Development of a unified digital transport and logistics intelligent platform based on the National Operator

G.B. Yusupkhodjaeva1*

1Tashkent State Technical University named after Islam Karimov, 100095, Uzbekistan, Tashkent, University St. 2A

Abstract. This article is devoted to the research and development of a single digital transport and logistics intelligent platform based on the infrastructure of the National Operator. In the context of a rapidly developing transport and logistics industry, the creation of such a platform becomes a key strategic initiative. The abstract analyzes the main components and benefits of the platform, such as data integration, route and load optimization, demand forecasting, warehouse management, cargo tracking, improved planning and coordination, and analytics and reporting.

1 Introduction

The development of a unified digital transport and logistics intelligent platform based on the National Operator is an important and strategically significant initiative. Such a platform can have many benefits, including better management and coordination of transport and logistics processes, improved forecasting and planning, and increased transparency and cost reduction in transport and logistics.

In order to take measures to implement the concept of ensuring road safety in the Republic of Uzbekistan for 2018 - 2022, as well as within the framework of the Decree of the President of the Republic of Uzbekistan dated July 11, 2017 No. PP-3127 "On measures to further improve the system for ensuring road safety" and Resolution of the Cabinet of Ministers dated May 19, 2018 No. 377 “On measures to further improve the road safety system in the Republic of Uzbekistan”, foreign experience in the creation and implementation of intelligent systems for road safety and navigation (transport monitoring) was studied, consultations were held with potential international investors, local developments in this direction are studied.

2 Experimental research

Foreign experience in the creation and implementation of intelligent systems for road safety and navigation includes many innovative solutions and technologies aimed at improving the safety, efficiency and manageability of the transport infrastructure:

1. Automatic driving assistance systems (Advanced Driver Assistance Systems, ADAS): These systems include a variety of functions such as lane control, automatic braking in the event of obstacles, collision warning systems, etc. Examples include an automatic parking system, blind spot monitoring systems, adaptive cruise controls, and others.

2. Infrastructural traffic support systems: The introduction of intelligent systems on the roads, such as sensors, cameras and traffic lights, linked into "smart" roads, allows you to monitor and manage traffic flows, optimize traffic lights, detect violations and emergency situations.

3. Navigation and GPS systems: Very popular and widespread, these systems provide drivers with accurate maps, traffic information, speed limits and other important data. In recent years, navigation systems have also been integrated with weather, road conditions and other parameters.

4. Communication systems between vehicles (V2V) and with traffic lights (V2I): V2V and V2I systems allow vehicles to communicate with each other and with traffic infrastructure. This can help alert you to near emergencies, provide smoother driving, and so on.

5. Violation and Accident Detection Systems: Many countries are implementing systems for automatic photo-video recording of violations, such as speeding, running a red light, etc. This makes it possible to effectively control traffic and reduce violations.

6. Data integration for road infrastructure management: Large amounts of data collected from
various sources can be used to analyze and manage transport infrastructure. For example, traffic flow analysis can help optimize the distribution of traffic signals.

Examples of countries successfully implementing such systems are Sweden (road equipment and infrastructure systems), Germany (ADAS development), USA (V2V and V2I technologies), Japan (GPS and navigation systems development), Singapore (traffic management systems) and a lot others.

3 Research results

Such intelligent systems greatly improve traffic safety, efficiency and convenience, but also require attention to data, privacy and cybersecurity aspects. The main components and benefits of developing such a platform may include:

Data integration: Collecting, aggregating, and analyzing data from various sources (transport companies, warehouses, ports, weather, and other relevant data) will help you create a complete picture of traffic flows, available resources, and the current situation in the logistics network. Integration of data from various sources, such as transport companies, warehouses, ports, weather data and other relevant sources, plays an important role in optimizing and improving logistics operations. Here's how it works and why it matters:

Data Collection: First you need to collect data from different sources. This data can include information about cargo, routes, delivery times, warehouse conditions, weather forecasts, vehicle information, and many other parameters.

Data Aggregation: The collected data is then aggregated in a centralized system or database. This allows you to combine information from different sources and create a single data access point.

Data Analysis: After data aggregation, you can perform analysis to create a complete picture of the logistics network. Data analysis allows you to identify trends, problems, opportunities for optimization and make more informed decisions.

