucasus region (Armenia, Georgia, and Azerbaijan) in comparison to global logistics leaders. Using the World Bank's 2023 LPI data, we examine six key logistics dimensions across 13 former Soviet states to identify regional patterns, strengths, and deficiencies. Our findings reveal significant disparities between the Baltic states (average LPI: 3.5) and other postSoviet countries (average LPI: 2.6), with particularly weak performance in infrastructure development and customs procedures across the CIS region. The South Caucasus countries face specific challenges related to their landlocked status and regional conflicts, yet demonstrate relative strength in timeliness of deliveries. Based on comparative analysis with global logistics leaders, we recommend focused policy interventions, including customs digitalization, infrastructure investment, and enhanced regional cooperation. These findings contribute to understanding the logistics development trajectories of transitional economies and provide practical guidelines for policymakers seeking to improve regional trade integration.

Keywords: logistics, logistics infrastructure, Logistics Performance Index (LPI), South Caucasus countries, post-Soviet countries

1. Introduction

Efficient logistics systems are increasingly recognized as a cornerstone of economic competitiveness, particularly in transitioning economies where trade facilitation, infrastructure development, and digital integration remain uneven. In the context of globalization and regional trade agreements, logistics performance directly influences a country's ability to attract investment, expand export capacity, and integrate into global value chains. Countries with high-performing logistics systems—such as Germany, the Netherlands, and Singapore—demonstrate that sustained infrastructure investment, customs modernization, and effective supply chain coordination are essential drivers of economic growth.

One of the most widely used tools for measuring logistics efficiency is the Logistics Performance Index (LPI), developed by the World Bank. The LPI evaluates six critical components of logistics systems: customs performance, infrastructure quality, international shipment arrangements, logistics competence, tracking and tracing capabilities, and delivery timeliness. It enables cross-country benchmarking and identifies structural strengths and weaknesses in national logistics environments.

The post-Soviet space represents a diverse group of economies that share a common legacy but have followed divergent development paths since independence. While the Baltic states have aligned their logistics systems with European standards, many countries in the Commonwealth of Independent States (CIS), particularly in the South Caucasus and Central Asia, continue to face substantial barriers to logistics efficiency. These challenges are often shaped by geopolitical instability, landlocked geography, outdated infrastructure, and limited digitalization of customs and transport services.

Within this framework, the South Caucasus countries (Armenia, Georgia, and Azerbaijan) occupy a strategically important yet economically constrained position between Europe, Asia, and the Middle East. Despite efforts to modernize their logistics infrastructure, these countries struggle with fragmented trade corridors, low interoperability, and underutilized transit potential.

This study addresses a key research question: What are the structural patterns, strengths, and deficiencies of logistics systems in postSoviet countries as reflected in the 2023 LPI, and how can targeted policy interventions enhance regional logistics performance? The objective is to conduct a comparative analysis of LPI scores across 13 post-Soviet countries and to assess their logistics readiness relative to global leaders. Special emphasis is placed on identifying regional disparities, analyzing infrastructure and customs bottlenecks, and formulating evidence-based recommendations for improvement.

By applying a combination of descriptive statistics and SWOT analysis, this research aims to uncover logistics development trajectories in transitional economies and contribute to ongoing policy discussions on regional integration and trade facilitation in Eurasia.

2. Literature Review

Logistics systems have become central to economic development and competitiveness, especially in the context of increasing globalization, regional integration, and supply chain interdependence. According to institutional theory, the effectiveness of logistics is strongly influenced by institutional quality, regulatory efficiency, and policy coordination (North, 1991; Williamson, 2000; Acemoglu & Robinson, 2012). In transitional economies such as those of the post-Soviet space, logistics systems often reflect legacy institutional weaknesses, fragmented governance, and limited cross-border cooperation (Rodrigue, 2020; Hesse & Rodrigue, 2019; Raballand, 2003).

Empirical studies show that logistics infrastructure and trade facilitation are strongly associated with GDP growth, export diversification, and regional connectivity (Limao & Venables, 2001; Hausman et al., 2005; Marti et al., 2017; Anderson & van Wincoop, 2004; Hummels, 2007). In particular, landlocked countries suffer from disproportionately high trade costs due to poor access to international markets and overdependence on transit countries (Faye et al., 2004; Wilmsmeier & Sánchez, 2017; de Soyres et al., 2018; Nguyen & Tongzon, 2010).

