



# Assessment Of The Status, Functioning And Level Of Integration Of Existing Transport Hub Systems In Uzbekistan

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**ABSTRACT**

Uzbekistan, as a doubly landlocked country in Central Asia, faces unique challenges in developing an efficient, integrated, and competitive transport system. This article presents a comprehensive assessment of the status, functioning, and level of integration of existing transport hub systems across Uzbekistan. Utilizing a mixed-methods approach that combines quantitative infrastructure performance indicators, spatial analysis, and institutional review, the study evaluates the operational efficiency of key multimodal transport hubs, including those in Tashkent, Bukhara, Navoi, Samarkand, and Termez. The analysis reveals that while significant capital investments have been made in recent years to modernize individual transport modes—particularly rail and air—the level of intermodal integration remains insufficient. Fragmented governance structures, incompatible information systems, regulatory barriers, and underinvestment in last-mile connectivity continue to impede the seamless transfer of passengers and freight across modes. The article proposes a set of evidence-based policy recommendations aimed at enhancing transport hub integration, including the adoption of unified digital platforms, institutional consolidation, public-private partnership frameworks, and alignment with international transit corridor standards.

**Keywords:**

Transport Hubs, Multimodal Integration, Uzbekistan, Logistics, Intermodal Connectivity, Central Asia, Transit Corridors.

## 1. Introduction

The Republic of Uzbekistan occupies a pivotal geographic position at the crossroads of Central Asia, serving historically as a vital link along the ancient Silk Road trade routes. Today, with a population exceeding 36 million (2024 estimate) and a GDP growth rate averaging 5–6% over the past decade, the country is experiencing rapid economic transformation, urbanization, and increasing demand for efficient transportation services (World Bank, 2023; State Statistics Committee of Uzbekistan, 2024).

However, Uzbekistan’s status as one of only two doubly landlocked countries in the world imposes fundamental constraints on its

connectivity to global markets. International trade must transit through at least two sovereign borders to reach the nearest seaport, making the efficiency of domestic transport hubs and their integration into regional and international corridors a matter of strategic economic importance (Asian Development Bank [ADB], 2022).

Transport hubs—defined as nodes in a transport network where multiple modes converge, enabling the transfer of passengers and freight—serve as critical infrastructure for economic competitiveness. The performance of these hubs, measured in terms of capacity, throughput, intermodal connectivity, dwell time, and information integration, directly

affects trade costs, supply chain reliability, and the country's attractiveness to foreign investment (Rodrigue, 2020).

Despite considerable government investment in individual transport sectors—including the electrification of railways, construction of high-speed rail corridors, expansion of airport facilities, and modernization of highway networks—the level of systemic integration among transport modes at key hub locations remains inadequately studied and insufficiently developed. Previous research has tended to examine individual modes in isolation, while a holistic assessment of hub-level integration is largely absent from the scholarly literature on Uzbekistan's transport system.

This study aims to:

1. Assess the current status and operational characteristics of major transport hubs in Uzbekistan.
2. Evaluate the level of functional integration across transport modes (rail, road, air, and logistics) at selected hub locations.
3. Identify institutional, regulatory, technological, and physical barriers to effective integration.
4. Propose evidence-based recommendations for improving the performance and integration of transport hub systems.

This research contributes to the growing body of literature on transport infrastructure development in landlocked developing countries and provides actionable insights for policymakers, transport planners, and international development organizations engaged in Central Asian connectivity initiatives, including the Belt and Road Initiative (BRI), the CAREC Transport and Trade Facilitation Strategy, and the Trans-Afghan Corridor.

## 2. Literature Review

### Theoretical Foundations of Transport Hub Systems

The concept of the transport hub has evolved significantly in academic literature. Early models treated hubs as simple interchange points, but contemporary frameworks emphasize their role as complex

socio-technical systems embedded within broader networks (O'Kelly, 1998; Button, 2010). The hub-and-spoke model, originally developed in the context of airline networks, has been extended to freight logistics, rail systems, and multimodal transport planning (Bryan & O'Kelly, 1999).

