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Identifying logistics and supply chain constraints in landlocked countries with evidence from Uzbekistan (2016–2023)

Identyfikacja ograniczeń logistycznych i łańcucha dostaw w krajach śródlądowych na przykładzie Uzbekistanu (2016–2023)

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Abstract

Landlocked developing countries face persistent logistics and supply chain constraints resulting from their lack of access to seaports and dependence on transit through neighbouring states. These structural barriers generate high transport costs, long transit times and complex regulatory environments, limiting participation in regional and global value chains. The aim of this article is to assess whether the post-2016 reform period in Uzbekistan coincides with measurable changes in logistics performance and trade openness, and to benchmark these developments against selected landlocked economies in Central Asia. This article reviews the main geographical, infrastructural and institutional challenges identified in the literature and discusses strategic solutions such as regional cooperation, multimodal transport development, customs digitalization and institutional reform. Using a descriptive approach based on World Bank Indicators Logistics Performance Index (LPI) and trade openness (exports plus imports as % of GDP), the analysis compares changes over time and against other Central Asian landlocked economies. The results show measurable post-reform improvements in Uzbekistan's logistics performance and a marked increase in trade openness, with trends more stable and pronounced than in regional peers. At the same time, trade openness increased, indicating a parallel positive trend in external trade integration. When benchmarked against other landlocked economies in Central Asia, Uzbekistan exhibits a more pronounced and stable improvement over the analyzed period. Although the analysis does not allow for causal inference, the observed patterns are consistent with the hypothesis that institutional and logistics reforms may have contributed to improved performance. Overall, the findings highlight the importance of coordinated policy action, infrastructure investment, digital

transformation and strengthened regional cooperation in improving logistics performance and long-term trade integration.

Keywords

landlocked countries, logistics, supply chain, trade facilitation transport infrastructure, digitalization, regional cooperation

1. Introduction

Landlocked countries occupy a structurally disadvantaged position in the global economy due to their lack of direct access to seaports and dependence on neighboring states for transit routes. This geographical limitation presents significant logistical and economic challenges, hindering the smooth flow of goods and services. Unlike coastal states that can directly access global markets via seaports, landlocked countries depend on transit through at least one or more foreign territories, exposing them to multiple border crossings, transit fees, and varying political and regulatory environments (Chaudhary & Paudel, 2024; Marteau et al., 2007). There are currently 32 developing landlocked countries in the world, distributed across several regions of the globe. In Central Asia, examples include Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan; in Africa, countries such as Ethiopia, Rwanda, Malawi, Niger and Botswana are landlocked; while in Central and Eastern Europe, states like Moldova, Serbia, North Macedonia and Hungary also lack direct access to the sea (UNCTAD, 2025). For developing landlocked countries in particular, logistics efficiency becomes a critical determinant of economic integration, export growth and participation in global value chains, as high transport costs and long transit times can quickly erode any comparative advantages in production or labour costs (Marteau et al., 2007). The challenges these countries face are not solely external. Internally, they often contend with poor transportation infrastructure, fragmented governance, and weak trade facilitation systems. These internal and external constraints limit their integration into regional and global value chains. However, advancements in regional partnerships, infrastructure development, and digital logistics systems are gradually reshaping their trade potential (UNCTAD, 2016).

Despite the extensive literature on trade costs and logistics performance, scholars note that landlocked developing countries (LLDCs) remain under-researched, especially regarding the interaction between logistics reforms, institutional modernization, and trade outcomes (Afolabi & Fatai, 2025). Foundational works such as Arvis et al. (2010) provide robust evidence of the disproportionately high logistics costs borne by landlocked developing countries, underlining supply chain unreliability and vulnerability as key price drivers (Marteau et al., 2007). However, the bulk of empirical research has concentrated on African LLDCs or aggregate LLDC samples, leaving a significant gap in longitudinal analyses of logistics performance and major logistics or institutional reforms' impacts in Central Asian LLDCs (Afolabi & Fatai, 2025; Chaudhary & Paudel, 2024). This article addresses this gap by providing a descriptive, longitudinal analysis

of logistics performance and trade openness in Uzbekistan after 2016, complemented by a regional benchmark against selected landlocked economies in Central Asia.

