

# Innovative transport technologies in Russia

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**Abstract.** Modern management of transport systems is characterized by the use of innovative automated and information systems. At the same time, digital technologies are being used to bring the transport system management model to a qualitatively new level. The use of such systems improves the development of vehicle management.

Transport is the largest and most important area in the country's economy. Transportation plays a major role in the daily life of people and society as a whole. The development of modern technologies is changing the world at a very fast rate. This can be seen mainly in the field of transport and its technologies. Humanity has created transport for the immediate, unhindered movement for both people and various goods on land, by air and by water.

The development of transport in our lives has led to a certain side effect - this is primarily polluted air, as well as congestion on highways, disruption of the land's topography, and climate change. All these things have led the society to pose global problems and search for solutions.

Information and communication technologies are currently the main tools of modernization in the transport sector. Information systems at the present stage are characterized by the formation of a single database for all participants interacting economic activity. Taking into account the scale of the Russian territory and its coverage by the transport networks from all regions of the country, it is the transport infrastructure that is the most geographically distributed. Therefore, the main feature of the transport industry is the high technical dependence.

The singularity of the transport industry lies in the fact that constant interaction is required between remote places. This fact shows the need to use the latest technical devices and information and communication technologies for data transmission. Since people's lives depend on transport security, the industry has significantly improved the reliability of data transmission and the need to protect data from external access.

The transformation of all transport modes is important not only in everyday life, but also has some meaning for the military, industrial and research fields.

The main task of the transport industry is to unite the various economic spheres from all the regions of the country into a single whole by means of transportation.

An innovative process that promotes the renewal of equipment and technologies in transport integrates material, mental and human resources. The economically optimal combination of different resources determines the effectiveness of the innovation process.

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The use of information systems for monitoring the movement of vehicles allows you to get remote information about routes and delays, fuel consumption, vehicle speed, its location, etc. In addition to the main goal, such systems can be flexibly configured by the developer, performing individual tasks for the client. Today, the market offers a variety of functional solutions for various car control systems.

DVRs are very popular at the moment. These devices are in a high demand and have a leading position in sales. They are indispensable for every vehicle owner. In case some disputes over an accident, registration will help clarify the situation. They are compact electronic devices equipped with a video camera, a module, image processing and recording facilities. The video is recorded and stored on mobile media. This option enables automatic deletion of old information to make room for new one (when there is no more memory on the media). Special attention should be paid to the option of automatically starting and synchronizing the device with the GPS receiver.

GPS trackers and beacons are designed for remote monitoring of the vehicle movement. The design of the devices includes a number of elements, where the main ones are the following: GPS/GLONASS signal receivers, GSM modules, information exchange in the set "device-navigation server", a battery, a Wi-Fi module, an internal memory.

Navigation systems are designed to track the location and vehicle movement. These devices include a comprehensive (regular) and mobile plan. The equipment includes a navigation processor (GPS/GLONASS chipsets), an antenna that receives satellite signals, and an image display. Navigation programs can be installed on any operating system.

Diagnostic systems of the main elements allow their owners to be aware of the technical condition of the car. The most common and useful system is the tire pressure monitoring system. When the permissible values fall, it informs the owner, showing the temperature parameters of the tires on the screen. There are innovative systems that track the level of battery charging and exhaust emissions.

Nowadays, the automotive industry is developing and implementing innovations aimed at improving the safety of drivers and passengers. Systems that measure driving performance, which track the behavior of the driver on the way, will allow you to adjust transport control. The most popular solution is the analysis of the driver's physical condition, which gives a signal in case of a critical change. This control will help to minimize the cases of drivers' fatigue when they want to complete the trip quickly.

Telematics systems (intelligent systems) are able to collect, store and analyze information about the transport movement and the mechanisms functioning. Installation of these devices includes diagnostic sockets-connectors.

Intelligent road transport systems (ITS) are a set of functional equipment that collects all the necessary information, monitors the movement of vehicles and informs road users.

Only if the transport system is sufficiently fitted with all the necessary equipment and related work, it is possible to achieve a significant improvement in the situation on the city roads.

ITS elements are: road video cameras; smart traffic lights; traffic flow detectors; electronic means of payment for travel; information boards; parking meters; automated lighting control; means of automatic detection for violations.

Priority subsystems of ITS are:

1. Monitoring the parameters of traffic flows (getting up-to-date information about changes in traffic flows).
2. Video surveillance (full video coverage of the network, receiving information in real time).
3. Identification of incidents (covering areas where an accident is more likely to happen).

4. Weather monitoring (creation of a unified system of weather monitoring with weather services, obtaining and forecasting information about changes in weather conditions on the roads).

5. Informing road users (providing all necessary information to road users, both before and during the start of the movement).

6. Monitoring the operation of road equipment (monitoring the effectiveness of road equipment).

The full and rapid development of intelligent transport systems is possible only when the state policy, business at all levels and science are united in solving national problems in the transport system.

The road transport industry has the greatest impact on the life of a modern person. Transport issues directly affect the interests of citizens.

With the growth and urbanization of cities, the number of cars also increases. At the same time, cars are considered to be one of the first factors of pollution, their concentration in one place entails major environmental problems. On the other hand, an increase in the density of traffic, the formation of traffic jams, as well as noise pollution, provokes an outflow of citizens from the city to the outskirts, which in turn reduces the amount of taxes.

