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Enhancing Logistics Performance and Sustainable Competitiveness in Azerbaijan: An LPI-Based Analysis

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Abstract. Logistics performance increasingly depends not only on physical infrastructure but also on service quality, institutional efficiency, and digital information flows. This study develops a descriptive–analytical (diagnostic) assessment of Azerbaijan's logistics system using the Logistics Performance Index (LPI) as a system-level benchmarking tool and Trade Facilitation Indicators (TFI) as an operational-level assessment framework.

The analysis integrates these indicators within a comparative framework that examines Azerbaijan's performance across key logistics dimensions, including customs efficiency, digitalization, logistics service capacity, and institutional coordination. In addition, regional benchmarking is employed to position Azerbaijan within major transit and corridor contexts.

The findings suggest that while substantial investments in transport infrastructure have improved physical connectivity, limitations in soft infrastructure—particularly in logistics services, data integration, and inter-institutional coordination—continue to constrain overall logistics performance and the effective utilization of the country's transit potential.

This study contributes to the literature by proposing an integrated analytical approach that links system-level benchmarking, operational indicators, and regional comparison, and by conceptualizing logistics performance as an information-intensive service system. The findings offer policy-relevant insights for improving logistics competitiveness in emerging transit economies.

Keywords: logistics performance, trade facilitation, soft infrastructure, digitalization, logistics competitiveness, Azerbaijan.

1. Introduction

Efficient logistics systems play a crucial role in facilitating international trade, strengthening regional connectivity, and supporting economic competitiveness in a globalized environment. The Logistics Performance Index (LPI), developed by the World Bank, is widely used as a system-level benchmarking framework for assessing logistics performance across key dimensions, including customs efficiency, infrastructure quality, shipment reliability, logistics competence, and tracking and tracing capabilities (World Bank, 2023; Arvis et al., 2016).

For strategically located transit economies such as Azerbaijan—situated along major East–West and North–South transport corridors—logistics performance is closely linked to broader economic and development objectives. In this context, improvements in logistics efficiency are increasingly viewed as a policy priority within national and regional connectivity strategies (International Transport Forum, 2023; World Intellectual Property Organization, 2025).

Over the past decade, Azerbaijan has implemented substantial investments in transport and logistics infrastructure, including port modernization, railway upgrades, airport development, and the expansion of logistics hubs. Key initiatives such as the Trans-Caspian International Transport Route (TITR) have strengthened the country's role within regional and intercontinental connectivity networks (Asian Infrastructure Investment Bank, 2024). These developments are aligned with broader efforts to improve corridor efficiency, enhance trade facilitation, and strengthen logistics system integration (Asian Development Bank, 2023).

Despite these infrastructure advancements, LPI-based studies indicate that institutional efficiency, logistics service quality, and coordination across logistics actors remain key constraints. In particular, customs procedures, service reliability, and system-wide coordination continue to influence overall logistics performance (World Bank, 2014; Chow et al., 1994; Heaver, 1992; TRACECA Intergovernmental Commission, 2022). Moreover, global supply chain disruptions have further highlighted the importance of resilient and well-coordinated logistics systems (Asian Development Bank, 2023).

Azerbaijan's engagement in regional cooperation frameworks such as CAREC and TRACECA, alongside the implementation of TIR-based transit facilitation mechanisms, reflects ongoing efforts to enhance trade facilitation and improve transit efficiency (CAREC Program, 2023; International Road Transport Union, 2022). At the same time, diversification of the non-oil economy increasingly depends on improvements in logistics service capacity and innovation in logistics systems (Chapman et al., 2003; Li & Guangwen, 2025).

Against this background, this study adopts a descriptive–analytical and policy-oriented approach to assess Azerbaijan's logistics performance. Specifically, the study develops an integrated analytical framework in which the LPI is used for system-level benchmarking, while international reports and regional corridor assessments are used to evaluate structural and institutional dimensions of logistics performance (World Bank, 2023; International Transport Forum, 2023; CAREC Program, 2023).

The study aims to identify structural strengths and weaknesses across logistics infrastructure, institutional capacity, and service quality, and to provide a coherent diagnostic assessment of how these dimensions jointly shape logistics competitiveness in transit-oriented economies.