Uzbekistan represents a relevant and timely case in this context. As a double-landlocked country, it embarked on a wide-ranging reform program beginning in 2016–2017, including customs modernization, digitalization of border procedures, investments in multimodal transport corridors, and enhanced regional cooperation through platforms such as CAREC. These reforms provide an opportunity to examine whether improvements in logistics systems and institutional frameworks translate into measurable changes in trade openness and supply chain performance (Tenet, 2024). Accordingly, this article addresses the following research question: To what extent has the improvement in Uzbekistan's logistics performance between 2016 and 2023 been associated with changes in trade openness and the country's integration into global supply chains? The study contributes to the literature by addressing the limited longitudinal evidence on logistics performance in Central Asian landlocked developing countries, offering a descriptive post-reform assessment of Logistics Performance Index indicators and trade openness in Uzbekistan within a regional benchmarking framework.

The remainder of the article is structured as follows. Section 2 outlines the major logistics and supply chain constraints faced by landlocked countries, drawing on established theoretical and empirical literature. Section 3 discusses key strategic solutions, including regional integration, infrastructure investment, digitalization, and institutional reforms. Section 4 presents the empirical illustration for Uzbekistan and comparative Central Asian LLDCs for the period 2016–2023, examining trends in LPI scores and trade openness. The article concludes with policy implications and recommendations for strengthening logistics performance and trade connectivity in landlocked contexts.

2. Data and analytical approach

This study uses secondary data from the World Bank, focusing on two indicators commonly applied in research on landlocked developing countries: the Logistics Performance Index (LPI) and trade openness (exports plus imports as a share of GDP). The analysis is descriptive in nature and relies on identifying changes over time and comparing Uzbekistan with other Central Asian landlocked economies. The LPI is available only for selected years (2010, 2012, 2014, 2016, 2018, 2023), therefore the evaluation focuses on direction and magnitude of changes between survey rounds rather than annual dynamics. Given the irregular frequency of LPI surveys, no interpolation was applied, and the analysis compares observed index values across available survey years to capture medium-term trends. Trade openness, available annually, is used to observe general trends before and after Uzbekistan's reform period starting in 2016. The analytical approach consists of visual examination of indicator trends, comparison of period-to-period changes across countries, and interpretation of these changes in light of documented reforms.

Changes in LPI across cycles were interpreted as improvements or declines in logistics performance, consistent with World Bank guidelines. For trade openness, increases were interpreted as stronger engagement with international markets. Period-to-period changes were

used to highlight relative shifts rather than absolute levels, allowing comparison across countries with different baseline values.

3. Major challenges in logistics and supply chain of landlocked countries

Landlocked developing countries (LLDCs) face a unique constellation of logistical and institutional challenges that constrain their participation in global trade. These barriers manifest across multiple layers of the supply chain from physical connectivity and transit dependence to regulatory complexity and infrastructural deficits, and together result in elevated trade costs, reduced reliability, and limited integration into regional and global value chains. Understanding these constraints is essential for designing effective interventions that can mitigate structural disadvantages and enhance trade competitiveness (Dumitrescu et al., 2018).

Geography represents the most fundamental barrier, as the absence of direct access to seaports forces landlocked economies to rely on extended and often fragmented supply chains that traverse one or more foreign territories, requiring multimodal movements and exposing transport to coordination failures, delays, and high vulnerability to disruptions (Marteau et al., 2007). Transport costs for landlocked economies can be up to 50% higher than for coastal states due to longer transit distances, multiple border inspections and limited route diversification, while prolonged travel time increases the risk of cargo loss, damage or spoilage, particularly for perishable or time-sensitive goods. These constraints are especially severe in regions with difficult terrain and climate conditions, such as Central Asia, where mountainous landscapes and extreme temperatures impede the reliability and seasonality of transport routes (UNDP, 2025). Compounding the geographic challenges is the structural dependence on transit countries, which subjects LLDCs to the political stability, regulatory environments and infrastructure quality of neighboring states. Border closures, diplomatic tensions or domestic crises in transit countries can abruptly disrupt trade (Dumitrescu et al., 2018). Even under stable conditions, fragmented customs regimes, inconsistent documentation requirements and mismatched technical standards contribute to costly delays at border crossings. Non-tariff barriers including multiple inspections, informal payments and redundant paperwork significantly elevate the cost and unpredictability of trade for LLDCs (Akiwumi, 2024). In regions like Central Asia, long queues and repeated inspections along Kazakh, Turkmen or Afghan transit corridors remain common bottlenecks, reflecting limited border-post capacity and inconsistent enforcement practices (Tekir, 2025).