Route and loading optimization: Using optimization algorithms, the platform can offer optimal routes and loading methods for vehicles, taking into account parameters such as distance, travel time, road capacity, and other constraints.

Route Optimization: Analyzing data about traffic flows and available resources helps you optimize delivery routes, which can save time and resources.

Improved forecasting: Integration of weather and other external factors data allows you to more accurately predict delays and other unexpected events, which contributes to more reliable delivery.

Inventory management: Analysis of data on the state of warehouses and expected deliveries helps you manage inventory effectively, avoiding a shortage or excess stock.

Improve customer service: Data integration allows you to quickly respond to changes in the logistics network and provide a higher level of customer service.

Save resources: By integrating data, companies can make better use of their resources, which can save money and reduce the negative impact on the environment.

Demand forecasting: Analysis of historical data and current trends will allow you to more accurately predict demand for transport and logistics services, which in turn will help you plan resources more efficiently. Demand forecasting is an important aspect in inventory management, logistics, and business in general. Demand forecasting allows companies to adapt their operations, optimize production, manage inventory, and provide a better level of customer service. Here are some key aspects of demand forecasting:

Data collection: The first step in forecasting demand is to collect data. This includes historical data on sales, trends, seasonal changes, as well as external factors that can influence demand, such as weather, economic events, etc.

Choice of forecasting methods: There are many forecasting methods available, including statistical methods (such as exponential smoothing, time series), machine learning, and artificial intelligence. The choice of method depends on the available data, the nature of the business, and the accuracy of the forecast that is required.

Data processing: Data may require preprocessing, such as eliminating outliers, filling in missing values, and normalizing data.

Modeling: Forecasts are made using the selected methods. Models can be trained on historical data and used to predict future values.

Accuracy assessment: It is important to evaluate the accuracy of forecasts by comparing the predicted values with the actual results. This allows you to improve models and forecasting methods.

Update forecasts: Forecasts are not static and may change depending on new data and changes in the business environment. Therefore, it is important to update your forecasts periodically.

Decision Making: Based on forecasts, you can make decisions about purchasing, production, inventory management, distribution, and marketing strategies.

Demand forecasting helps companies avoid shortage or excess inventory, optimize production and logistics, and provide more accurate promises on delivery times and customer service. This is a key element of successful business management and reducing transaction costs.

Warehouse Management: The platform can help optimize inventory management by offering data on current inventory levels, predicting needs, and optimal times to move to orders.

Inventory Monitoring: The platform allows companies to track current inventory levels in a warehouse. This includes information about the
number of products, their location, expiration dates, and other characteristics.

Demand forecasting: The platform uses data on past sales and other factors (such as seasonality, marketing campaigns, changes in market conditions) to predict future demand. This helps you determine how many items you need to keep in stock.

Order management: The platform optimizes the order process by calculating the best moments for ordering goods from suppliers. This may include automating orders, optimizing order batches, and taking into account factors such as minimum orders from suppliers.

Optimization of distribution: The platform helps optimize the location of goods in the warehouse to reduce pick-up time and simplify the process of shipment of goods.

Expiration Date Management: For products with expiration dates, the platform can provide information about upcoming expiration dates, which allows you to manage inventory more efficiently and avoid losses.

Data Analysis: The platform can provide analytical tools that enable companies to analyze warehouse performance, identify bottlenecks, and optimize operations.

Cargo tracking: Monitoring and tracking systems will allow real-time monitoring of cargo movement, which will improve supply management and provide customers with up-to-date information, improve logistics operations management, improve customer service, and help companies be more efficient and competitive in the market.

Improved planning and coordination: The system can automate planning and coordination tasks, reducing the risk of errors and conflicts in the transport and logistics chain. Improved logistics planning and coordination are key components of successful logistics operations. Modern technologies and methods can significantly improve planning and coordination processes. Here are some of the ways this can be achieved:

- Improved transparency and security: The platform can provide greater transparency of the entire process of moving goods, which helps to improve security and prevent losses. Improved logistics planning and coordination are key components of successful logistics operations. Modern technologies and methods can significantly improve planning and coordination processes. Here are some of the ways this can be achieved:

  - Analytics and Reporting: Generating analytical reports and statistics helps identify trends, bottlenecks, and areas for improvement in transport and logistics operations.