2. Literature Review

The assessment of logistics performance plays an important role in understanding competitiveness within modern economic systems. Efficient logistics systems contribute to reducing trade costs, improving market access, and enhancing overall economic efficiency. In this context, the Logistics Performance Index (LPI), developed by the World Bank, is widely used as a system-level comparative framework for evaluating logistics systems across countries. It is structured around key dimensions,

including customs efficiency, infrastructure quality, logistics competence, shipment tracking capability, and supply chain reliability (World Bank, 2023; Arvis et al., 2016).

The LPI has been extensively applied in both empirical and policy-oriented studies to examine cross-country differences in logistics performance. Existing research suggests that higher LPI scores are generally associated with lower trade costs, more efficient logistics operations, and stronger integration into regional and global value chains (OECD, 2019; Hausman et al., 2013a). From a policy perspective, the LPI serves primarily as a benchmarking tool, enabling governments to identify structural gaps and prioritize reforms.

However, while the LPI provides a comprehensive system-level overview, it has limitations in capturing the operational and procedural dimensions of trade facilitation. To address this gap, studies increasingly complement LPI-based analysis with broader institutional and policy frameworks that emphasize border efficiency, coordination, and logistics governance (OECD, 2019; Chow et al., 1994).

In the case of Azerbaijan, its geographic location and transit potential make logistics performance a critical policy area. While the economy has historically been dominated by the oil and gas sector, recent development strategies have increasingly emphasized the role of transport and logistics in supporting economic diversification and regional connectivity (Asian Development Bank, 2023; International Transport Forum, 2023). Key infrastructure projects, including integration into the Trans-Caspian International Transport Route (TITR), represent major components of this strategy (Asian Infrastructure Investment Bank, 2024).

The Logistics Performance Index is widely used as a multidimensional indicator of logistics efficiency, incorporating six key components reflecting both infrastructure and operational performance (World Bank, 2023; Arvis et al., 2016). Recent empirical studies further integrate LPI into analytical frameworks to assess logistics performance determinants in developing economies (Le Thai, 2025), while also highlighting its relationship with trade intensity and economic integration (Raimbekov et al., 2024; Wang et al., 2024).

These developments have strengthened Azerbaijan's multimodal transport capacity by improving the integration of rail, maritime, and road transport systems. However, infrastructure improvements alone are not sufficient to ensure high logistics performance. Increasingly, the literature emphasizes the role of service quality, institutional coordination, and digital integration as critical determinants of logistics efficiency (Chapman et al., 2003; Li & Guangwen, 2025).

Rezaei et al. (2018) emphasize that the components of the Logistics Performance Index are not equally important. Using the Best Worst Method, they demonstrate that infrastructure carries the highest weight, while tracking and tracing has lower relative importance, indicating that equal weighting in the LPI may distort logistics performance assessment.

Despite growing attention to these factors, existing studies often treat logistics performance either at a macro benchmarking level (using LPI) or at a policy-institutional level, without fully integrating these perspectives into a unified analytical framework. This creates a gap in understanding how system-level performance, operational efficiency, and regional positioning interact in shaping logistics competitiveness.

This study addresses this gap by adopting an integrated descriptive–analytical approach that combines LPI-based benchmarking with comparative regional analysis. In doing so, it provides a more comprehensive diagnostic evaluation of logistics performance, particularly relevant for emerging transit economies such as Azerbaijan.