These external constraints are further reinforced by internal deficiencies in transport and logistics infrastructure. Road and railway networks in many LLDCs lack the quality, connectivity and resilience needed to support high-volume, competitive trade flows, leaving rural regions poorly linked to main corridors and restricting producers' access to regional markets (UN-OHRLLS, 2018). Critical logistics facilities such as dry ports, inland container depots, cold-chain networks and modern warehousing are often underdeveloped, driving up handling costs and reducing overall supply chain reliability, particularly for agricultural exporters (ChoongYeol et al., 2018). Institutional and regulatory inefficiencies further compound these disadvantages,

as customs clearance processes are frequently characterized by overlapping agency mandates, redundant documentation and slow adoption of digital systems, leading to long delays and high compliance costs (WCU, 2017). Corruption and weak administrative capacity exacerbate inconsistencies in enforcement, while the lack of regulatory alignment with transit countries introduces uncertainty and undermines supply chain predictability. Although initiatives such as national Single Window systems and regional transit agreements have been increasingly introduced, progress across LLDCs remains uneven and incomplete (UNDP, 2025).

The cumulative effects of these geographic, infrastructural and institutional obstacles significantly limit the ability of LLDCs to integrate into global markets. High transport costs, long lead times and low logistical reliability undermine participation in global value chains, especially in sectors requiring strict delivery schedules, such as electronics, automotive components or processed foods (Hanif & Kaluwa, 2016). Limited connectivity reduces foreign investment attractiveness and constrains opportunities for economic diversification, leaving producers in landlocked economies unable to compete effectively with coastal exporters due to higher logistics costs embedded in final prices (Takele & Buvik, 2019). Empirical studies demonstrate that logistics inefficiency can reduce a landlocked country's trade volume by up to 60%, even when controlling for economic size and population (Moore, 2018). Together, these constraints create a persistent structural disadvantage that restricts LLDCs' integration into regional and global trade systems and underscores the need for targeted reforms and coordinated policy interventions (Yeo & Deng, 2020).

4. Strategies and solutions

Addressing the diverse and interconnected logistics challenges faced by landlocked countries requires a comprehensive and multidimensional set of strategies that combine regional cooperation, physical infrastructure investment, digital modernization, and institutional reform (Akinsanya, 2020). Enhanced regional integration is widely recognized as one of the most effective approaches to overcoming structural transit constraints, as participation in regional trade agreements and economic blocs enables landlocked countries to benefit from harmonized customs standards, simplified regulatory frameworks, and coordinated investment in cross-border infrastructure (Takele, 2019). Mechanisms such as joint border committees, one-stop border posts, unified transit systems, and shared logistics platforms have been shown to reduce the time and cost of cross-border movements, with initiatives such as the African Continental Free Trade Area (AfCFTA), the Central Asia Regional Economic Cooperation (CAREC) Program, and the European Union's integration framework offering strong evidence of the economic gains associated with deep regional cooperation (Hung & Hoang, 2022). These collaborations also support the creation of regional value chains, allowing landlocked economies to specialize and participate in intra-regional production networks, thereby reducing their dependence on distant global markets and increasing resilience to external shocks (John, 2025).

Complementing regional strategies, large-scale investments in physical infrastructure remain essential for lowering transport costs, improving connectivity, and facilitating the efficient and reliable movement of goods (Quium, 2019). Expanding and upgrading roads,

railways, cross-border transport corridors, and multimodal links can directly connect landlocked states to major seaports, while the development of dry ports, inland container depots, bonded warehouses, and cold-chain facilities strengthens domestic logistics capacity and supports time-sensitive exports (Alo, 2020). These investments often rely on public-private partnerships as well as funding from international financial institutions such as the World Bank, the African Development Bank and the Asian Development Bank, and must be aligned with climate-resilient design principles, social inclusion priorities, and long-term national logistics strategies to yield sustainable benefits (Thorn et al., 2022).