Integration in transport systems can be analyzed at multiple levels (Givoni & Banister, 2010):

- Physical integration: The spatial co-location of infrastructure for different modes, including shared terminals, platforms, and transfer facilities.
- Operational integration: Coordinated scheduling, ticketing, and service planning across modes.
- Informational integration: Shared data platforms enabling real-time tracking, intermodal booking, and performance monitoring.
- Institutional integration: Unified governance structures, regulatory harmonization, and coordinated investment planning.

The European Union's Trans-European Transport Network (TEN-T) policy provides a benchmark for hub integration standards, emphasizing the importance of "seamless transport chains" and "efficient terminal operations" at core network nodes (European Commission, 2021).

### Transport Development in Landlocked Developing Countries

Landlocked developing countries (LLDCs) face distinctive transport challenges, including high trade costs, dependence on transit neighbors' infrastructure, and limited access to maritime shipping networks (Arvis et al., 2011). The UN Vienna Programme of Action for LLDCs (2014–2024) and its successor framework specifically call for improved multimodal transport connectivity and efficient transit systems as preconditions for economic diversification and sustainable development (UN-OHRLS, 2023).

Research on Central Asian transport systems has highlighted the legacy effects of Soviet-era infrastructure planning, which prioritized north-south connectivity toward

Russia over east-west linkages within the region (Pomfret, 2019). Post-independence investments have gradually reoriented networks, but coordination failures and institutional fragmentation persist.

### Prior Studies on Uzbekistan's Transport System

Several studies have examined specific dimensions of Uzbekistan's transport infrastructure. Abdullaev and Rahimov (2020) analyzed railway modernization, noting the transformative impact of the Tashkent-Samarkand-Bukhara high-speed rail corridor. Karimov et al. (2021) assessed road network conditions across major freight corridors. The ADB (2022) conducted a comprehensive country transport sector assessment, identifying logistics performance gaps and recommending investment in intermodal facilities. However, no study to date has systematically evaluated the integration of transport modes at the hub level, creating the research gap this article seeks to address.

## 3. Methodology

### 3.1. Research Design

This study employs a mixed-methods research design combining:

1. Quantitative analysis of transport infrastructure indicators and performance metrics.

2. Spatial analysis using Geographic Information Systems (GIS) to map hub connectivity.

3. Institutional analysis of governance frameworks and regulatory structures.

4. Semi-structured interviews with transport officials, logistics operators, and international development practitioners (n = 42).

### 3.2. Selection of Transport Hubs

Five major transport hub systems were selected for detailed assessment based on

Dimension

Physical Integration

Operational Integration

criteria including volume of passenger and freight traffic, number of transport modes present, strategic location along international corridors, and government designation as priority development zones:

1. Tashkent – National capital, primary multimodal hub (rail, air, road, metro, bus rapid transit)

2. Samarkand – Regional hub, tourism gateway, high-speed rail node

3. Bukhara – Regional hub, cultural tourism center, rail-road interchange

4. Navoi – Free economic zone, international air cargo hub, industrial logistics center

5. Termez – Southern border hub, gateway to Afghanistan, emerging transit corridor node

### 3.3. Data Sources

Data were gathered from the following sources:

- Ministry of Transport of the Republic of Uzbekistan (statistical reports, 2019–2024)

- JSC "Uzbekiston Temir Yo'llari" (Uzbekistan Railways) operational data

- Uzbekistan Airports Authority traffic statistics

- World Bank Logistics Performance Index (LPI) data

- CAREC Corridor Performance Measurement and Monitoring (CPMM) reports

- ADB Transport Sector Assessment reports

- Field observations conducted between March and September 2024

- Semi-structured interviews with stakeholders

### 3.4. Analytical Framework

An integration assessment framework was developed based on Givoni and Banister's (2010) multi-dimensional integration model, adapted for the Central Asian context. Each hub was evaluated across four dimensions:

Indicators

Co-location of modal facilities; distance between terminals; pedestrian/vehicular transfer infrastructure; signage and wayfinding

Coordinated scheduling; unified ticketing; average transfer time; service frequency

Informational Integration

Institutional Integration

Presence of integrated information systems; real-time tracking; digital booking platforms; data sharing between operators  
Governance structure; number of regulatory bodies involved; existence of hub management authority; public-private coordination mechanisms

Each indicator was scored on a 5-point Likert scale (1 = very low integration; 5 = very high integration) based on triangulated data from documentary analysis, field observations, and expert assessments.

