



# Innovation driven development

The Russian Railways Group's R&D activities and innovation driven development follow the priorities set forth in the Company's Long-Term Development Programme until 2025, as well as the Group's Research and Development Strategy until 2025 and further until 2030 (the "White Book"), in line with the country's strategic development goals and global R&D trends.

The Group's Comprehensive Innovative Development Programme (the "CIDP") lays the groundwork for implementing the Long-Term Development Programme.

In 2019, a new CIDP until 2025 ("CIDP 2025") was developed.

It provides for the implementation of 11 groups of key projects, contains proposals for the development of the organizational structure of innovation management, and lays down partnership mechanisms based on the principle of open innovation.

Russian Railways' 2019 R&D capex amounted to

**1,031**  
RUB m

## Key areas of the Group's innovation driven development:

- developing a customer-focused transportation and logistics system in a unified transportation space;
- establishing and implementing dynamic transportation management systems using artificial intelligence;
- implementing innovative systems to automate and mechanise station processes ("intelligent station");
- developing and implementing advanced equipment and technologies for track maintenance infrastructure, railway automation and telematics, electrification and power supply, innovative information and telecommunication technologies;
- setting requirements for the construction and deployment of innovative rolling stock;
- developing the traffic safety management system and risk management methods associated with the transportation safety and reliability;
- developing and implementing equipment and technologies for promoting high-speed and ultra high-speed railway transport;
- promoting technologies for heavy-duty freight traffic management;
- improving energy efficiency of operations;
- implementing the best available technologies in environmental protection;
- promoting the quality control system.

## KEY INNOVATION DRIVEN DEVELOPMENT PROJECTS IN 2019

### Passenger transportation

In 2019, the Company started selling tickets of 24 suburban passenger companies to all destinations across Russia through its RZD Passengers mobile app.

The app users can now contact support staff via online chat, buy tickets in exchange for RZD Bonus points and order goods via FPC Market. For frequent travellers, there are itinerary templates that make it easier to buy tickets to favourite destinations. Tickets of most suburban passenger companies can be paid in-app using a bank card or a one-tap payment system such as Apple Pay, Google Pay and Samsung Pay.

Innovative Mobility, Russian Railways' controlled entity, is developing an IT-platform that will leverage modern digital technologies to bring various modes of transportation under one roof. The platform has a multimodal trip builder that allows users to plan trips involving four modes of transport: rail transport (long-haul trains, Aeroexpress), buses (a network of more than 3,472 destinations, including foreign countries), planes (routes within Sirena and Sabre travel networks) and river transport (20 seasonal routes between seven Lower Volga destinations).

### Freight transportation

#### Distributed ledger technologies

In 2019, the Company joined a pilot project to create a blockchain-based freight transportation platform. The project is implemented as part of cooperation between Russian Railways, shippers, consignees, railcar fleet owners, freight operators, ports, terminal operators, customs authorities and banks.

As part of a project to introduce smart contracts on the October Railway, the distributed ledger technology was put to use for container freight shipments starting July 2019. In 2019, the technology was used for over 70 shipments carried by container trains.

On top of that, the blockchain-based platform was integrated with corporate automated systems, new functionality was added to allow smart contract parties to see identical information, accurate geolocation data for moving objects was obtained using geolocation sensors.

#### Railcar fleet management

Russian Railways uses a uniform corporate automated system for rolling stock control that has been developed for railcar fleet management on a nationwide basis.

### Communications

#### Quantum communications

In July 2019, Russian Railways and the Russian Government signed an agreement to facilitate the development of quantum communications in Russia. In August 2019, Russian Railways established a Quantum Communications Department to engage in dialogue with the scientific community and tech companies on the use of quantum technologies for data transfer and protection.

Russian Railways developed a draft road map entitled Quantum Communications. In January 2020, the Ministry of Digital Development, Communications and Mass Media of the Russian Federation submitted it to the Russian Government.

Together with ITMO University, Russian Railways created a National Quantum Internet Research Centre. Russian Railways provides funding for the project by developing a Moscow–St Petersburg

quantum communications network. When implemented, it will enable the Company not only to satisfy its own business needs, but become the main network operator for other consumers, resulting in more investment funds being raised for the project.

## RUSSIAN RAILWAYS' CONTRIBUTION TO THE DIGITAL ECONOMY OF THE RUSSIAN FEDERATION GOVERNMENT PROGRAMME

The Digital Economy of the Russian Federation programme was approved by the Russian Government's Order No. 1632-r dated 28 July 2017. It defines goals, objectives, areas, and timelines of the key efforts stipulated by the public policy for promoting Russia's digital economy development. Russian Railways works with entities responsible for the Digital Transportation and Logistics project.

Russian Railways' key IT development areas align with the Group's main business lines and include:

- providing IT services for external customers in freight and passenger transportation;
- developing new end-to-end digital solutions for transportation management ("Digital Railway") as part of Russian Railways' Digital Transformation Strategy until 2025;
- improving the quality of internal IT services;
- ensuring the business continuity while meeting the highest IT security requirements.



## DIGITAL TRANSFORMATION STRATEGY

In 2019, the Company approved its Digital Transformation Strategy until 2025 and updated its IT Development Strategy until 2025.

The Digital Transformation Strategy (the "Strategy") was elaborated in accordance with the relevant resolution of the Board of Directors made in September 2018. The strategy is aligned with the Company's Long-Term Development Programme until 2025 as regards the timeline, financial terms, actions and targets. Apart from the integration of digital technology, the digital transformation projects

are geared towards improving business processes, updating regulations and creating a digital culture within the Company.

The digital transformation in Russian Railways will be focused on the following eight digital platforms:

- multimodal passenger transportation;
- multimodal freight transportation;
- transportation and logistics hubs;
- local infrastructure operator;
- logistics operator in e-commerce;
- transportation management;
- business support processes;
- traction stock.

Each platform will offer digital services for both internal and external customers. In accordance with the Strategy,

55 digital projects across six business lines are planned to be delivered by 2025.

Based on the market analysis, high-potential end-to-end digital transformation technologies were identified, including technologies based on the Internet of Things, big data, distributed ledgers (blockchain), artificial intelligence, virtual and augmented reality, advanced data transmission solutions (such as quantum communications). Developing corporate culture is no less important. The Company has already introduced a new role of Change Agent who will be responsible for educating others, taking part in change management initiatives, exploring new workflow organisation opportunities, identifying and promoting best practices in the Company.