At the same time, the digitalization of trade and transport systems offers landlocked countries a transformative opportunity to leapfrog traditional inefficiencies (Rajapriya & Harish, 2025). Electronic customs systems, single-window platforms, cargo-tracking technologies (such as GPS and RFID), blockchain-based documentation, e-invoicing, and electronic payment systems significantly reduce processing times, enhance transparency, and increase predictability across supply chains (Gürcan, 2021). When implemented at scale, digital tools improve compliance with international standards, strengthen coordination among agencies, and empower small traders, particularly in remote areas to participate in formal trade channels (Morini et al., 2024). However, the success of digitalization depends on strong cybersecurity frameworks, investments in digital infrastructure, and comprehensive capacity-building programs for customs officials and logistics personel (Santos, 2024).

Institutional reform and administrative strengthening are equally vital for ensuring that logistics improvements are sustainable. Addressing redundant regulations, streamlining customs procedures, harmonizing national frameworks with international standards set by the WTO and WCU, and reducing corruption and bureaucratic bottlenecks are essential steps toward improving the efficiency of border processes (WCU, 2017). Effective reforms require the modernization of customs administrations, the development of performance benchmarks, internal audit systems, and the promotion of inter-agency cooperation both domestically and with transit neighbors (Alsharari, 2021). Public-private dialogue platforms also play a critical role in ensuring that reforms respond to the needs of businesses and logistics operators, fostering trust and shared accountability in the trade environment (Ha & Phuong, 2025).

Finally, the development of dry ports and inland logistics hubs has emerged as a key strategic solution for bridging geographical disadvantages and strengthening inland connectivity. These facilities act as inland extensions of maritime ports by providing customs clearance, storage, consolidation, transshipment, and value-added services close to production centers (Abdoulkarim et al., 2019). Strategically located dry ports improve multimodal integration, reduce congestion at borders and seaports, attract ancillary services such as freight forwarding and warehousing, stimulate local economic development, and support export diversification particularly for perishable and time-sensitive goods (Nguyen et al., 2024). Their effectiveness depends on modern infrastructure, robust digital systems, clear regulatory frameworks, and sustainable operation models, often supported by public-private partnerships and international development agencies. Taken together, these interconnected strategies offer a coordinated blueprint for enhancing logistics performance, strengthening supply chain resilience, and enabling landlocked countries to integrate more effectively into regional and global trade networks (Amel & Allaoua, 2025).

5. Logistics reforms and trade openness in Uzbekistan

Uzbekistan represents a particularly valuable case for examining how improvements in logistics and institutional reforms can influence trade outcomes in landlocked contexts. As discussed in previous sections, landlocked developing countries (LLDCs) face disproportionately high transport costs, longer transit times and structural dependence on neighbouring states, which collectively weaken their integration into global value chains (Kumar, 2024). Uzbekistan's situation has historically reflected these dynamics: prior to 2016, the country exhibited low trade openness, limited logistics capabilities and persistent bottlenecks along border crossings and internal transport corridors. International assessments noted that Uzbekistan underperformed relative to its geographic position at the crossroads of Central Asia, despite being strategically located along key CAREC transport routes. At the same time, Uzbekistan's logistics system suffered from weak customs automation, underdeveloped intermodal infrastructure, and limited institutional coordination which are precisely the areas highlighted in theoretical literature as structural LLDC constraints (Pomfret, 2023).

A major inflection point occurred in 2016–2017, when Uzbekistan initiated a comprehensive set of economic and administrative reforms. Policies implemented during this period included the unification of the exchange rate, liberalisation of administered prices, simplification of tariff structures, steps supporting WTO accession, and a systematic restructuring of the customs administration (Pomfret, 2020). Subsequent policy frameworks such as the Transport System Development Strategy to 2035 and the "Digital Uzbekistan 2030" program initiated targeted investments in multimodal infrastructure, digital customs solutions, risk-management systems and simplified border procedures. Together, these reforms aimed to reduce logistics frictions, improve transit efficiency, increase transparency in customs operations and leverage Uzbekistan's central position within CAREC corridors. The theoretical expectation, derived from LLDC literature, is that such improvements should translate into higher logistics performance and, over time, into greater trade openness (Moore, 2018).

To assess whether these expected dynamics materialised, the analysis first examines changes in Uzbekistan's Logistics Performance Index (LPI) across available LPI cycles. Although the LPI is not annual, its repeated measurement allows identification of broad patterns of improvement or decline.

The Figure 1 demonstrates a sharp decline between 2010 and 2012 followed by a significant improvment, and then a gradual upward movement from 2014 onward. Notably, the post-2016 period aligns with a return to positive LPI change, culminating in the 2018 improvement that coincides with the implementation of customs digitalization and transport reforms. The modest decline observed between 2018 and 2023 reflects the revised LPI methodology and global disruptions, yet the overall trajectory remains upward relative to earlier years.