### 3.5. Limitations

The study acknowledges limitations including restricted access to certain commercial and military logistics data, potential response bias in interviews, and the rapidly evolving nature of infrastructure investments that may alter conditions subsequent to the data collection period.

## 4. Overview of Uzbekistan's Transport System

### 4.1. Modal Composition

Uzbekistan's transport system comprises five principal modes:

#### 4.1.1. Railway Transport

Uzbekistan Railways (JSC "O'zbekiston Temir Yo'llari") operates approximately 6,950 km of track, of which approximately 1,600 km is electrified (as of 2024). The railway system handles approximately 60% of total freight turnover and serves major domestic corridors. Notable achievements include the Afrosiyob high-speed rail service (Tashkent–Samarkand–Bukhara), the Angren–Pap electrified line (opened 2016) bypassing Tajikistan, and ongoing projects to extend electrification and introduce new rolling stock. Rail remains the backbone of the national logistics system, particularly for bulk commodities including cotton, minerals, chemicals, and construction materials (Ministry of Transport, 2024).

#### 4.1.2. Road Transport

The national road network extends approximately 185,000 km, of which approximately 42,600 km constitutes the primary network. Road transport accounts for

over 88% of passenger movements and approximately 25% of freight volume. Major highway corridors include the M-39 (connecting Tashkent to Samarkand, Bukhara, and Turkmenistan), the M-34 (Tashkent–Fergana Valley), and the A-373 (Tashkent–Kokand via Kamchik Pass). Road quality varies significantly, with international corridors generally in good condition following recent rehabilitation projects funded by the ADB, World Bank, and Islamic Development Bank, while secondary and rural roads remain underdeveloped (World Bank, 2023).

#### 4.1.3. Air Transport

Uzbekistan has 11 airports with scheduled passenger services, with Tashkent International Airport (Islam Karimov International Airport, TAS) serving as the primary hub. Navoi International Airport has been developed as a specialized cargo hub, particularly for freight transit between East Asia and Europe. Uzbekistan Airways and the low-cost subsidiary Uzbekistan Express operate domestic and international services. Total passenger throughput reached approximately 8.5 million in 2023, reflecting post-pandemic recovery and growing tourism demand (Uzbekistan Airways, 2024). Samarkand International Airport underwent significant expansion in 2022–2023.

#### 4.1.4. Urban and Metropolitan Transport

Tashkent possesses the only metro system in Central Asia (4 lines, ~60 km), supplemented by bus rapid transit, conventional bus services, minibuses (marshrutkas), and emerging ride-hailing platforms. Other cities rely primarily on bus and minibus networks with limited formal planning and integration.

#### 4.1.5. Pipeline and Inland Waterway Transport

Uzbekistan has approximately 2,000 km of pipeline infrastructure for oil and natural gas transport. Inland waterway transport on the Amu Darya is minimal and does not constitute a significant component of the hub system.

#### 4.2. Traffic Volumes and Trends

Table 1 summarizes key transport statistics:

Table 1. Selected Transport Indicators for Uzbekistan (2020–2023)

Indicator	2020	2021	2022	2023
Railway freight (million tons)	74.2	78.5	82.1	86.3
Road freight (million tons)	1,210	1,305	1,398	1,482
Air passengers (million)	3.2	5.1	7.2	8.5
Railway passengers (million)	15.8	18.2	21.6	24.1
Container throughput (TEUs, rail)	85,000	102,000	128,000	155,000

\*Source: State Statistics Committee of Uzbekistan; Ministry of Transport; Uzbekistan Railways\*

The data indicate consistent growth across all modes, with containerized freight showing the most rapid increase, reflecting the country's integration into international supply chains.

#### 4.3. International Corridor Positioning

Uzbekistan is positioned along several international transport corridors:

- CAREC Corridors 2, 3, and 6 – connecting China through Central Asia to the Caucasus, South Asia, and Europe.

- Trans-Caspian International Transport Route (TITR / Middle Corridor) – increasingly important as an alternative to Russian transit routes.

- China-Kyrgyzstan-Uzbekistan (CKU) Railway – a proposed corridor that, if constructed, would significantly alter hub dynamics.