  However, the development and implementation of such a platform also involves a number of difficulties, including technical, organizational, security and legal aspects. It is necessary to take into account data confidentiality, provide protection against cyber threats, and ensure consistency and cooperation between different participants in the transport and logistics network.

  It is also important to establish a regulatory framework and standards governing the use and development of the platform, as well as ensure the participation of all stakeholders, including transport companies, logistics operators, government agencies and other market participants, to ensure the effectiveness and success of this initiative.

  Since the beginning of 2019, a similar system has been launched in the Republic of Kazakhstan (EVAC). Currently, work is underway to link emergency response systems in Russia and Kazakhstan. In addition, emergency response systems have been put into operation since April 2018 on the territory of 28 states of the European Union as part of the implementation of the ECall program. All these systems have an identical principle of operation, which consists in installing special equipment on vehicles, which automatically sends detailed information about the location of the vehicle and the nature of damage to the emergency response center at the time of a road accident. This significantly reduces the response time of emergency services and assistance to victims, and the presence of an intercom device in the car also allows you to provide psychological assistance before rescuers arrive.

  The transport connectivity of the Republic of Uzbekistan with the Republic of Kazakhstan and the Russian Federation, as well as the increasing traffic flow between these states, make it necessary to create
an emergency response system in case of accidents on highways of the Republic of Uzbekistan with subsequent integration with the ERA-GLONASS and EVAK systems, which will significantly expand the unified ecosystem of transport security and create conditions for security of citizens of the Republic of Uzbekistan, both on the territory of their own state and in neighboring territories.

Tasks of the national operator: One of the main tasks of the national operator will be the creation and operation of the state information system for emergency response in case of accidents in transport (traffic accidents) (hereinafter referred to as the Emergency Response System in case of an accident), an analogue of the European E-Call system and the Russian GAIS "ERA-GLONASS". The principle of operation of the European and Russian systems is identical and consists in installing special equipment on each vehicle, which automatically sends detailed information about the location and nature of damage to the emergency response center at the time of a traffic accident. Due to this, the response time of emergency ambulance services, the Ministry of Emergency Situations and the Ministry of Internal Affairs is significantly reduced, and the presence of an intercom in the car allows you to provide psychological support to persons injured in an accident before the arrival of rescue services.

Also, one of the key activities of the national operator should be the solution of state tasks related to the control of the location of vehicles of certain categories that carry out passenger and freight transportation.

4 Conclusion

Development of a unified digital transport and logistics intelligent platform based on the National Operator. The emergency response system in case of an accident can also be used to create and ensure the functioning of a system for controlling road and rail transportation, which provides for the use of identification tools (seals) operating on the basis of GLONASS technology:

- ensuring the control of the integrity of the identification means (seals) installed on the vehicle, functioning on the basis of GLONASS technology (hereinafter referred to as the seals), with a control system with the transfer of information about the application, removal and violation of the seal to the authorized state authorities;

- checking the performance and identification of seals in the control system;

- providing access to the control system in 24x7 mode for the purpose of obtaining information about the location of vehicles and the safety of cargo.

Any types of cargo spaces (compartments) of vehicles and railway rolling stock, premises, containers and other places where goods are or may be located during their transportation through the territory of the Republic of Uzbekistan can act as mobile objects of protection. It can be various types of containers, wagons, tanks, car trailers, refrigerators, thermoses.

Market volumes (initial data for revenue estimation) If a decision is made on the mandatory equipping of vehicles put into circulation with emergency call devices, taking into account the current forecast for the volume of production of vehicles on the territory of the Republic of Uzbekistan, as well as the volume of exports and imports of vehicles, the predicted number of equipped vehicles by 2024 will be about 1.3 million units.

According to international recommendations, the indicators of the commercial (financial) efficiency of the project “as a whole” take into account the financial consequences of its implementation for the participants implementing the investment project, assuming that they incur all the costs necessary for the implementation of the project at their own expense and use all its results. When constructing the model, an assumption was made that the cost of funds of the GIK services operator is assumed to be equal to the pledged rate of return and is 20%. Thus, the weighted average cost of the operator's funds is 20%.

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