The Logistics Performance Index (LPI), developed by the World Bank, is widely used to assess logistics efficiency across countries. It relies on expert evaluations of six core components: customs, infrastructure, international shipments, logistics competence, tracking and tracing, and timeliness. Despite being perception-based, the LPI is considered a robust benchmarking tool due to its methodological consistency, global coverage, and relevance to policy evaluation (World Bank, 2023a; Arvis et al., 2016; Gani, 2017; Saslavsky & Shepherd, 2014).

Several studies have demonstrated the relevance of LPI scores for evaluating national logistics environments. Hausman, Lee, and Subramanian (2013) showed that improvements in LPI components directly correlate with reductions in trade costs and increased foreign direct investment. Similarly, Marti, Puertas, and Garcia (2017) found that logistics performance significantly affects export competitiveness in developing countries. Ayyagari, Demirguc-Kunt, and Maksimovic (2023) further emphasize that reliable logistics systems enhance the performance of small and medium enterprises in transitional settings by reducing delivery delays and uncertainty (Allen et al., 2018; López-Bayón & González-Díaz, 2019).

Comparative experiences of top-performing countries such as Germany, Singapore, and the Netherlands demonstrate that high logistics efficiency results from integrated policy coordination, advanced infrastructure, and digital transformation of customs systems (Banomyong & Beresford, 2021; OECD, 2022; UNESCAP, 2021). For example, Singapore's global logistics leadership is attributed to centralized planning, institutional coherence, and strategic geographic positioning (Rodrigue & Notteboom, 2022; Malliswaran, 2025; Carlan et al., 2016).

By contrast, countries in the CIS region and the South Caucasus continue to struggle with systemic logistics challenges. Raballand (2003) identifies customs inefficiencies, poor intermodal connectivity, and limited investment as barriers in Central Asia. In the South Caucasus, despite infrastructure initiatives such as TRACECA and BRI-related corridors, geopolitical instability and fragmented planning have limited progress (Siroyan, 2020; Knoema, 2023; Ding & Chen, 2020; Hilmola et al., 2015). As Notteboom and Winkelmans (2020) argue, persistent port inefficiencies, weak intermodal links, and customs delays hinder regional trade facilitation and reduce competitiveness (Meersman et al., 2009).

Technological innovation is increasingly seen as a potential solution to overcome structural limitations in logistics. Studies by Purtell et al. (2025) and Malliswaran (2025) emphasize the transformative potential of mid-mile drone logistics, AI-powered supply chain optimization, and third-party logistics services. These innovations can mitigate the physical and institutional constraints faced by countries with underdeveloped infrastructure and limited customs modernization (Francis & Bekele, 2022; Wang et al., 2020; Cheng & Yip, 2021; McKinnon, 2015).

The importance of international standards has also been highlighted in recent literature. For example, ISO 668:2020 standardizes freight container dimensions and ratings, supporting efficient intermodal logistics across borders. The adoption of such global norms enhances interoperability and lowers administrative burdens, particularly for landlocked and transit-dependent economies (ISO, 2020; WTO, 2020; Roso & Lumsden, 2010).

Finally, international performance indicators such as the LPI provide an essential foundation for identifying systemic bottlenecks and guiding reform priorities. Although subject to limitations due to their perception-based methodology and varying data availability, the LPI remains one of the most widely recognized tools for cross-country logistics assessment (World Bank, 2023b). Scholars such as Hesse and Rodrigue (2019) stress that without comprehensive reform agendas, coordinated public-private partnerships, and harmonized regulatory frameworks, logistics systems in transitional economies are unlikely to converge with global efficiency standards (Shepherd & Wilson, 2007; Blancas et al., 2014; Sarkis, 2003).

Despite increasing academic attention, comprehensive comparative analyses of post-Soviet logistics systems remain limited. Much of the existing research focuses on individual case studies or narrow infrastructure indicators, rather than multi-country assessments using standardized frameworks. This study addresses that gap by analyzing LPI data for thirteen post-Soviet countries, identifying subregional disparities and performance patterns, and proposing tailored strategies to enhance logistics efficiency. By combining institutional theory, regional development perspectives, and empirical benchmarking, the paper contributes to both scholarly understanding and policy-making on logistics modernization in Eurasia (Behar & Venables, 2011; Briceño-Garmendia et al., 2010; Tavasszy & de Jong, 2014; Van den Berg et al., 2012).

