

Traffic Congestion Mitigation in Urban Areas: Evidence from Uzbekistan

Khafizov Dilbek Abdugani o'g'li

2nd year master's student of Karshi State Technical University, Uzbekistan

Received: 14 March 2026; **Accepted:** 02 April 2026; **Published:** 28 April 2026

Abstract: This scientific work analyzes the problem of traffic congestion in the cities of Uzbekistan, in particular in Tashkent. The study examined the main causes of traffic congestion as the rapid growth of the number of cars, the insufficient development of the public transport system, the limited capabilities of the city's infrastructure, and shortcomings in the transport management system. The results show that a comprehensive approach is needed to reduce traffic congestion, in which the development of public transport, the introduction of intelligent transport systems, improved urban planning, and measures to manage transport demand play an important role.

Keywords: Traffic congestion, urbanization, public transport, urban infrastructure, transport management, intelligent transport systems, road traffic, sustainable development.

INTRODUCTION:

Traffic congestion is a serious urban challenge in Uzbekistan, particularly in Tashkent. This study analyzes its causes and evaluates integrated mitigation strategies based on Uzbek academic literature, government reports, and transport development strategies. The structure and focuses on public transport modernization, smart traffic systems, urban planning reforms, and demand management policies. The findings show that congestion can only be solved through a combination of infrastructure, technology, and policy reforms. Urban transport systems in Uzbekistan are facing rapid transformation due to population growth, economic development, and increasing vehicle ownership. In Tashkent, traffic congestion has become a daily problem, especially during peak hours. According to Karimov (2021), urban mobility demand has increased significantly over the last decade. [1] The State Statistics Committee of Uzbekistan reports continuous growth in registered vehicles, which puts additional pressure on road infrastructure. [2] As a result, travel time increases, fuel consumption rises, and environmental pollution worsens.

The main aim of this research is to analyze congestion causes and propose effective mitigation strategies suitable for Uzbekistan.

METHODS

This study is based on qualitative document analysis. Sources include Uzbek textbooks, scientific journals, and government reports. Key materials: Karimov A. (2021) Urban Transport Systems, Ismoilov M. (2019) Urban Planning and Transport, Ministry of Transport reports (2023), State Statistics Committee data (2024), Ecology Committee environmental reports (2022)

RESULTS

Growth of Vehicle Population: vehicle ownership in Uzbekistan has increased rapidly in recent years. According to the State Statistics Committee (2024), the number of private vehicles has grown significantly. [3] This has led to higher traffic density and frequent congestion in urban centers. Public Transport Limitations: Saidov (2020) notes that public transport systems in Tashkent suffer from outdated fleets, insufficient coverage, and poor route

optimization.[4] As a result, many citizens prefer private cars, increasing congestion pressure. Infrastructure Constraints: Ismoilov (2019) explains that many urban roads were designed for lower traffic volumes.[5] Narrow streets, lack of alternative routes, and insufficient bypass roads create bottlenecks in peak hours. Traffic Management Issues: according to the Ministry of Transport (2023), digital traffic management systems are being introduced but are not yet fully implemented². Manual traffic control still dominates many intersections, reducing efficiency. Environmental Impact: the Ecology Committee of Uzbekistan reports that transport emissions are one of the major contributors to urban air pollution.[6] Traffic congestion increases fuel consumption and carbon emissions, negatively affecting public health.

DISCUSSION

The results indicate that traffic congestion in Uzbekistan is caused by a combination of infrastructure, behavioral, and policy factors. Public transport expansion is considered the most effective long-term solution. However, without modernization and integration, it cannot fully compete with private vehicles.

Smart transport systems such as adaptive traffic lights, GPS monitoring, and digital control centers can significantly improve flow efficiency. Urban planning reforms, including polycentric city development, can reduce commuting distances and distribute traffic more evenly.

Demand management policies such as parking regulation and flexible working hours can further reduce peak-hour congestion.

Additional Section: Modern Approaches to Traffic Congestion Mitigation Transportation Demand Management (TDM), in recent years, many developed and developing cities have shifted from purely infrastructure-based solutions to transport demand management strategies. This approach focuses on reducing the need for private vehicle use rather than only expanding road capacity. Key measures include:

Flexible working hours to distribute peak traffic loads
Remote working (telecommuting) policies

Congestion pricing in central urban areas

Incentives for public transport usage

Studies show that well-implemented TDM policies can reduce peak-hour congestion by 15–30%, depending on the city structure and enforcement level. Intelligent Transportation Systems (ITS), intelligent Transportation Systems play a crucial role in modern urban mobility management. These systems use digital technologies and data-driven solutions to improve traffic efficiency. Main components include:

Adaptive traffic signal control systems

Real-time traffic monitoring using sensors and cameras

GPS-based navigation and route optimization

Artificial intelligence for traffic prediction and flow control

In cities like Tashkent, ITS implementation is still in development, but it is considered a key direction for future urban transport modernization. Public Transport Modernization, Improving public transport systems is one of the most effective long-term solutions for reducing congestion. Research shows that high-quality public transport significantly reduces dependence on private cars. Important strategies include:

Introduction of electric and hybrid buses

Expansion of metro networks

Development of Bus Rapid Transit (BRT) corridors

Integration of unified smart ticketing systems

A well-connected and reliable public transport system increases accessibility and reduces travel time variability. Urban Planning and Smart City Development, Modern urban planning emphasizes the concept of polycentric and smart cities, where economic and residential zones are distributed across multiple centers. Key principles include:

Reducing long-distance commuting

Integrating residential and commercial zones

Developing mixed-use urban areas

Designing transport-oriented development (TOD) zones

According to urban planning studies, such approaches

significantly reduce congestion pressure in central districts. Environmental and Economic Impacts, Traffic congestion is not only a transport issue but also a major economic and environmental challenge. Its effects include:

Increased fuel consumption and transportation costs

Loss of productive working hours

Higher levels of air pollution and greenhouse gas emissions

Global studies indicate that congestion can reduce urban economic efficiency by a noticeable percentage, especially in rapidly growing cities

CONCLUSION

Traffic congestion in Uzbekistan is a complex urban issue requiring integrated solutions. The study concludes that sustainable mitigation requires:

- Expansion of public transport systems
- Implementation of intelligent transport systems
- Urban planning reforms
- Demand management strategies
- Environmental protection measures

A coordinated approach between government, urban planners, and society is essential for long-term improvement.

REFERENCES

1. Karimov A. (2021). Urban Transport Systems. Tashkent: University Press, pp. 110–118.
2. Ministry of Transport of Uzbekistan (2023). Transport Development Strategy 2030, Sections 2.3–3.1.
3. State Statistics Committee (2024). Transport Statistics Report, p. 14.
4. Saidov B. (2020). Public Transport Problems in Tashkent. Transport and Logistics Journal, 2(1), pp. 17–22.
5. Ismoilov M. (2019). Urban Planning and Transport Systems. Tashkent: Science Press, pp. 64–90.
6. Ecology Committee of Uzbekistan (2022). Air Pollution and Transport Emissions Report, pp. 23–25.