To contextualise Uzbekistan's performance, the analysis compares its LPI dynamics with those of other Central Asian landlocked economies (Kazakhstan, Kyrgyzstan and Tajikistan) using the same period-over-period change measure.

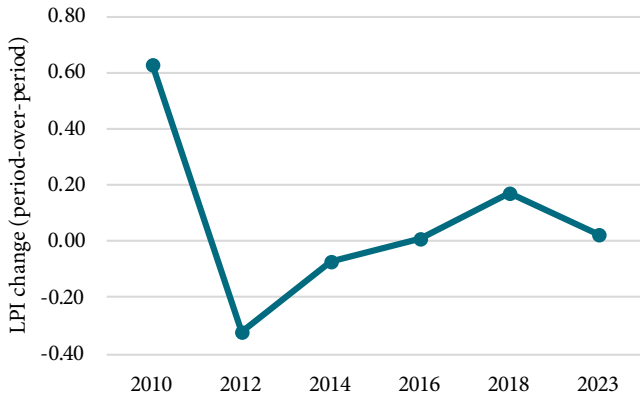

Figure 1. Change in LPI scores for Uzbekisatan across LPI cycles

S o u r c e: Authors' own elaboration based on World Bank Data Logistics Performance Index (LPI) [accessed: 2025-11-19].

The comparative Figure 2 shows that Uzbekistan's improvement after 2016 is more stable than that of Kyrgyzstan and Tajikistan, which exhibit substantially higher volatility and negative shifts during several LPI cycles. Kazakhstan maintains moderate but flatter performance. This pattern is consistent with the hypothesis that Uzbekistan's reforms yielded more sustained improvements in logistics capabilities relative to its regional peers, whose institutional and infrastructure reforms progressed at uneven pace.

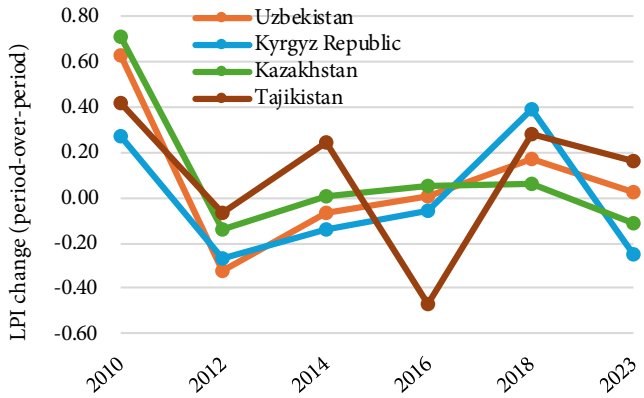

Figure 2. Change in LPI scores for Central Asian LLDCs across LPI cycles

S o u r c e: Authors' own elaboration based on World Bank Data Logistics Performance Index (LPI) [accessed: 2025-11-19].

The observed changes in Uzbekistan's Logistics Performance Index scores can be interpreted in light of several interrelated factors. First, the post-2016 reform agenda focused on customs modernization, procedural simplification, and the digitalization of trade-related

processes, which are likely to influence LPI components related to customs efficiency, tracking and tracing, and timeliness. Second, ongoing investments in transport infrastructure and efforts to improve regional connectivity may have contributed to gradual improvements in logistics reliability and transit performance, reflected in the index over time. At the same time, LPI scores are sensitive to broader external conditions, including global trade dynamics, developments in transit countries, and the survey-based nature of the index. Consequently, the observed improvements should be interpreted as consistent with reform-related developments rather than as evidence of a direct causal relationship.

A second component of the empirical illustration concerns trade openness measured as total exports and imports as a percentage of GDP. This indicator captures the extent to which economies integrate into international markets and is widely used in analyses of LLDC performance.