- Termez–Mazar-i-Sharif–Kabul–Peshawar Corridor – connecting to South Asian markets via Afghanistan.

- North-South Corridor – linking Russia through Kazakhstan and Uzbekistan to Afghanistan and potentially to Pakistani seaports.

### 5. Assessment of Major Transport Hubs

#### 5.1. Tashkent Transport Hub System

##### 5.1.1. Status and Infrastructure

Tashkent functions as the preeminent transport hub of Uzbekistan, concentrating the greatest diversity and volume of transport services. Key infrastructure includes:

- Tashkent Railway Station (Toshkent Vokzali): Centrally located main passenger terminal handling approximately 8 million passengers annually. Recently modernized with improved platforms, waiting areas, and electronic information displays.

- Tashkent-Yuk (Tashkent Cargo) Terminal: Primary rail freight terminal located in the industrial zone, handling approximately 12 million tons annually.

- Islam Karimov International Airport (TAS): Located 12 km south of the city center, handling approximately 5.5 million passengers and 45,000 tons of cargo annually (2023). Terminal 3 (international) was commissioned in 2023, significantly expanding capacity.

- Tashkent Metro: Four lines with 50 stations, carrying approximately 250,000 passengers daily.

- Bus Rapid Transit (BRT): Yuksak Poyezdlar line operational since 2021, with extensions planned.

- Intercity and International Bus Terminal (Tashkent Avtovokzal): Serving routes to Fergana Valley, Samarkand, and cross-border destinations (Kazakhstan, Tajikistan, Kyrgyzstan).

- Logistics Centers: Several private and state-operated logistics facilities in the Tashkent region, including the Angren Special Economic Zone.

##### 5.1.2. Integration Assessment

Physical Integration (Score: 2.5/5): Despite the co-presence of all major transport modes within the Tashkent metropolitan area,

physical distances between key terminals remain significant. The airport is located approximately 12 km from the central railway station, with no dedicated rail link. The Aeroexpress project has been discussed but remains unrealized. Transfer between the metro and railway station is facilitated by the proximity of the Toshkent metro station (Uzbekiston line), but pedestrian routing is indirect and poorly signed. The bus terminal is located approximately 4 km from the main railway station, requiring a separate public transport trip.

**Operational Integration (Score: 2.0/5):** There is no unified ticketing system across modes. Railway tickets are purchased through the Uzbekistan Railways (UzRailPass) platform, while metro tokens/cards operate on a separate system (recently transitioning to a contactless card). Bus services have fragmented ticketing. Coordinated scheduling between rail departures and airport connections is absent. Average transfer time between airport and city center ranges from 40 to 90 minutes depending on traffic conditions.

**Informational Integration (Score: 2.0/5):** Each transport operator maintains its own information system. Uzbekistan Railways operates the E-Railway passenger system and the ISUP freight management system. The airport has a separate flight information display system. No integrated multimodal journey planner exists for passengers. Freight tracking across modes requires manual coordination between operators.

**Institutional Integration (Score: 1.5/5):** Multiple government agencies exercise jurisdiction: the Ministry of Transport (overall policy), JSC O'zbekiston Temir Yo'llari (railways), the Civil Aviation Agency (airports and airlines), the Tashkent Municipal Government (metro and urban transport), and the State Committee for Roads (highways). No unified hub management authority exists. Coordination occurs through inter-ministerial committees, but these lack enforcement authority and dedicated funding.

Overall Tashkent Hub Integration Score: 2.0/5 (Low Integration)

## 5.2. Samarkand Transport Hub System

### 5.2.1. Status and Infrastructure

Samarkand is Uzbekistan's second-most important transport hub, serving as the primary tourism gateway and a regional economic center for the Zarafshan Valley.

- Samarkand Railway Station: Terminus for the Afrosiyob high-speed service from Tashkent (journey time: 2 hours 10 minutes). Handles approximately 3.5 million passengers annually. Recently renovated. - Samarkand International Airport (SKD): Expanded in 2022–2023 with a new terminal building, serving approximately 1.2 million passengers (2023) with domestic and growing international services.

- Road Infrastructure: Located on the M-39 highway corridor. Regional bus terminal serves intercity and local routes.

- Urban Transport: Conventional bus and minibuses services; no metro or BRT.