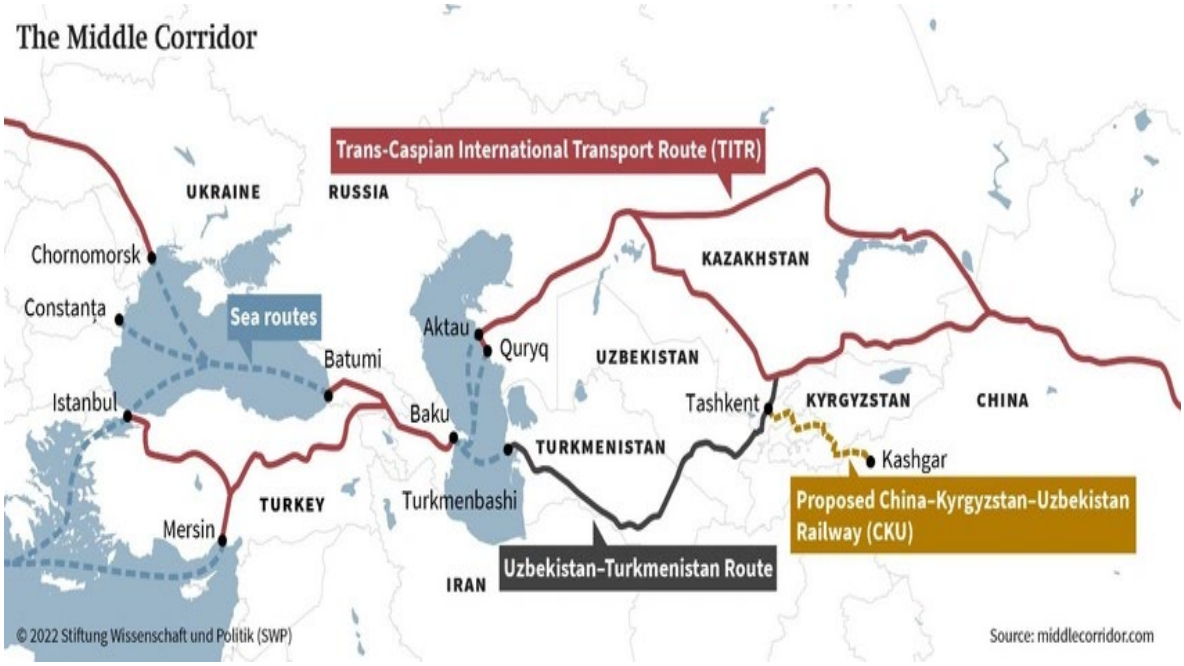

Fig 1: Azerbaijan's positioning in major Eurasian transit corridors (Middle Corridor and TRACECA

3. Methodology

This study adopts a descriptive–analytical and diagnostic research design to evaluate logistics performance in Azerbaijan and to identify structural and policy-related factors shaping logistics competitiveness. The research is explicitly non-causal and non-econometric in nature, as it does not aim to estimate causal relationships or test statistical hypotheses. Instead, it focuses on comparative indicator analysis, interpretive synthesis, and policy-oriented assessment of logistics performance (Arvis et al., 2016; World Bank, 2023).

A key methodological feature of the study is its integrated analytical design, which connects different datasets into a unified interpretive structure. Rather than analyzing each dataset independently, the study systematically combines system-level benchmarking (Logistics Performance Index), operational efficiency measurement frameworks, and regional comparative positioning tools to construct a multi-layered explanation of logistics performance (Arvis et al., 2016; OECD, 2019).

This integration allows the research to move beyond descriptive reporting towards a structured diagnostic interpretation of logistics competitiveness. In particular, it enables a comparative policy-oriented assessment of corridor performance and trade facilitation conditions across Eurasian transport networks (International Transport Forum, 2023; CAREC Program, 2023; Asian Development Bank, 2023).

3.1 Data Sources

The study relies primarily on secondary data obtained from internationally recognized databases and institutional reports. The core dataset is the Logistics Performance Index (LPI), developed by the World Bank, which provides internationally comparable indicators across six key dimensions: customs efficiency, infrastructure quality, international shipments, logistics competence, tracking and tracing, and timeliness (Arvis et al., 2016; World Bank, 2023). The LPI serves as a system-level benchmark reflecting the overall performance and structural capacity of national logistics systems.

To complement this macro-level perspective, the study incorporates corridor- and region-level performance assessments derived from CAREC Corridor Performance Measurement and Monitoring (CPMM) reports. These indicators capture operational-level aspects such as border-crossing efficiency,

transport reliability, and corridor-level bottlenecks, providing a more detailed understanding of logistics performance at the procedural level (CAREC Program, 2023; Asian Development Bank, 2023).