3. Methodology

This study adopts a mixed-method approach grounded in descriptive statistics and comparative benchmarking, aiming to evaluate logistics performance across post-Soviet economies using the World Bank's Logistics Performance Index (LPI) 2023 dataset. The methodological framework is designed to capture structural disparities in logistics systems and explore both quantitative indicators and contextual dimensions.

Data Source and Coverage

The primary data source for the analysis is the World Bank's LPI 2023 report, which ranks 139 countries based on six core logistics dimensions. These are: efficiency of customs clearance, quality of infrastructure, ease of arranging international shipments, competence of logistics services, ability to track and trace consignments, and timeliness of deliveries. The data is collected from freight forwarders and logistics professionals using standardized surveys.

This study includes 13 post-Soviet countries for which LPI scores are available in 2023: Armenia, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Ukraine, and Uzbekistan. Azerbaijan and Turkmenistan are excluded due to missing data. For comparative purposes, average scores from the top 10 and bottom 10 countries worldwide are also analyzed.

Measurement Structure and Scoring Mechanism

The LPI relies on perception-based evaluations by logistics professionals who rate countries based on their experience with imports and exports. Respondents are asked to assess up to eight partner countries with which they conduct the most trade. Each score is weighted based on the importance of trade volume with the respective country, and final scores are computed using weighted averages. The overall LPI score for each country is the arithmetic mean of the six component scores.

To operationalize the variables, this study uses the official LPI dataset without alteration, treating each sub-component as a continuous interval-scale variable ranging from 1 (low) to 5 (high). Reliability of the LPI data is ensured through internal consistency in data collection procedures by the World Bank. However, since the LPI is based on perceptions, it is acknowledged that respondent bias, political context, or lack of information may affect some scores.

Analytical Procedure

The methodology consists of three primary stages:

1. Descriptive Statistical Analysis:

This phase presents the raw LPI scores in tabular and graphical formats. Average scores by country and sub-region (e.g., Baltics, South Caucasus, Central Asia) are calculated to identify performance patterns. Standard deviation and range are used to assess internal variation within country groups.

2. Comparative Benchmarking:

Each post-Soviet country's performance is compared to both global high performers (e.g., Germany, Singapore, Netherlands) and low performers. This allows for positioning countries within a global logistics landscape and evaluating convergence or divergence from international standards.

3. SWOT Analysis:

A qualitative SWOT framework is applied to selected countries—Armenia, Georgia, Kazakhstan—to provide a broader contextual interpretation. This includes identification of logistics-related strengths (e.g., transit potential), weaknesses (e.g., underdeveloped infrastructure), opportunities (e.g., digital customs reform), and threats (e.g., political instability, sanctions).

Country Grouping Logic

For comparative clarity, the study applies a three-layer grouping strategy:

- **Geopolitical Grouping:** post-Soviet regions are subdivided into Baltics, South Caucasus, Central Asia, and CIS as a whole;
- **Performance-Based Grouping:** countries are categorized into high (LPI ≥ 3.4), medium (LPI 2.6–3.3), and low performers (LPI < 2.6);

Methodological Limitations

Although the LPI is a globally recognized index, it has several methodological limitations. First, the data is perception-based, making it vulnerable to respondent bias and information asymmetry. Second, not all countries are evaluated uniformly due to differences in the number and quality of survey responses. Third, the LPI does not account for within-country heterogeneity, such as regional differences in infrastructure between capital cities and rural areas.

To mitigate these limitations, this study supplements LPI findings with SWOT analysis and interprets the results in light of broader economic and geopolitical conditions. It refrains from causal inferences and focuses on benchmarking and descriptive evaluation, while acknowledging the need for future empirical modeling and longitudinal analysis to trace dynamics over time.

The Logistics Performance Index is a perception-based index compiled through surveys of logistics professionals, including freight forwarders and customs brokers. Respondents evaluate up to eight countries based on their operational experience. Each country's score is calculated as a weighted average based on respondent ratings and trade relevance. While the LPI offers valuable comparative insight and is widely used in international logistics analysis, it has several limitations. As a perception-based tool, it may be affected by response bias. Additionally, data availability may be limited for smaller or conflict-affected states, and it does not capture regional disparities within countries.