### 5.2.2. Integration Assessment

**Physical Integration (Score: 2.0/5):** The railway station and airport are located approximately 6 km apart, with no dedicated transfer service. The bus terminal is adjacent to the railway station, providing reasonable rail-bus connectivity for regional services. Pedestrian infrastructure around the railway station has been improved, but connectivity to tourism sites relies on taxi services.

**Operational Integration (Score: 1.5/5):** No coordinated scheduling between train arrivals and airport departures. No unified ticketing. Tourism packages sometimes bundle transport, but this occurs through private operators rather than systemic coordination.

**Informational Integration (Score: 1.5/5):** Tourist information centers provide some multimodal guidance, but no digital platform integrates transport options. Real-time information at the bus terminal is minimal.

**Institutional Integration (Score: 1.5/5):** Governance is divided between national agencies (railway, aviation) and regional/city authorities (urban transport, tourism). The Samarkand Regional Administration has limited authority over nationally operated infrastructure.

Overall Samarkand Hub Integration Score: 1.6/5 (Very Low Integration)

### 5.3. Navoi Transport Hub System

#### 5.3.1. Status and Infrastructure

Navoi represents Uzbekistan's most ambitious attempt at creating a purpose-built logistics hub, anchored by the Navoi Free Economic Zone (NFEZ) established in 2008.

- Navoi International Airport (NVI): Developed as a cargo hub through a partnership with Korean Air (2008–2019) and subsequently with other operators. Handled approximately 18,000 tons of air cargo in 2023. Features a 4,000-meter runway capable of accepting all aircraft types. The cargo terminal includes temperature-controlled facilities and customs processing areas.

- Rail Connection: Connected to the national rail network with freight sidings serving the free economic zone.

- Road Access: Located on the M-39 highway with good connectivity to Bukhara (100 km) and Samarkand (280 km).

- Free Economic Zone: Hosts manufacturing, pharmaceutical, electronics, and food processing enterprises with preferential customs and tax regimes.

#### 5.3.2. Integration Assessment

Physical Integration (Score: 3.0/5): The NFEZ was designed with multimodal connectivity in mind, with the airport, rail sidings, and road access located within a contiguous zone. Warehousing and customs facilities serve both air and surface transport. However, the rail connection is limited to freight and lacks a dedicated intermodal container terminal with modern handling equipment.

Operational Integration (Score: 2.5/5): The NFEZ management authority provides some coordination of logistics operations. Customs processing can handle air-to-surface transfers. However, air cargo volumes remain below capacity, and the rail-air transfer process involves significant dwell time (averaging 24–48 hours for documentation and handling).

Informational Integration (Score: 2.0/5): The free economic zone operates a management information system, but it is not fully integrated with Uzbekistan Railways' freight tracking system or the national customs automated processing system (ASYCUDA).

Institutional Integration (Score: 3.0/5): The NFEZ has a dedicated management authority with some coordinating powers. The special economic zone framework provides regulatory clarity within its boundaries. However, coordination with external transport networks remains dependent on inter-agency negotiation.

Overall Navoi Hub Integration Score: 2.6/5 (Low-Moderate Integration) ###

### 5.4. Bukhara Transport Hub System

#### 5.4.1. Status and Infrastructure

Bukhara serves as the western terminus of the Afrosiyob high-speed rail service and a key node on corridors toward Turkmenistan and Iran.

- Bukhara Railway Station: Terminus for Afrosiyob service; handles approximately 2 million passengers annually. Located in the new city (approximately 10 km from the historic center).

- Bukhara International Airport (BHK): Small facility handling approximately 500,000 passengers annually. Domestic services and limited international charters.

- Road Infrastructure: M-39 highway and connections to the Turkmen border at Farap/Alat.

- Urban Transport: Primarily minibus and taxi services.

#### 5.4.2. Integration Assessment

Physical Integration (Score: 1.5/5): The airport and railway station are approximately 5 km apart, without any direct link. The historic city center is distant from both facilities. No intermodal transfer infrastructure exists.

Operational Integration (Score: 1.0/5): No coordination between modes; separate ticketing; no through-journey capability.

Informational Integration (Score: 1.0/5): Minimal digital information systems at either facility. Tourism-oriented information is available but does not extend to integrated transport planning.

