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TECHNIQUES FOR BOOSTING ROADS' ECONOMIC EFFICIENCY

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Abstract. This thesis considers the issues of economic efficiency of highways, development of transport infrastructure and introduction of resource-saving technologies. The main focus is on reducing costs in road construction and operation, optimizing traffic flow and ensuring environmental sustainability. The results of the study show that increasing the economic efficiency of highways has a positive impact on the overall economic development of the country.
Keywords: highways, economic efficiency, transport infrastructure, logistics, operating costs, modernization, resource-saving technologies.

INTRODUCTION

Roads play an important role in the economic and social development of the country. They play a significant role in ensuring traffic, developing the logistics system, strengthening interregional integration and expanding trade relations. The quality and efficiency of road infrastructure directly affect the country's economic growth rates. High-quality and well-built roads reduce freight costs and save time. At the same time, the economic efficiency of roads is related not only to the funds spent on their construction, but also to the processes of their operation, maintenance and modernization. Today, developed countries are striving to increase economic efficiency by updating road infrastructure and introducing modern technologies. In particular, approaches such as smart road systems, the use of energy-efficient materials and optimizing traffic flow are widely used. In Uzbekistan, the issue of improving the quality and economic efficiency of roads is also relevant, and a large part of state investments are directed to the development of this sector. This study analyzes factors affecting the economic efficiency of highways, methods for reducing operating costs, modern technologies, and the economic benefits of road infrastructure.

The impact of roads on the economy. Transport plays a significant role in economic activity and development in the republic. They include a wide range of infrastructure and services necessary for the efficient movement of goods, people and resources. A high-quality and developed transport network accelerates production processes, expands domestic and international trade, and strengthens regional connectivity. Improving roads reduces logistics costs and ensures that products reach consumers quickly. This, in turn, creates a favorable economic environment for enterprises and business entities and increases the opportunities for attracting investment. Modern transport infrastructure also has a positive impact on the development of remote areas, connecting them with large economic centers, thereby improving the living standards of the population [1].

Economic aspects of road construction and operation costs. Road construction and operation processes play an important role in ensuring the overall efficiency of highways. Road design, material selection and technological approaches are key factors during the construction phase. To create a high-quality road infrastructure, it is necessary to attract investments, use modern materials and increase the efficiency of the construction process. Operating costs are associated with the constant maintenance, repair and modernization of roads. Ensuring the durability and quality of the road surface is one of the main factors in reducing operating costs. The use of intelligent transport systems and automated monitoring technologies also helps to effectively manage operational processes. Extending the service life of roads through maintenance and

planned repairs and creating comfortable driving conditions for vehicles is also of great importance. Thus, effective management of road construction and operation costs ensures the sustainable operation of transport infrastructure [2].

The impact of quality roads on transportation costs. High-quality roads significantly reduce the operating costs of vehicles. Smooth and durable road surfaces reduce the cost of vehicle maintenance and repair, as good roads reduce the wear and tear of vehicle parts. In addition, high-quality roads help tires last longer, which reduces tire replacement costs. Uneven and poor roads put excessive strain on the vehicle's suspension and suspension components, which leads to their rapid wear. Smooth roads, on the other hand, extend the service life of these components, significantly reducing costs for car owners. Also, the cost of washing and cleaning cars is reduced due to high-quality roads. Dusty and dirt roads cause rapid contamination of the car body, increasing the need for frequent washing. On paved and well-maintained roads, these costs are significantly reduced. In general, high-quality roads have a number of positive effects, such as reducing the operating costs of vehicles, extending the service life of car parts, and creating comfort for passengers. This has a positive impact not only on drivers, but also on the efficiency of the entire transportation system. Quality roads reduce the number of accidents, which in turn reduces medical and insurance costs.

Introduction of resource-saving technologies. Investing in innovative technologies to improve the environmental sustainability of transport systems requires significant financial outlays. Many countries and the corporate sector need to invest heavily in developing electric vehicles, creating hydrogen fuel infrastructure and modernizing public transport. The production cost of electric vehicle batteries remains relatively high, which increases their market price. At the same time, the economic value of non-performing assets, such as petroleum-based infrastructure, must be taken into account in the transition from traditional fuel systems to clean technologies. Nevertheless, in the long term, these changes provide significant economic advantages. The operating costs of electric vehicles are significantly lower than those of conventional vehicles, significantly reducing fuel consumption. In addition, the minimal maintenance requirements of electric vehicles increase the long-term benefits of ownership. The introduction of clean transport systems will alleviate urban congestion, improve public health and protect the environment, thereby increasing economic efficiency. Electric vehicles have significantly lower operating costs than conventional vehicles, reduce fuel consumption and require less maintenance, significantly reducing the total cost of ownership. Their use in cities will play an important role in reducing congestion and improving public health. In addition, optimizing traffic on highways will prevent traffic jams and reduce various types of toxic emissions and fuel residues emitted into the atmosphere [3].

CONCLUSION

Since the impact of highways on the state economy is very large, it is planned to develop and build highways in such a way that they use less resources or cost less and have a long service life. In proportion to this, the more usable the highways are, the lower the cost of cars increases, and it has been found that a car moving on a flat road consumes less fuel than a car moving on an unusable road.

The fuel consumption recorded in the vehicle documents also records the fuel consumed during movement on a road that meets the requirements.

Depending on how smooth and smooth the highways are and how they meet world standards, it will be convenient, fast, safe and inexpensive for both car movement and the delivery of goods or passengers to the destination.

This can significantly reduce economic costs.

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