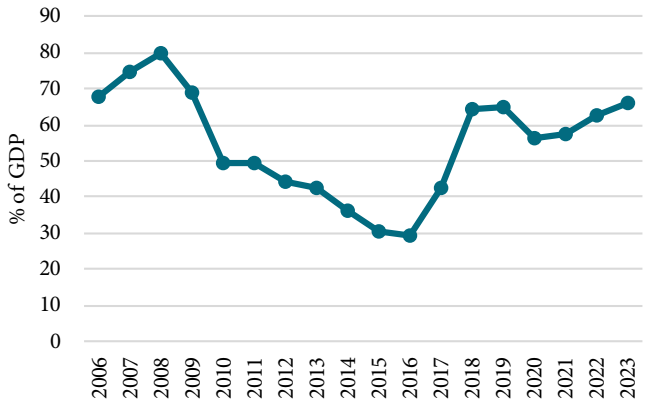

Figure 3. Trade (% of GDP) Uzbekistan 2006–2023

S o u r c e: Authors' own elaboration based on World Bank Data Trade (% of GDP) [accessed: 2025-11-19].

The Figure 2 reveals a clear long-term decline in trade openness leading up to 2015, followed by a sharp upward shift beginning in 2016 and stabilisation at noticeably higher levels between 2018 and 2023. This aligns closely with the timing of Uzbekistan's economic and logistics reforms. While global shocks such as the COVID-19 pandemic temporarily reduced openness in 2020, the recovery in 2021–2023 appears to sustain a new, higher plateau compared to the pre-reform decade. The pattern suggests that improvements in logistics and trade facilitation reduced structural barriers, enabling exporters and importers to engage more effectively with global markets.

To situate this trend within a regional context, the analysis compares how trade openness evolved in Uzbekistan relative to neighbouring landlocked economies.

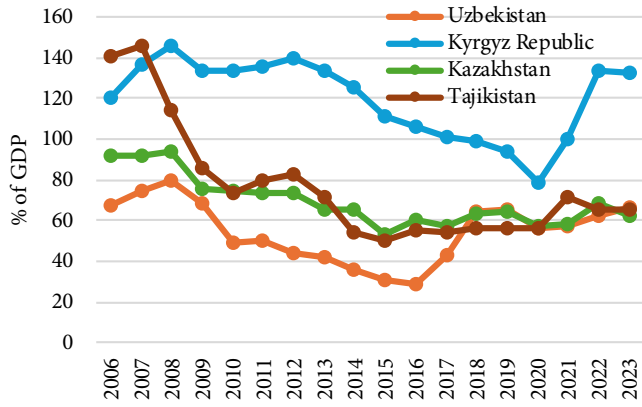

Figure 4. Trade (% of GDP) comparison selected LLC Central Asia 2006–2023

S o u r c e: Authors' own elaboration based on World Bank Data Trade (% of GDP) [accessed: 2025-11-19].

The comparison Figure 4 highlights that Uzbekistan experienced a notably larger and more sustained increase in trade openness after 2016 than Kazakhstan, Kyrgyzstan or Tajikistan. Unlike the other LLDCs which show modest or fluctuating openness Uzbekistan's curve displays both a clear structural break and a steady upward trajectory. This provides additional support for the argument that domestic reforms in logistics, customs and regional connectivity played a meaningful role in shaping the country's external economic engagement.

Taken together, the evidence suggests that Uzbekistan's post-2016 reforms coincide with measurable improvements in logistics performance and trade openness. While causality cannot be formally established due to data frequency differences and the limited number of LPI observations, the alignment of structural reforms with positive shifts in both indicators is consistent with theoretical expectations and empirical findings on LLDCs. The upward movements in LPI change and the sustained rise in trade openness after 2016 imply that Uzbekistan may be transitioning from a structurally "landlocked" economy toward a more regionally integrated and globally connected "land-linked" economy. This interpretation is further supported by the comparative analysis showing that Uzbekistan outperformed regional peers on both logistics improvements and trade expansion over the same period.

7. Conclusion

Landlocked developing countries face persistent and deeply rooted logistics and supply chain constraints arising from their geographical isolation and institutional limitations. The analysis presented in this article demonstrates that, although these barriers significantly hinder trade competitiveness and participation in global value chains, they can be mitigated through coordinated and sustained policy interventions. The reviewed literature and strategic frameworks indicate that improvements in transport infrastructure, regional cooperation, digitalization of customs and border procedures, and institutional reform collectively create the

conditions necessary for more reliable, efficient, and predictable supply chains (Akiwumi, 2024; Dumitrescu et al., 2018; UN-OHRLLS, 2018).