Institutional Integration (Score: 1.0/5): Governance fully fragmented across national and local authorities with no coordination mechanism specific to transport hub development.

Overall Bukhara Hub Integration Score: 1.1/5 (Very Low Integration)

5.5. Termez Transport Hub System

5.5.1. Status and Infrastructure

Termez, located on the Afghan border, is emerging as a strategically important transit hub for trade with South Asia.

- Termez Rail Terminal: Connected to the Hairatan rail bridge crossing into Afghanistan. Handles growing freight volumes (approximately 3 million tons annually in cross-border trade).

- Termez Airport (TMJ): Small facility with limited domestic services.

- Road Border Crossing: The Friendship Bridge (Dustlik Koprugi) connects to Hairatan, Afghanistan, carrying road freight and passenger traffic.

- River Port: Historically used for Amu Darya crossing; currently limited activity.

- Logistics Zone: The government has designated an international trade logistics center in Termez (established 2021).

5.5.2. Integration Assessment

Physical Integration (Score: 2.0/5): The rail terminal and road border crossing are within reasonable proximity. The logistics center is designed to co-locate storage, customs, and transfer facilities. However, the airport is disconnected from the logistics system, and river port infrastructure is obsolete.

Operational Integration (Score: 2.0/5): The logistics center provides some coordination for cross-border freight operations. The security situation in Afghanistan introduces variability and unpredictability into operations. Customs processing times remain lengthy (average 2–3 days for cross-border freight).

Informational Integration (Score: 1.5/5): Limited electronic documentation. Cross-border data exchange with Afghan authorities is minimal. The ASYCUDA system is partially operational.

Institutional Integration (Score: 2.0/5): The cross-border nature of operations involves coordination between multiple national agencies (Customs Committee, Border Guard Service, Ministry of Transport, Ministry of Foreign Affairs) and Afghan counterpart institutions. The logistics center management

provides some coordination but lacks authority over border agencies.

Overall Termez Hub Integration Score: 1.9/5 (Low Integration)

6. Comparative Analysis and Discussion

6.1. Synthesis of Integration Scores

Table 2. Summary of Transport Hub Integration Scores

Hub	Physical	Operational	Informational	Institutional	Overall
Tashkent	2.5	2.0	2.0	1.5	2.0
Samar kand	2.0	1.5	1.5	1.5	1.6
Navoi	3.0	2.5	2.0	3.0	2.6
Bukhara	1.5	1.0	1.0	1.0	1.1
Termez	2.0	2.0	1.5	2.0	1.9
Mean	2.2	1.8	1.6	1.8	1.8

The results reveal consistently low integration scores across all five hubs, with no hub achieving a score above 3.0 on any dimension. The overall mean integration score of 1.8 out of 5.0 indicates that Uzbekistan's transport hub systems remain largely fragmented and mode-centric.

6.2. Key Findings

Finding 1: Physical co-location without functional integration. In all assessed hubs, transport infrastructure for different modes exists within the same urban area but lacks the physical connective tissue—pedestrian walkways, transfer platforms, shuttle services, or rail links—needed for seamless multimodal journeys. The absence of an airport-city rail link in Tashkent is particularly notable for a capital city of its size and ambition.

Finding 2: Informational integration is the weakest dimension. The absence of integrated digital platforms—multimodal journey planners, unified booking systems, or shared freight tracking databases—represents the most significant and most readily addressable gap. In an era when comparable developing countries (e.g., Vietnam, Georgia, Morocco) are deploying integrated transport

apps and single-window logistics platforms, Uzbekistan's digital fragmentation is a competitive disadvantage.

Finding 3: Navoi's planned-hub model demonstrates the value of intentional integration. The Navoi Free Economic Zone, despite falling short of its original cargo hub ambitions, achieves the highest integration scores precisely because it was designed from inception as a multimodal facility with a dedicated management authority. This suggests that retrofitting integration onto existing hubs is more challenging than building it into new developments.

Finding 4: Institutional fragmentation is the root cause of integration failures. The distribution of transport governance across multiple ministries, state-owned enterprises, and regional authorities—each with its own budget, performance metrics, and political constituency—creates structural barriers to coordinated hub development. No institution is mandated or incentivized to optimize cross-modal performance.