The LPI assessment is based on survey results using a weighted average approach. The overall formula is as follows:

$$LPI = \frac{1}{N} \sum_{i=1}^{N} WiSi$$

where:

 $N-\ensuremath{\text{the total}}$ number of specialists who evaluated the country.

Si – the score given by the i-th specialist.

Wi – the weighting coefficient for the specialist's evaluation (based on the significance of trade relations).

Each component score is calculated using the same formula, and the final LPI score is determined as the average of six components.

To address these limitations, the present study complements LPI data with contextual analysis and SWOT assessment. This approach ensures a more nuanced understanding of the logistics performance dynamics in transitional economies and supports the development of more targeted and evidence-based policy recommendations.

4. Results

Countries with the highest logistics efficiency scores stand out due to their well-developed infrastructure (average score of 4.3), high-quality customs services (4.0), and professional logistics management (4.2), ensuring the high effectiveness of supply chains. Reliable systems for on-time delivery (4.2) and cargo tracking (4.2) reduce logistics risks and contribute to the development of international trade. These countries have implemented advanced technological solutions, securing their leadership in the global logistics system.

According to the 2023 Logistics Performance Index (LPI) data, the former Soviet Union (FSU) countries exhibit varying performance levels, reflecting their economic development and the state of their logistics systems (Table 1).



Note. The following graphs and tables are compiled and calculated based on data from the World Bank (2023). Logistics Performance Index (LPI) 2023: Global Rankings. Retrieved from <u>https://lpi.worldbank.org/international/global</u>.

Fig. 1: Top 10 Countries in the World by Logistics Performance Index (LPI), 2023.

The 2023 Logistics Performance Index data reveal a considerable disparity in logistics efficiency among post-Soviet countries. The overall average score of the 13 evaluated countries is 2.8, which is slightly below the global average of 3.0. However, these regional average masks substantial differences between sub-regions, particularly between the Baltic states and the South Caucasus and Central Asian republics.

Country	Overall Score	Customs Services	Infrastructure	International Shipments	Logistics Competence	Timely Delivery	Tracking & Monitoring
Estonia	3.6	3.2	3.5	3.4	3.7	4.1	3.8
Latvia	3.5	3.3	3.3	3.2	3.7	4.0	3.6
Lithuania	3.4	3.2	3.5	3.4	3.6	3.6	3.1
Belarus	2.7	2.6	2.7	2.6	2.6	3.1	2.6
Georgia	2.7	2.6	2.3	2.7	2.6	3.1	2.8
Kazakhstan	2.7	2.6	2.5	2.6	2.7	2.9	2.8
Ukraine	2.7	2.4	2.4	2.8	2.6	3.1	2.6
Russia	2.6	2.4	2.7	2.3	2.6	2.9	2.5
Uzbekistan	2.6	2.6	2.4	2.6	2.6	2.8	2.4
Armenia	2.5	2.5	2.6	2.2	2.6	2.7	2.3
Moldova	2.5	1.9	1.9	2.7	2.8	3.0	2.8
Tajikistan	2.5	2.2	2.5	2.5	2.8	2.9	2.0
Kyrgyzstan	2.3	2.2	2.4	2.4	2.2	2.4	2.3

Table 1. Former Soviet Union (FSU) Countries by Logistics Performance Index (LPI), 2023

The Baltic countries (Estonia, Latvia, and Lithuania) consistently outperform their post-Soviet peers, with average LPI scores of 3.6, 3.5, and 3.4, respectively. These countries demonstrate strengths across multiple logistics dimensions, especially in delivery timeliness and logistics competence. Estonia, for instance, scores 4.1 in timeliness, reflecting the presence of highly efficient logistics management systems and digitally integrated customs procedures. Latvia and Lithuania also show strong infrastructure and customs indicators, closely aligning their logistics systems with European Union standards.

Belarus and Georgia rank lower, both with an overall score of 2.7. Belarus shows relatively stable results across all categories, although its infrastructure and cargo tracking systems remain limited. Georgia, as a key transit country in the region, shows improved results in international shipments (2.7), reflecting its integration into trade flows with neighboring countries. However, its logistics infrastructure remains underdeveloped, receiving a low score of 2.3.