The case of Uzbekistan illustrates how such reforms can translate into measurable improvements. The comprehensive reform agenda launched after 2016 which included customs modernization, development of multimodal transport corridors, simplification of border procedures, and the introduction of digital trade systems coincided with a positive trajectory in Logistics Performance Index scores and a clear increase in trade openness. When compared with other landlocked economies in Central Asia, Uzbekistan shows a more stable and sustained improvement, suggesting that coordinated logistics and institutional reforms can meaningfully reduce structural disadvantages associated with the absence of seaport access.

Although data limitations do not allow for establishing direct causality, the alignment between the reform period and improvements in logistics indicators and trade openness is consistent with theoretical expectations and empirical findings in research on landlocked developing countries. The observed changes in the Logistics Performance Index should not be interpreted as solely attributable to the post-2016 reform agenda. The experience of Uzbekistan illustrates the potential for a landlocked economy to gradually enhance its regional connectivity and integration into regional supply and trade networks. The analysis is based solely on descriptive patterns due to data availability constraints, particularly the limited frequency of LPI surveys. In particular, the infrequent availability of LPI surveys limits the ability to capture short-term dynamics and to formally assess the timing and persistence of observed changes. As such, the findings illustrate associations rather than provide formal statistical testing, which remains an avenue for future research.

Overall, the findings emphasize the need for integrated, forward-looking approaches to logistics development. For landlocked countries, overcoming structural trade barriers requires not only investment in physical infrastructure but also governance reforms, technological innovation, and strong regional partnerships. When these elements are pursued together, they can substantially improve trade performance, strengthen economic resilience, and support more inclusive and sustainable development trajectories for landlocked economies.

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Abstrakt

Rozwijające się kraje śródlądowe zmagają się z utrzymującymi się wyzwaniami logistycznymi i w łańcuchach dostaw wynikającymi z braku dostępu do portów morskich oraz zależności od tranzytu przez państwa sąsiednie. Ograniczenia te prowadzą do wysokich kosztów transportu, długiego czasu tranzytu oraz złożonych procedur regulacyjnych, co utrudnia integrację z regionalnymi i globalnymi łańcuchami wartości. Celem artykułu jest ocena, czy okres reform w Uzbekistanie po 2016 roku zbiega się z mierzalnymi zmianami w zakresie efektywności logistyki i otwartości handlu, a także porównanie tych zmian z wybranymi gospodarkami śródlądowymi w Azji Środkowej. Artykuł przedstawia główne bariery geograficzne, infrastrukturalne i instytucjonalne opisane w literaturze oraz omawia wskazywane w niej kierunki działań, takie jak integracja regionalna, rozwój transportu multimodalnego, cyfryzacja procedur celnych i reformy instytucjonalne. Studium przypadku Uzbekistanu pokazuje, jak reforma logistyczna po 2016 roku wpłynęła na poprawę warunków handlowych. W analizie zastosowano opisowe podejście oparte na wskaźnikach Banku Światowego, obejmujące Zmienny Indeks Efektywności Logistycznej (LPI) oraz wskaźnik otwartości handlowej (eksport oraz import jako % PKB). Porównano zmiany w czasie oraz na tle innych państw Azji Centralnej pozbawionych dostępu do morza. Wyniki wskazują na wyraźną poprawę LPI i trwały wzrost otwartości handlowej Uzbekistanu po reformach, bardziej stabilny niż w krajach sąsiednich. Jednocześnie otwartość handlowa zwiększyła się, wskazując na porównywalne pozytywne tendencje w integracji handlu zagranicznego. Porównanie gospodarki Uzbekistanu z innymi krajami śródlądowymi Azji Centralnej wskazuje na jej wyraźniejszą i bardziej stabilną poprawę w analizowanym okresie. Można stwierdzić, że reformy instytucyjne i logistyczne mogły mieć pozytywny wpływ na ten wzrost. Chociaż dostępne dane nie pozwalają na ustalenie ścisłej zależności przyczynowej, zgodność momentu reform z obserwowanymi trendami potwierdza wnioski teoretyczne dotyczące krajów śródlądowych. Wnioski podkreślają znaczenie skoordynowanej polityki, inwestycji infrastrukturalnych, cyfryzacji oraz współpracy regionalnej dla poprawy efektywności logistycznej i integracji handlowej gospodarek pozbawionych dostępu do morza.

Słowa kluczowe

kraje śródlądowe, logistyka, łańcuch dostaw, otwartość handlowa, infrastruktura transportowa, cyfryzacja, współpraca regionalna