The information system at the transport enterprise is able to automate all processes, which leads to an increase in the efficiency of employees. An important plus is a significant reduction in the costs of companies – from now on, many processes are carried out without additional human influence on them. Indeed, the process of planning, approving and performing a particular task would take a lot of time from employees, and money from the company. Thus, we come to the conclusion that such information accounting systems play an important and vital role in production. For an enterprise in the field of transport, it is necessary to have up-to-date information about the production process, execution and the location tracking of transport. This is possible only if there are information systems that allow you to get all information in real time. Also, the intelligent system allows you to diagnose the company, which allows you to get accurate data on the functioning of the enterprise, that is, to make the right decisions regarding the further development of the corporation in the future.

First of all, it is worth considering an information system designed to automate the activities of enterprises in the field of transport services, which has its own fleet.

The development of this system provides:

- keeping a log of each available vehicle, recording characteristics and data (date of purchase, brand, cost, equipment, internal characteristics, etc.);
- maintaining a directory of rolling stock models with fuel consumption standards. This makes it easier to maintain a file cabinet;
- accounting for the use of trailers and the cargo capacity of vehicles;
- maintaining a file of drivers with all the information about them. Assigning a driver to a specific vehicle;
- documentation control-replacement of expired transport and driver documents;
- accounting for the use of refueling materials and hot products;
- registration of applications for the use of vehicles by third-party drivers and customers, the formation of documents;
- registration of waybills with the indication of routes and crew members;
- vehicle occupancy planning, travel schedule, customer data recording;
- accounting for additional equipment in vehicles (tires, first aid kit, batteries).

Dispatching of the enterprise is also important. This is a set of activities that are aimed at functional communication with the client to achieve high performance results.

Thus, the accounting information system is fully capable of solving a wide range of tasks for automating the processing, planning and executing applications for all types of transport work.

Rail transport remains one of the most cost-effective types of land transport for transporting goods and passengers. Its advantages include: low cost, regularity, reliability in different weather conditions and of course high load capacity.

The main problem of the railway sector is the low level of service quality in comparison with the market requirements. The high-tech development of rail transport can solve this problem.

Russian Railways (RZD) lags behind air transport in innovative solutions. However, even here, the availability of an electronic ticket for passengers is expanding: online booking, ticket purchase.

Russian Railways continues to operate the largest business information system (ERP) in Russia and Europe.

Russian Railways is in many respects the largest railway company in the world, including in terms of road length. The implementation of IT systems in such critical situations allows us to implement the principle of centralized development. As part of product development with wider replication in the industry, a shared road network and centralized modification are vital for success and effective implementation.

Innovations in aviation are also very interesting. Aviation is divided into civil and military. The various goals of any of them determine the vector of development, including in the field of using innovations.

The main task of the military aviation of any independent state is to ensure the security of the nation. The country's leadership defines the development of military aircraft and control systems to be a step above another state as the main task, since the security of a power depends on it.

Civil aviation is focused on other tasks. This includes ensuring safe, comfortable delivery of passengers and cargo, aircraft maintenance, minimizing the financial costs of carriers, and taking into account environmental issues.

To solve these problems, air transport uses the innovations which:

- increase the efficiency of aviation fuel, reduce air pollution and optimal investment of finances;
- improve the functional distribution of free space inside the aircraft;
- design more powerful, maneuverable, types of air transport, which are able to travel long distances optimally and more comfortably for passengers.

Air transport is a type of industry where innovative developments in the field of information technology find instant practical application. It is no longer possible to imagine reality without online booking and ticket sales, registration via airport web booths or via the Internet, not to mention open access to information about the schedule of aircraft.

When the number of air travel significantly decreased in the context of the global economic downturn, IT technologies became an important tool for competition between airlines.

Thus, the Sirena-Travel system was introduced, which provides a quarter of the passenger traffic by Russian air transport and allows online booking of charter flights by tour operators and most airlines. At the same time, for the convenience of passengers, the information system was supplemented with the eGO payment service.

The ability to increase the productivity of the organization using innovative technologies and effectively manage financial income has become an important parameter for the existence of aviators under modern conditions.

We also need to pay attention to the use of innovations in river transport. River transport occupies an important place in the state's transport system due to the low cost of freight and passenger transportation on the long river route that skirts hundreds of Russian cities.

The production of new vessels is still very low due to insufficient state attention and lack of investment. These problems require the implementation of strategic decisions and the introduction of innovations.

The following areas can be identified for the use of innovation in river transport:

- increase in the number of Russian-made river fleet vessels in order to attract investment in the production sector;
- organization of the ship renovation processes, repair and modernization of fleet facilities;
- optimization of the river fleet management organization, the formation of professional development systems among industry employees;
- decommissioning of old vessels, development and application of measures for the operation of obsolete vessels.

Similar solutions exist for all modes of transport, and most importantly, with the introduction of satellite navigation, which tracks the location of each transport unit in real time, economic operators can achieve the greatest success in the transport industry.

Currently, the transport complex of the Russian Federation is moving to the stages of renewal and development. This is facilitated by the growth of our country's economy, which has increased the demand for transport services. It is also important to activate the state policy, thanks to which the volume of investment in the transport sector has been increasing for several years.

Significant attention is also being paid to the technological performance of the transport system in the way of modernization and improvement. This problem is highlighted as a priority of the transport strategy.

In order to achieve high efficiency of transport processes, it is necessary to implement an integrated approach, to use effective methods and appropriate standards.

In general, the development, implementation and use of transport innovations is one of the most important mechanisms at any stage of the country's development. This is the way to positive construction of the transport sector, corresponding to the increasing human needs for travelling around the world.

## References

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