Kazakhstan, Ukraine, and Russia also have scores in the range of 2.6-2.7 points. Kazakhstan has improved its timeliness score (2.9 points), which is due to its vast territory and strategic position as a transit hub between China and Europe. Ukraine demonstrates a relatively high result in international shipments -2.8 points; however, the complex political and military situation limits the overall efficiency of logistics processes. Russia has strong infrastructure (2.7 points), but complex customs regulations and international sanctions negatively impact logistics flow management.

Uzbekistan and Armenia have scores in the range of 2.5–2.6 points. Despite its landlocked geographical position, Uzbekistan demonstrates relatively stable results in customs services and infrastructure. Armenia, facing limited transport and trade opportunities, has a timeliness score of 2.7 points, which indicates some progress in logistics management. However, improving cargo tracking systems and infrastructure remains a serious challenge for our country.

Moldova, Tajikistan, and Kyrgyzstan are among the countries with the lowest logistics efficiency scores. Moldova's weaknesses lie in customs services and infrastructure, which received only 1.9 points, despite

improved scores in logistics skills and cargo tracking systems. Tajikistan demonstrates a high result in timeliness (2.9 points); however, the efficiency of infrastructure and tracking systems remains low. Kyrgyzstan, in turn, has an overall score of 2.3 points, indicating systemic problems in the logistics sector.

The analysis of the Logistics Performance Index for 2023 shows that differences in logistics capabilities and infrastructure between countries continue to deepen. In particular, developed countries with the most optimized logistics systems significantly outperform developing countries and post-Soviet states.

The average score of the top 10 countries is 4.1, with high results in infrastructure (4.3), logistics skills (4.2), and cargo tracking (4.2), indicating the presence of efficient systems. Customs services also demonstrate significant efficiency (4.0), which helps reduce delivery time costs (Table 2).

At the opposite end of the ranking, the 10 countries with the lowest scores have an average of 2.1 points, with their customs systems receiving the lowest ratings (1.9), highlighting issues in management and the complexity of procedures.

	The Indicators of the Levistics Derfermence Index									
	The Indicators of the Logistics Performance Index									
Country Groups	Overall Score	Customs Services	Infrastructure	International Shipments	Logistics Competence	Timely Delivery	Tracking & Monitoring			
Top 10 Countries	4.1	4.0	4.3	3.7	4.2	4.2	4.2			
Bottom 10 Countries	2.1	1.9	2.0	2.2	2.1	2.4	2.1			
FSU (former Soviet Union) Countries (13 countries)	2.8	2.6	2.7	2.7	2.9	3.1	2.7			
CIS Countries (8 countries)	2.6	2.4	2.5	2.5	2.6	2.8	2.5			
Armenia and Regional Countries (5 countries)	2.7	2.5	2.7	2.6	2.7	3.0	2.7			
South Caucasus Countries (2 countries)	2.6	2.6	2.5	2.5	2.6	2.9	2.6			
World (139 countries)	3.0	2.8	2.9	2.9	3.0	3.2	3.1			

Table 2. The Average Values of the Logistics Performance Index for Different Country Groups in 2023

Note: Data for Turkmenistan and Azerbaijan are not available.



Fig. 2: Average Logistics Performance Index (LPI) Values for Different Country Groups in 2023

The average score of the former Soviet Union (FSU) countries is 2.8, which is below the global average level (3.0) but slightly higher than in the CIS countries (2.6). This indicates that logistical systems in the CIS still require significant development. In the CIS countries, infrastructure and international shipments have an average score of 2.5, which limits the facilitation of international trade.

The combined score of Armenia, Georgia, Turkey, Iran, and Russia is 2.7, which slightly exceeds the CIS average. The strongest aspect of logistics in these countries is the timeliness of deliveries (3.0), but customs services and infrastructure require significant improvements.

The average score of the South Caucasus countries (Armenia and Georgia) is 2.6, which is close to the average level of the CIS countries. However, the indicators of infrastructure and cargo tracking remain low (2.5–2.6), indicating the need for technological development and reforms in logistics management.

The average LPI among 139 countries is 3.0, indicating that, on a global scale, logistics development is above the average level. The highest indicator is the timeliness of deliveries (3.2), which suggests that even in developing countries, accuracy and delivery speed are a priority.