Finding 5: International corridor integration is advancing faster than domestic hub integration. Driven by CAREC agreements, Belt and Road Initiative projects, and bilateral transit treaties, cross-border facilitation and corridor-level investments are proceeding. However, the benefits of corridor-level improvements are diminished by inefficiencies at domestic hub transfer points.

### 6.3. Comparison with International Benchmarks

Comparing Uzbekistan's hub integration levels with international benchmarks underscores the gap:

- World Bank Logistics Performance Index (2023): Uzbekistan ranks 88th out of 139 countries, with "infrastructure" and "logistics competence" as the weakest subcategories. The LPI score of 2.6 (out of 5.0) is below the global average and significantly below comparator countries such as Kazakhstan (2.8) and Georgia (3.0).

- CAREC CPMM Data: Average border-crossing time at Uzbek border posts (approximately 16 hours for road freight and 38 hours for rail freight in 2023) exceeds the

CAREC average and is substantially longer than in Kazakhstan or Georgia.

- European TEN-T Core Hub Standards: European core network hubs are expected to achieve intermodal transfer times of under 30 minutes for passengers and under 4 hours for freight. None of Uzbekistan's assessed hubs approach these standards.

### 6.4. Discussion of Barriers

The barriers to integration can be categorized as follows: Structural barriers:

- Soviet-era infrastructure layouts that separated modal facilities

- Land use patterns that place airports, rail terminals, and logistics zones in dispersed locations

- Absence of dedicated intermodal terminal infrastructure

Institutional barriers:

- Vertical (modal) rather than horizontal (spatial/hub-based) governance structures

- Multiple overlapping jurisdictions at hub locations

- Lack of a national multimodal transport authority or hub development agency

- Weak local government authority over nationally controlled infrastructure

Financial barriers:

- High capital costs of integration infrastructure (e.g., airport rail links, intermodal terminals)

- Limited private sector participation due to regulatory uncertainty

- Donor-funded projects that reinforce modal silos (e.g., a "railway project" or "road project" rather than a "hub project")

Technological barriers:

- Legacy information systems within individual operators

- Low digital literacy among some transport sector employees

- Absence of national standards for transport data exchange

- Cybersecurity concerns limiting data sharing between agencies

Regulatory barriers:

- Separate legal frameworks for each transport mode

- Customs procedures not designed for intermodal movement

- Licensing restrictions that prevent multimodal operator development

## 7. International Experience and Best Practices

### 7.1. Singapore: Integrated Logistics Hub Model

Singapore's approach to transport hub integration—coordinated through the Land Transport Authority (LTA) and the Maritime and Port Authority—provides a model for how a small, trade-dependent economy can achieve world-class multimodal connectivity. Key transferable lessons include: unified digital platforms (SimplyGo payment system), comprehensive land use planning that collocates transport facilities, and strong institutional authority over hub performance (Hesse & Rodrigue, 2004).

### 7.2. Germany: Federal Transport Infrastructure Plan

Germany's Bundesverkehrswegeplan integrates investment planning across all transport modes within a single analytical framework, ensuring that hub investments are evaluated for their cross-modal benefits rather than mode-specific returns. The establishment of integrated transport associations (Verkehrsverbünde) in metropolitan areas ensures operational coordination across modes (Buehler & Pucher, 2012).

### 7.3. Georgia: Transit Country Modernization

Georgia's experience as a small transit country connecting Europe and Asia through the TITR/Middle Corridor offers particularly relevant lessons. Georgia has invested in integrated customs processing, single-window systems, and coordinated rail-port operations at Poti and Batumi, resulting in significant improvements in transit times and logistics performance (ADB, 2021).

### 7.4. Kazakhstan: Khorgos Gateway

The Khorgos Gateway dry port on the China-Kazakhstan border demonstrates how a purpose-built intermodal facility with dedicated management authority, integrated customs processing, and digital freight platforms can achieve high-performance hub operations (Khorgos Gateway, 2023). This model is directly

relevant to Uzbekistan's planned developments at Termez and along the CKU corridor.

## 8. Recommendations

Based on the assessment findings, international best practices, and stakeholder consultations, the following recommendations are proposed:

### 8.1. Institutional Reforms

Recommendation 1: Establish a National Transport Hub Development Authority.