In addition, institutional and regional sources such as TRACECA reports, OECD publications, and international transport policy analyses are used as contextual reference materials. These sources are not treated as independent analytical datasets but rather as supporting triangulation tools, helping to interpret variations and complementarities between LPI-based benchmarking and corridor-level performance assessments (OECD, 2019; TRACECA Intergovernmental Commission, 2022; International Transport Forum, 2023).

Although primary data collection through interviews and surveys was initially considered, it was excluded from the final analysis due to limitations in comparability, consistency, and cross-country standardization. As a result, the study relies exclusively on secondary datasets that allow for harmonized comparative analysis across countries, time periods, and regional transport corridors (World Bank, 2023).

3.2 Analytical Framework

The analytical framework is constructed as a multi-layered and vertically integrated system**,** in which three analytical levels are interconnected rather than treated as separate analytical stages. The central methodological innovation of the study lies in explicitly linking these levels to form a coherent explanatory structure of logistics performance.

(1) System-Level Analysis (LPI – Outcome Dimension)

At the system level, the Logistics Performance Index (LPI) is used to evaluate the overall structure and effectiveness of national logistics systems. This level captures aggregate performance outcomes, including infrastructure quality, customs efficiency, logistics competence, and digital tracking capabilities. In this framework, LPI represents the final outcome layer of logistics performance, reflecting the combined effect of institutional, infrastructural, and operational factors.

(2) Operational-Level Analysis (TFI – Process Dimension)

At the operational level, Trade Facilitation Indicators (TFI) are used to examine the procedural mechanisms that generate system-level outcomes. This includes border-crossing efficiency, clearance time variability, transport cost structures, and corridor-level operational bottlenecks. In contrast to LPI, which reflects results, TFI captures the process layer**,** explaining how logistics performance is shaped through day-to-day operational and administrative procedures.

(3) Regional-Level Analysis (Comparative Positioning Dimension)

At the regional level, cross-country comparisons are conducted within the CAREC region and the broader Middle Corridor context. This level provides a relational or positioning layer**,** allowing the study to assess whether observed performance patterns in Azerbaijan reflect structural competitiveness, regional convergence, or persistent divergence in logistics systems.

Integrated Analytical Logic

The three analytical levels are conceptually integrated in a hierarchical explanatory structure:

- LPI identifies what the logistics performance outcome is (system-level results)
- TFI explains how these outcomes are produced operationally (process mechanisms)
- Regional comparison explains where Azerbaijan stands in relation to peer economies (contextual positioning)

This integrated logic ensures that logistics performance is not interpreted as a set of isolated indicators but as a multi-layered system shaped by interactions between structure, process, and regional

environment. Accordingly, infrastructure development, institutional capacity, and digital readiness are treated as cross-cutting determinants influencing all three levels simultaneously rather than as separate explanatory variables.

3.3 Analytical Approach

The study applies a comparative descriptive approach based on structured tabular analysis of LPI scores, rankings, and TFI indicators. However, unlike purely descriptive studies, these tables are interpreted within the integrated analytical framework described above, allowing for cross-level synthesis between system, operational, and regional dimensions.

The analysis focuses on key logistics performance dimensions, including:

- customs and border management efficiency
- infrastructure quality and capacity
- logistics service capability and market maturity
- tracking and tracing systems (digitalization and visibility)
- institutional coordination and governance effectiveness

Each dimension is examined not only within individual datasets but also across datasets. For example, infrastructure quality in LPI is interpreted alongside operational bottlenecks captured by TFI and then contextualized through regional comparison. This approach ensures that observed differences are not treated as isolated findings but as interconnected elements of a broader logistics system.

No dependent or independent variables are defined, and no econometric or statistical modeling techniques are applied. The analytical emphasis is placed on interpretive synthesis rather than causal estimation.

3.4 Scope and Limitations

This study is explicitly non-causal and does not attempt to establish statistical relationships between variables. Instead, it identifies indicative patterns, structural constraints, and policy-relevant insights based on integrated comparative evidence.

Accordingly, the findings should be interpreted as diagnostic and exploratory in nature**,** providing a structured basis for policy discussion rather than formal empirical inference.