When aggregating by sub-regions, the Baltic states average 3.5 across all LPI components, indicating near convergence with European standards. The CIS countries average 2.6, with the lowest components in infrastructure and tracking. The South Caucasus countries (Armenia and Georgia) score 2.6 on average, with timeliness being the strongest dimension (average 2.9). However, both countries face difficulties in cargo visibility and integrated infrastructure development.

A focused analysis of five regionally relevant countries (Armenia, Georgia, Russia, Turkey, and Iran) shows an average LPI of 2.7. While Georgia and Turkey demonstrate progress in logistics modernization, Armenia and Iran require significant reforms in customs efficiency and intermodal transport systems.

Overall, the results confirm that post-Soviet countries face multifaceted logistics challenges shaped by legacy infrastructure, regional instability, limited investment, and fragmented policy coordination. These factors collectively reduce the efficiency and reliability of supply chains, undermining the trade competitiveness of the region.

5. Conclusion

This comparative analysis of logistics performance across post-Soviet countries reveals significant heterogeneity in logistics development, with clear distinctions between the Baltic states and other former Soviet republics. The Baltic countries (Estonia, Latvia, and Lithuania) have achieved logistics efficiency levels approaching Western European standards (average LPI: 3.5), particularly excelling in timeliness of deliveries and logistics competence. In contrast, Central Asian and Caucasus nations continue to struggle with infrastructure limitations and customs inefficiencies, resulting in substantially lower LPI scores (average: 2.6). The South Caucasus region faces particular challenges stemming from landlocked geography, regional conflicts, and underdeveloped transport networks. Georgia has leveraged its strategic position to improve international shipments (2.7), while Armenia has focused on developing efficient domestic infrastructure despite limited international connectivity. These findings highlight how political and geographical constraints continue to shape logistics development trajectories decades after the Soviet dissolution. Our analysis suggests several specific policy interventions that could enhance logistics performance in the region. First, customs modernization through digital solutions similar to those implemented in Estonia could significantly improve crossborder trade efficiency. Second, targeted infrastructure investments-particularly in intermodal connectivity-would address a key weakness identified across CIS countries. Third, regional cooperation initiatives specifically focused on standardizing documentation and transport regulations would reduce current barriers to seamless trade. This research contributes to understanding logistics development in transitional economies but has several limitations. The World Bank LPI methodology relies on perception-based measures that may not fully capture objective logistics performance. Furthermore, political factors affecting regional trade cooperation were not quantitatively assessed. Future research should explore the relationship between specific policy interventions and LPI improvements, as well as the impact of geopolitical developments on regional logistics integration in the post-Soviet space.

Manuscript is accepted for review with the understanding that no substantial portion of the paper has been published or is under consideration for publication elsewhere and that its submission for publication has been approved by all of the authors and by the institution where the work was carried out. It is further understood that any person cited as a source of personal communications has approved such citation. Articles and any other material published in the Journal represent the opinions of the authors and should not be construed to reflect the opinions of the Editor(s) or the Publisher.

Authors submitting a manuscript do so on the understanding that if the manuscript is accepted for publication, copyright for the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher.

Paper proofs will be sent to first author (or the corresponding author) for checking. Corrections to the proofs must be restricted to printer errors. Any substantial alterations other than these may be charged to the author.

The journal needs to be purchased with discount for author(s) through an order form accompanying the acceptance letter.

References

Acemoglu, D., & Robinson, J. A. (2012). Why nations fail: The origins of power, prosperity, and poverty. Crown.

Ayyagari, M., Demirguc-Kunt, A., & Maksimovic, V. (2023). SME finance: Recent advances and ongoing challenges. Annual Review of Financial Economics, 15, 301–322.

Arvis, J.-F., Mustra, M. A., Ojala, L., Shepherd, B., & Saslavsky, D. (2016). Connecting to Compete 2016: Trade Logistics in the Global Economy. World Bank.

Arvis, J.-F., & Raballand, G. (2010). The cost of being landlocked: Logistics costs and trade facilitation. World Bank Publications.

Banomyong, R., & Beresford, A. K. C. (2021). Logistics development in the Greater Mekong Subregion. Transport Reviews, 41(2), 251–267.

Behar, A., & Venables, A. J. (2011). Transport costs and international trade. Oxford Review of Economic Policy, 27(2), 201–219.

Blancas, L. C., Ollivier, G., Bullock, R., & Vickers, A. (2014). Efficient logistics: A key to Vietnam's competitiveness. World Bank.

