MODERNIZATION OF URBAN PUBLIC TRANSPORT SYSTEMS UNDER MARKET ECONOMY CONDITIONS: A CASE STUDY OF TASHKENT METRO

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Abstract: Under the conditions of a developed market economy, qualitatively new and large-scale requirements are being imposed on the goals, objectives, and forms of improving the urban public transport (UPT) management system. This article analyzes the socio-economic significance of UPT through the lens of a unified transport network, emphasizing the structural and financial transformations within the Tashkent Metro system. Based on empirical data from the last decade, the study examines the correlation between passenger traffic growth, operational costs (tariffs vs. prime costs), and infrastructure constraints - specifically rolling stock depreciation. The findings indicate that while integration and infrastructure expansion (from 38 km to 59 km) have doubled passenger capacity, sharp disparities between state-regulated tariffs and market-driven operational costs create significant financial bottlenecks that require strategic state intervention and digitalization.

Keywords: Urban public transport (UPT), unified transport system, tashkent metro, tariff policy, prime cost, rolling stock modernization, infrastructure integration.

Introduction

In modern urbanized areas, public transport is not merely a logistical tool but a core element of the socio-economic infrastructure. Transitioning towards advanced market economic models requires a fundamental restructuring of Urban Public Transport (UPT) management. The strategic goal of this transformation is to fulfill the population's mobility demands with minimal economic expenditure while maintaining high-quality service standards.

When assessing the socio-economic weight of UPT, it must be evaluated as a unified transport system. This systemic approach is grounded in two primary principles:

1. **Universal regulatory laws:** All modes of urban transport must adhere to unified quality metrics to optimize resource consumption.
2. **Methodological modeling homogeneity:** Due to structural similarities in usage, universal organizational and economic models can be applied across different transport modes to streamline management.

Infrastructure expansion and institutional reforms

The period between 2016 and 2021 marked a phase of intensive infrastructural growth for the Tashkent Metro. Total track length expanded significantly from 38 km to 59 km, while the number of operational stations grew from 29 to 43.

Key Performance Indicator: This expansion triggered a two-fold increase in transit capacity compared to 2016 baseline figures, lifting daily ridership numbers from 160,000 to a steady range of 400,000–420,000 passengers. Currently, daily traffic reaches up to 450,000 passengers, reflecting a 54.5% net growth in annual volume over the past decade.

To sustain this momentum, construction is underway on Phase II of the elevated ring line - specifically the 13 km "Quyliq – Qipchoq" section comprising 7 new stations.

Administratively, a critical institutional pivot occurred following the Presidential Decree No. PP-5260 (October 16, 2021) *"On measures to increase the efficiency of the Tashkent Metro"*. The Unitary Enterprise (UK) was structurally reorganized and integrated under the Ministry of Transport. This decree established several strategic vectors:

- Implementation of advanced international corporate management mechanisms.

- Phased modernization of infrastructure and rapid rolling stock renewal.
- Digitalization of operational processes via modern Information Technology (IT).
- Integration of surface public transit routes with the underground metro grid.
- Legal regulation of commercial services, retail, and advertising within metro premises.

Financial asymmetry: Tariffs vs. Prime Costs

One of the most complex challenges in UPT management under market conditions is tariffication. While commercial entities supply fuel, energy, and components at fluctuating market rates, transit fares remain strictly regulated by state authorities to protect public interest.

№	**10-YEAR ECONOMIC TREND ANALYSIS**	
1	Average economy-wide consumer price index (CPI) growth	10% - 12%
2	Metro operational prime cost (tannarx) increase	5.0x
3	Passenger tariff (yo‘l haqi) increase	2.8x

Data shows that over the last decade, the operational prime cost per passenger rose 5-fold, while the regulated tariff only increased 2.8-fold. Furthermore, during the last three years, the passenger tariff remained completely static. This caused the *tariff-to-prime-cost ratio index* to decline by nearly half. When fare adjustments freeze, the only viable mechanism to stabilize the system's financial results is an aggressive increase in total passenger volume to achieve economies of scale.

Operational schedule and technical assets

The backbone of subway logistics is the train movement schedule, which balances passenger demand, safety, and labor regulations for locomotive crews.

The Tashkent Metro operates 64 trains consisting of 256 individual carriages. However, the system faces a massive technical deficit regarding asset depreciation:

Carriage exploitation age	**Number of carriages**	**Percentage of total fleet**
30 to 40 Years	151	59%
Over 40 Years	16	6%
Modern / Recent Fleet	89	35%

Optimizing the traffic schedule allows the system to compress intervals to 2–3 minutes during peak hours, stretching up to 15 minutes during off-peak times, with maximum operational speeds reaching up to 80 km/h. On standard business days, 4-carriage configurations run an average of 1,062 trips daily, scaling down slightly to 1,058 on Saturdays and 953 on Sundays.

Conclusion

Improving the urban public transport system in Tashkent requires mitigating the widening gap between market-priced operational inputs and socially-capped tariffs. While infrastructure growth has successfully generated higher passenger volumes, the high depreciation rate of the rolling stock (with 65% of carriages exceeding a 30-year lifespan) poses long-term sustainability risks. Future strategic management must prioritize state-backed subsidized financing models, rapid rolling stock replacement, and full integration of surface and subsurface transit grids via digital scheduling systems.

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