A key methodological limitation lies in the exclusive reliance on secondary datasets. While this enables cross-country comparability and consistency, it also limits the ability to capture micro-level institutional dynamics and stakeholder perspectives. To mitigate this limitation, the study triangulates multiple secondary sources (LPI, TFI, TRACECA, OECD) within a unified interpretive framework.

Overall, the methodological design prioritizes comparability, integration, and interpretive coherence**,** ensuring that logistics performance is analyzed as a system of interrelated structural, operational, and regional factors rather than as isolated descriptive indicators.

Table 1: Azerbaijan LPI infrastructure indicator performance trend (Rank) (2012–2018)

Country	LPI Rank	Customs Rank	Infrastructure Rank	International shipments Rank	Logistics competence Rank	Tracking & tracing Rank	Timeliness Rank
Azerbaijan	123	81	66	109	153	153	146
Georgia	124	109	108	132	139	130	114
Iran, Islamic Rep.	81	96	70	94	72	95	95
Kazakhstan	77	78	79	87	89	78	65
Kyrgyz Republic	132	110	126	157	147	116	126
Russian Federation	85	131	73	105	73	88	74
Tajikistan	147	154	133	143	132	143	142
Turkiye	37	47	30	40	37	36	39
Turkmenistan	142	133	129	135	150	137	143
Uzbekistan	117	147	98	134	109	110	101

Source: https://lpi.worldbank.org/international/aggregated-ranking

The table below presents a comparative assessment of the Logistics Performance Index (LPI) and its sub-indicators for Azerbaijan and selected regional economies for 2023. The indicators include customs efficiency, infrastructure quality, international shipments, logistics competence, tracking and tracing, and timeliness, based on the World Bank database (World Bank, 2023).

The results indicate notable variation across logistics performance dimensions. Azerbaijan demonstrates relatively stronger performance in infrastructure (2.69), reflecting sustained investment in transport systems. However, comparatively lower scores in logistics competence (2.14) and tracking and tracing (2.18) suggest persistent constraints in service quality, human capital, and digital integration.

From a comparative perspective, this pattern indicates an imbalance between physical infrastructure development and soft infrastructure components. While transport capacity and connectivity have improved, the effectiveness of logistics services and information systems remains comparatively limited. This disparity highlights the importance of strengthening institutional coordination, enhancing logistics service capabilities, and expanding digital logistics systems.

Overall, the findings suggest that improvements in infrastructure alone are insufficient to ensure high logistics performance. Greater emphasis on service quality, digitalization, and operational efficiency is required to fully leverage Azerbaijan's transit potential within regional logistics networks.

Table 2: Azerbaijan LPI infrastructure indicator performance trend (Score) (2012–2018)

Country	LPI Score	Customs Score	Infrastructure Score	International shipments Score	Logistics competence Score	Tracking & tracing Score	Timeliness Score
Azerbaijan	2,45	2,53	2,69	2,56	2,14	2,18	2,62
Georgia	2,45	2,38	2,36	2,38	2,27	2,37	2,92
Iran, Islamic Rep.	2,71	2,46	2,67	2,68	2,76	2,63	3,07
Kazakhstan	2,77	2,57	2,59	2,73	2,6	2,81	3,31
Kyrgyz Republic	2,38	2,38	2,23	2,2	2,21	2,49	2,79
Russian Federation	2,69	2,25	2,64	2,59	2,74	2,67	3,23
Tajikistan	2,29	2,02	2,17	2,32	2,29	2,26	2,65
Turkiye	3,29	2,94	3,36	3,19	3,23	3,37	3,68
Turkmenistan	2,34	2,25	2,23	2,36	2,2	2,32	2,63
Uzbekistan	2,5	2,13	2,44	2,38	2,49	2,54	3,01

Source: https://lpi.worldbank.org/international/aggregated-ranking

Despite improvements in transport infrastructure, customs efficiency and border-crossing procedures remain a significant operational constraint within Azerbaijan's logistics system. Evidence from TRACECA and CAREC assessments indicates persistent bottlenecks, including clearance delays, procedural inconsistencies, and uneven implementation across border checkpoints (TRACECA Intergovernmental Commission, 2022; CAREC Program, 2023).

