DIRECTION OF DIGITALIZATION AND DEVELOPMENT OF AUTOTRANSPORT INFRASTRUCTURE IN UZBEKISTAN

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Abstract. *In the current conditions of global digital transformation, the modernization and digitization of road transport infrastructure is of great importance for the socio-economic development of countries. The article analyzes the state of digitalization of road transport infrastructure in Uzbekistan, modern trends in the field of intelligent transport systems (ITS), ecology and logistics. It also discusses the prospects for the development of the transport system based on electric vehicles, hydrogen fuel technologies, intelligent services and the concept of "smart cities". The article indicates the directions for increasing transport efficiency, ensuring road safety and ensuring environmental sustainability through the introduction of digital technologies.*

Keywords: *road transport infrastructure, digitization, intelligent transport systems, electric vehicles, ecological sustainability, smart city, logistics.*

In the current conditions of global digital transformation, the modernization and digitization of road infrastructure plays an important role in the socio-economic development of any country. In particular, in Uzbekistan, the digitization of the transport sector, the improvement of the logistics system, and the introduction of modern information and communication technologies have become one of the priorities of state policy.

The efficiency of road infrastructure is directly related to the competitiveness of the country's economy, population mobility, and the level of security.

Road infrastructure includes the following main components:

- road network;
- bridges and tunnels;
- traffic management systems;
- road services (logistics, passenger transportation);
- service and maintenance facilities.

Digitization allows you to integrate these components into a single information system. This allows you to:

- effectively manage traffic flows;
- reduce traffic accidents;
- improve the quality of service;
- helps reduce logistics costs.

The global market for electric vehicles has grown several times over the past decade. In Europe, the US and China, it is planned to gradually ban cars running on

gasoline or diesel fuel in the near future. These changes are due to the following reasons:

- reduction of atmospheric pollution;
- energy inefficiency of internal combustion engines;
- cheaper battery technologies;
- increasing the share of renewable energy sources.

Tesla, Waymo, Baidu and other companies are carrying out extensive work on levels 4-5 of autonomous driving. Intelligent sensors, lidar, radar and artificial intelligence algorithms allow cars to move independently.

“Digital twins” of cars, IoT sensors, predictive diagnostics, online services - all this increases the efficiency of technical service.

What is the current state of development of motor transport in Uzbekistan today?

If we analyze the dynamics of the domestic market, we can see that the number of cars in Uzbekistan is increasing every year. By 2024, the car fleet in the republic will exceed 4.5 million, and the number of cars per 1,000 population will exceed 130.

Along with the growth of the level of motorization in our country, certain changes are also being made in the road infrastructure. Especially in recent years:

- more than 1,000 km of roads have been repaired and reconstructed;
- intelligent traffic management systems are being implemented in Tashkent, Samarkand, Bukhara and Fergana;
- the number of electric vehicle charging stations has increased 10 times.

Of course, the sharp increase in the number of cars cannot but seriously affect the environmental conditions of the country.

We all know that the transport system plays an important role in the economic development of countries. According to the conclusions of specialists and international experts, the development of the transport system, along with having a positive effect on economic growth, remains one of the main sources of harmful gas emissions into the environment.

The transport sector accounts for 25-30% of atmospheric emissions. Therefore, environmentally friendly technology has become the main direction of development. As a solution to this, it is considered appropriate to implement the following basic measures:

- increasing Euro standards;
- introducing electric and hybrid buses;

- increasing the share of gas-powered vehicle fleets in passenger transportation;
- Creating “green zones” in city centers.

In this regard, Uzbekistan is implementing a policy of introducing engines with Euro-4 and higher standards, providing customs privileges for electric vehicles, and increasing the share of environmentally friendly transport in government procurement. Important steps have also been taken to increase the share of electric vehicles in the automobile market and local production.

As is known, electric vehicles have the following advantages over vehicles with internal combustion engines:

- reduces CO_2 emissions;
- operating costs are 30-40% lower;
- the engine design is simple and long-lasting;
- Compatibility with renewable energy sources.

Today, one of the promising directions for creating environmentally friendly vehicles is the widespread use of hydrogen fuel technologies.

Hydrogen-powered cars (like the Toyota Mirai) are seen as a future equal competitor to electric cars. Such vehicles can travel 600–800 km, and refueling with such fuel is very fast.

For the efficient use of vehicles, the creation and widespread implementation of intelligent transport systems and a digitalized transport infrastructure will yield positive results.

Intelligent transport systems are aimed at performing the following tasks:

- monitoring traffic density;
- controlling smart traffic lights;
- assessing road safety;
- Supporting autonomous and semi-autonomous transport.

The implementation of the “smart city” concept within the framework of a digitalized transport infrastructure creates opportunities such as:

- online navigation;
- intelligent traffic lights;
- automatic photo and video recording;
- Traffic jam forecasting.

The use of a digital platform in logistics - block chain in auto-logistics, electronic CMR, automated terminals, GPS monitoring will increase the efficiency of cargo transportation by 20-30 percent.

The prospects for the automotive sector in Uzbekistan include the modernization of the local automotive industry, i.e., expanding the production line of electric vehicles; reducing the import of auto components; robotization of the automotive industry.

It is also proposed to expand the electric vehicle infrastructure (it is planned to build more than 3,000 charging stations by 2030), and gradually introduce intelligent traffic lights and control systems to all regional centers based on the experience of Tashkent.

In addition, it is advisable to create and implement a legal framework for autonomous transport, i.e., develop standards for testing, certification, liability and protection of autonomous vehicles.

In conclusion, the digitalization of the automotive infrastructure in Uzbekistan is an important factor in ensuring the sustainable development of the economy. Through the widespread introduction of modern information technologies, the possibilities of increasing the efficiency of the transport system, ensuring traffic safety and providing convenient services to the population will expand.

In the future, the acceleration of digital transformation processes, the introduction of innovative solutions and the effective use of international experience will ensure the sustainable development of this field.

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