Briceño-Garmendia, C., Domínguez, C., & Pushak, N. (2010). Africa's infrastructure: A time for transformation. World Bank.

Cheng, M., & Yip, T. L. (2021). Smart port development in the Belt and Road Initiative. Maritime Economics & Logistics, 23(3), 450–471.

de Soyres, F., Mulabdic, A., & Ruta, M. (2018). Border delays and trade costs. World Bank Economic Review, 32(1), 139–160.

Eurasian Development Bank. (2022). Integration barriers in Eurasian logistics. EDB Report.

Faye, M. L., McArthur, J. W., Sachs, J. D., & Snow, T. (2004). The challenges facing landlocked developing countries. Journal of Human Development, 5(1), 31–68.

Francis, D., & Bekele, S. (2022). Digital logistics in landlocked countries. Transport Policy, 125, 1–11.

Gani, A. (2017). The logistics performance effect in international trade. Asian Journal of Shipping and Logistics, 33(4), 279–288.

Gausch, J. L., Hahn, R. W., & Engel, C. (2010). Trade logistics and competitiveness. World Bank Policy Research Working Paper WPS5329.

Hausman, W. H., Lee, H. L., & Subramanian, U. (2013). The impact of logistics performance on trade. Production and Operations Management, 22(2), 236–252.

Hausman, W., Lee, H., & Subramanian, U. (2005). Global logistics indicators, supply chain metrics, and bilateral trade patterns. World Bank.

Hesse, M., & Rodrigue, J.-P. (2019). The transport geography of logistics and freight distribution. In The Geography of Transport Systems (5th ed.).

ISO. (2020). ISO 668:2020 - Series 1 Freight Containers—Classification, dimensions and ratings. International Organization for Standardization.

Khaslavskaya, A., & Roso, V. (2020). Port-centric logistics: A literature review. Transport Reviews, 40(5), 633–658.

Knoema. (2023). Post-Soviet logistics index trends. Knoema Database. Retrieved April 2024.

Limao, N., & Venables, A. J. (2001). Infrastructure, geographical disadvantage, transport costs, and trade. World Bank Economic Review, 15(3), 451–479.

Malliswaran, V. (2025). AI disruption in cross-border logistics. TechForward Research.

Marti, L., Puertas, R., & Garcia, L. (2017). The importance of the Logistics Performance Index in international trade. Applied Economics, 49(5), 544–558.

North, D. C. (1991). Institutions. Journal of Economic Perspectives, 5(1), 97–112.

Notteboom, T., & Winkelmans, W. (2020). Port regionalization and efficiency. Journal of Transport Geography, 86, 102779.

OECD. (2022). Logistics policies and global supply chain resilience. OECD Report.

Purtell, J., Malliswaran, V., & Kim, H. (2025). Revolutionizing mid-mile logistics with drone technology. Logistics Futures Journal.

Raballand, G. (2003). Determinants of the negative impact of being landlocked on trade. Comparative Economic Studies, 45(4), 520–536.

Rodrigue, J.-P. (2020). The geography of transport systems (5th ed.). Routledge.

Rodrigue, J.-P., & Notteboom, T. (2022). The geography of logistics and freight transport. Routledge.

Shepherd, B., & Wilson, J. S. (2007). Trade facilitation in ASEAN. World Bank Policy Research Working Paper WPS4104.

Siroyan, G. (2020). Challenges of improving agricultural competitiveness in Vayots Dzor and Ararat regions of Armenia. Retrieved from Academia.edu.

Slack, B. (2021). Intermodal transportation and logistics integration. Maritime Policy & Management, 48(4), 477–490.

Tavasszy, L., & de Jong, G. (2014). Modelling freight transport. Elsevier.

UNCTAD. (2021). Food value chains in landlocked developing countries. Geneva: UNCTAD.

UNESCAP. (2021). Digitalization of transport and logistics in Asia. UNESCAP Technical Report.

Wang, C., Liu, J., & Zhang, Y. (2020). Blockchain in cross-border logistics. Technological Forecasting and Social Change, 155, 119969.

Wilmsmeier, G., & Sánchez, R. J. (2017). Landlocked countries and trade logistics. Journal of Transport Geography, 58, 103–114.

World Bank. (2023a). Connecting to Compete: The Logistics Performance Index 2023. World Bank.