From an operational perspective, these constraints are reflected in trade facilitation and logistics performance assessments, particularly in dimensions related to border efficiency and procedural reliability. The observed variations suggest that, while certain reforms have improved efficiency in specific segments, border management processes remain uneven and insufficiently coordinated. This points to the need for greater procedural harmonization and the strengthening of system-wide logistics governance.

Beyond border procedures, the results highlight the increasing importance of soft infrastructure in shaping logistics performance. While Azerbaijan has made substantial progress in developing physical transport capacity, comparatively lower performance in service-related dimensions—such as logistics competence and tracking and tracing—indicates limitations in service quality, operational coordination, and supply chain visibility (World Bank, 2023; Arvis et al., 2016). This imbalance suggests that infrastructure expansion has not been matched by equivalent development in logistics service capabilities.

In this context, the relatively limited integration of advanced logistics practices and service innovation can be interpreted as a structural constraint affecting value-added logistics development. Similarly, gaps in system integration and coordination reduce overall efficiency and transparency in logistics operations (Chapman et al., 2003; Li & Guangwen, 2025).

Institutional and governance-related factors further shape these outcomes. Existing evidence indicates that logistics performance is closely associated with the effectiveness of regulatory frameworks, customs procedures, and administrative coordination (Heaver, 1992; Chow et al., 1994). While ongoing reforms emphasize trade facilitation and infrastructure investment, the results suggest that improvements in institutional capacity remain critical for enhancing overall logistics performance.

From a regional perspective, Azerbaijan's position within the Trans-Caspian International Transport Route (TITR) reinforces its strategic role as a transit hub connecting Central Asia, the South Caucasus, and European markets. The country's multimodal transport system supports increasing

transit volumes and corridor integration (Asian Infrastructure Investment Bank, 2024; International Transport Forum, 2023).

However, the comparative analysis suggests that physical connectivity alone is insufficient to fully leverage this strategic position. Differences in logistics performance across dimensions indicate structural asymmetries in operational efficiency and service delivery. These asymmetries highlight the need for more coordinated and standardized logistics procedures across trade flows.

Overall, the findings indicate that Azerbaijan's logistics performance is shaped by a combination of infrastructure capacity, operational efficiency, and institutional effectiveness. While significant progress has been achieved in physical infrastructure development, further improvements depend increasingly on strengthening soft infrastructure components, including service quality, institutional coordination, and logistics system integration.

Table 3: Trade Facilitation Indicators for Azerbaijan (2021–2023)

Trade Facilitation Indicators		**Road Transport**			
		2021	**2022**	**2023**	**% change**
TFI1	Time taken to clear a border-crossing point (hour)	5.8	4.0	4.3	6.29%
	Outbound	**7.5**	**5.3**	**4.4**	**-17.18%**
	Kazakhstan	**3.6**	**2.5**	**4.1**	**66.82%**
TFI2	Cost incurred at border-crossing clearance ($)	106	52	56	5.91%
	Outbound	**100**	**42**	**46**	**9.04%**
	Kazakhstan	**112**	**63**	**67**	**5.70%**
TFI3	Cost incurred to travel a corridor section	27	50	58	15.44%
	($, per 500 km, per 20-ton cargo)				
SWD	Speed to travel on CAREC Corridors (km/h)	39.1	28.9	22.0	-23.91%
SWOD	Speed without Delay (km/h)	52.3	53.3	50.0	-6.47%

Source: CAREC Institute. https://cpmm.carecprogram.org/2023-report/azerbaijan/

A significant structural advantage of Azerbaijan's logistics system is its access to the Caspian Sea through the Port of Alat, which functions as a key multimodal node within transit corridors connecting the South Caucasus with Europe and Central Asia. Despite continued investments in port infrastructure and railway modernization, regional assessments indicate that transit efficiency is still affected by procedural bottlenecks and administrative coordination challenges at certain border-crossing points, including the Red Bridge corridor (Ministry of Digital Development and Transport, 2025).