Create a dedicated government body (or empower an existing entity within the Ministry of Transport) with a mandate specifically for multimodal hub planning, investment coordination, and performance monitoring. This authority should have the power to coordinate across modal agencies and the budget to fund integration infrastructure. Recommendation 2: Develop Hub Master Plans for each priority location.

Commission comprehensive master plans for Tashkent, Samarkand, Navoi, Bukhara, and Termez that integrate land use planning, transport infrastructure development, and operational coordination across all modes. These plans should be developed through inter-agency working groups with binding commitments.

Recommendation 3: Strengthen regional and municipal authority.

Devolve greater transport planning and coordination powers to regional (viloyat) and city (shahar) administrations for local integration issues, while retaining national coordination for inter-regional and international connectivity.

### 8.2. Digital and Informational Integration

Recommendation 4: Deploy a National Multimodal Transport Information Platform.

Develop a unified digital platform that integrates real-time information from all transport operators, enabling multimodal journey planning for passengers and cargo tracking for freight. This could be built on existing e-government infrastructure (e.g., my.gov.uz) and aligned with CAREC digital trade facilitation initiatives.

Recommendation 5: Implement unified electronic ticketing.

Introduce a single contactless payment card/system valid across all public transport modes in Tashkent (metro, BRT, bus, commuter rail) as a first phase, with subsequent extension to intercity rail and possibly domestic air services.

Recommendation 6: Adopt the ASYCUDA World single-window system universally.

Accelerate the deployment of automated customs processing at all hub locations with full electronic document exchange between transport operators and border agencies.

### 8.3. Physical Infrastructure Investments

Recommendation 7: Prioritize airport-city rail links.

Construct a dedicated rail connection between Tashkent International Airport and the central railway station/metro system. A feasibility study should be commissioned immediately, with potential funding from international development banks. Similar assessments should be conducted for Samarkand.

Recommendation 8: Develop modern intermodal container terminals.

Invest in purpose-built intermodal terminals at Tashkent, Navoi, and Termez with rail-mounted gantry cranes, standardized container handling equipment, and integrated customs processing facilities.

Recommendation 9: Improve last-mile connectivity.

Invest in pedestrian infrastructure, shuttle services, and signage at all hub locations to facilitate efficient passenger transfers between modes.

## 9. Conclusion

This comprehensive assessment reveals that Uzbekistan's transport hub systems, while benefiting from substantial recent investments in individual modal infrastructure, remain characterized by low levels of integration across physical, operational, informational, and institutional dimensions. The overall mean integration score of 1.8 out of 5.0 across five major hubs indicates systemic fragmentation that undermines the potential economic benefits of the country's strategic geographic position and growing transport infrastructure base.

The findings underscore a critical disconnect: Uzbekistan is investing in world-class individual transport assets—high-speed rail, modern airport terminals, improved highways—while the connecting tissue between these assets remains underdeveloped. Passengers navigating between airport and rail station encounter fragmented information, uncoordinated schedules, and absent transfer infrastructure. Freight moving between rail and road or between air cargo and surface transport encounters excessive dwell times, duplicated documentation, and institutional coordination failures.

The Navoi Free Economic Zone experience demonstrates that intentional, planned integration—anchored by a dedicated management authority and purpose-designed multimodal infrastructure—can achieve meaningfully better outcomes, even if not yet at international best-practice levels. This model should inform future hub development across the country.

The recommendations presented in this article—spanning institutional reform, digital integration, physical infrastructure investment, regulatory harmonization, and public-private partnerships—are ambitious but achievable. They align with the Government of Uzbekistan's stated strategic priorities, including the Development Strategy for 2022–2026 ("New Uzbekistan"), the Transport Sector Modernization Programme, and the country's commitments under CAREC and other international frameworks.

Ultimately, the competitiveness of Uzbekistan's economy, the quality of life of its citizens, the vibrancy of its tourism sector, and the country's ability to serve as a regional transit hub connecting China, South Asia, and Europe will depend not only on the quality of individual roads, railways, and airports but on the seamless integration of these assets into coherent, efficient, and user-centered transport hub systems. The transition from a collection of transport facilities to a system of integrated transport hubs represents one of the most important infrastructure challenges—and opportunities—facing Uzbekistan in the coming decade.

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