Within the framework of Trade Facilitation Indicators (TFIs), particularly TFI1, Azerbaijan exhibits short-term variability in border-crossing performance over the 2021–2023 period. Improvements observed between 2021 and 2022 reflect enhanced procedural efficiency, while the subsequent increase in 2023 suggests partial reversal driven primarily by higher inbound clearance times. Outbound flows, in contrast, demonstrate relatively more stable and improving performance.

From a descriptive LPI–TFI perspective, these dynamics indicate that operational efficiency is not uniform across direction of trade flows. Instead, performance varies depending on procedural coordination, workload distribution, and border management consistency. When interpreted alongside the Logistics Performance Index (LPI), these fluctuations align with broader differences in logistics reliability and competence, rather than indicating a stable linear improvement trajectory.

Overall, border-crossing performance should be understood as a process-dependent system influenced by institutional coordination and operational synchronization across agencies. The observed

variations therefore reflect structural characteristics of border management systems rather than isolated short-term anomalies.

In comparative regional terms, CAREC economies demonstrate heterogeneous TFI patterns over the same period, reflecting differences in infrastructure type, procedural frameworks, and traffic composition. While some countries experienced improvements in road transport efficiency, others faced increased processing times or mixed performance across transport modes. Within this context, Azerbaijan's performance corresponds to a broader regional pattern characterized by uneven efficiency gains rather than exceptional divergence.

4. Analytical Framework

The study adopts a descriptive–analytical design and does not employ econometric modeling, hypothesis testing, or statistical inference. Instead, it relies on an interpretive framework based on comparative logistics indicators to examine structural differences in logistics performance.

Rather than treating indicators as isolated measures, the analysis is structured as an integrated framework in which Logistics Performance Index (LPI) and Trade Facilitation Indicators (TFI) are used in a complementary manner. LPI captures system-level outcomes of logistics performance, while TFI provides insight into the operational processes that generate these outcomes. This dual structure is further contextualized through cross-country comparison, allowing regional positioning of Azerbaijan within broader logistics networks.

The analysis is organized around four interrelated dimensions derived from established logistics benchmarking approaches:

- **Customs efficiency**, measured through Trade Facilitation Indicators (TFI), particularly border-crossing time and procedural performance, reflecting the operational functioning of trade facilitation systems.
- **Infrastructure quality**, reflecting the capacity and development of physical transport systems, primarily captured through LPI infrastructure-related indicators.
- **Digitalization and tracking systems**, capturing logistics visibility, information flow, and system integration, assessed through LPI tracking and tracing indicators and supported by TFI operational transparency measures.
- **Institutional and soft infrastructure conditions**, including logistics competence, regulatory effectiveness, and human capital, interpreted as cross-cutting determinants influencing both LPI outcomes and TFI performance.

Importantly, these dimensions are not analyzed independently but are interpreted through cross-level interaction between system-level (LPI) and operational-level (TFI) evidence. This allows the study to move beyond descriptive benchmarking towards an integrated explanation of how structural capacity, institutional quality, and operational efficiency jointly shape logistics performance.

Within this framework, infrastructure development, institutional capacity, and digital readiness are treated as interdependent components of logistics competitiveness that simultaneously influence both outcome (LPI) and process (TFI) levels.

Accordingly, variations in logistics performance are interpreted not as isolated country-specific characteristics but as reflections of underlying structural and institutional configurations that operate across multiple levels of the logistics system.

5. Discussions

The results reveal a structural imbalance in Azerbaijan's logistics development, whereby progress in physical infrastructure and regional connectivity has not been accompanied by proportional improvements in overall logistics performance. This divergence reflects persistent deficiencies in operational efficiency, institutional capacity, and innovation readiness. Consistent with existing literature, the findings indicate that infrastructure expansion alone is insufficient without concurrent

improvements in governance, coordination, and service quality (OECD, 2019; International Transport Forum, 2023).

From a structural standpoint, Azerbaijan's investments in the Port of Alat, the Baku–Tbilisi–Kars railway, and the Trans-Caspian International Transport Route (TITR) have significantly enhanced connectivity and corridor capacity, reinforcing its role as a transit hub between Europe and Asia (Asian Infrastructure Investment Bank, 2024). However, the limited reflection of these investments in Logistics Performance Index (LPI) outcomes underscores the importance of non-physical determinants in shaping logistics competitiveness (Arvis et al., 2016; World Bank, 2023).

In this context, customs and border management inefficiencies emerge as a primary constraint. Procedural inconsistencies, clearance delays, and fragmented institutional coordination reduce predictability and corridor reliability, thereby constraining transport efficiency and contributing to persistent performance gaps (TRACECA Intergovernmental Commission, 2022; Heaver, 1992). This suggests that the effectiveness of physical infrastructure is strongly contingent upon the coherence of administrative and regulatory processes.

A similar pattern is observed in logistics service development. While improvements in transport infrastructure have strengthened physical connectivity, limitations in logistics service capabilities and system coordination indicate that service quality remains an underdeveloped component of the logistics system (Chapman et al., 2003; Li & Guangwen, 2025). As a result, the translation of infrastructure investment into operational efficiency remains partial.

Human capital and organizational capacity further compound these constraints. The limited development of advanced logistics service structures restricts value-added logistics activities and reduces the system's ability to generate innovation-driven competitiveness (Chow et al., 1994; International Transport Forum, 2023). This highlights the importance of institutional learning and capability development in logistics systems.

These constraints are closely associated with institutional factors. Weak coordination mechanisms, regulatory fragmentation, and implementation gaps limit reform effectiveness and reduce system coherence. In transit-oriented logistics systems, such governance-related inefficiencies directly affect performance outcomes and weaken the impact of infrastructure investments.

Synthesizing these findings, Azerbaijan's logistics performance can be understood as the outcome of interactions among three interdependent dimensions: infrastructure capacity, operational efficiency, and institutional effectiveness. While the first dimension has advanced significantly, the latter two remain comparatively underdeveloped, constraining overall system performance (World Bank, 2023; OECD, 2019).

Overall, Azerbaijan is undergoing a transition from an infrastructure-driven logistics model toward a capability-based system. However, this transition remains incomplete, as improvements in logistics performance increasingly depend on institutional coordination, service quality, and operational efficiency rather than additional physical investment.

6. Conclusions

This study examined Azerbaijan's logistics performance through its Logistics Performance Index (LPI) position and underlying structural determinants. The findings confirm substantial progress in infrastructure and regional connectivity, driven by multimodal transport investments such as the Port of Alat, the Baku–Tbilisi–Kars railway, and the Trans-Caspian International Transport Route (TITR) (Asian Development Bank, 2023; CAREC Program, 2023; Asian Infrastructure Investment Bank, 2024).

However, these advancements have not translated into proportional improvements in overall logistics performance. The analysis suggests that inefficiencies in operational processes and institutional coordination remain binding constraints. In line with the literature, the results reinforce the argument

that infrastructure development is a necessary but insufficient condition for achieving high logistics performance (OECD, 2019; World Bank, 2023; Arvis et al., 2016).

The main limitations are concentrated in soft infrastructure components, particularly customs efficiency, regulatory coordination, and system integration. These factors reduce supply chain reliability and limit the returns on existing infrastructure investments (TRACECA Intergovernmental Commission, 2022; Heaver, 1992). Furthermore, deficits in logistics capabilities and service development constrain innovation capacity and value-added logistics expansion (Chapman et al., 2003; Li & Guangwen, 2025). Importantly, these constraints are structurally interconnected. Institutional weaknesses affect procedural efficiency, limit the effectiveness of logistics coordination, and constrain system-wide integration, thereby reinforcing inefficiencies across the logistics ecosystem.

Overall, Azerbaijan remains in a transitional phase toward a more integrated and performance-oriented logistics system. However, structural constraints in institutional effectiveness, service quality, and system coordination continue to limit the pace and depth of this transition.

Future improvements in logistics performance will depend on coordinated enhancements in customs efficiency, service capability, logistics innovation, and institutional coherence. These priorities align with international logistics performance frameworks and empirical findings in the literature (World Bank, 2023; OECD, 2019; Rezaei et al., 2018).

In conclusion, while Azerbaijan has established a substantial infrastructural base, long-term competitiveness will depend on the effective integration of soft and hard infrastructure components, enabling a more efficient, resilient, and innovation-driven logistics system.

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