DIGITAL TRANSFORMATION OF RUSSIAN RAILWAYS

FIRST DEPUTY HEAD OF IT DEPARTMENT
JSC “RUSSIAN RAILWAYS”
GERMAN SUKONNIKOV

NOVEMBER 2, 2022
KEY TRENDS OF TRANSPORT INDUSTRY DEVELOPMENT

- Growing demand on multimodal transportation and door-to-door transportation
- Increase of requirements in reduce of terms and price of transportation, limitation of environmental impact
- Increase of requirements in the field of transportation safety, including labor protection and industrial safety
- Introduction of the “digital” participants in the transport industry, development of ecosystems
- Shaping the ecosystem of Eurasian “digital transport corridors”
- Digital behavior of customers: working online, maximum of services available remotely, paper-free document workflow, minimum of personal contacts
RUSSIAN RAILWAYS DIGITAL TRANSFORMATION DIRECTIONS

**BUSINESS SERVICES**

**RUSSIAN RAILWAYS SERVICES**
- **INTERNAL CUSTOMERS**
  - Internal customers
  - Employees
- **EXTERNAL CUSTOMERS**
  - Passengers
  - Shippers

**SERVICES OF SUBSIDIARIES AND AFFILIATES**
- **RZD SUBSIDIARIES AND AFFILIATES**
  - Subsidiaries and Affiliates

**SERVICES FOR THE MARKET**
- **STATE**
  - Ministries and agencies
- **PARTNERS**
  - Research institutes
  - Funds / start-ups
  - Technological partners
- **COUNTERPARTIES**
  - Counterparties
  - Clients

**DIGITAL PLATFORMS**

**MULTIMODAL PASSENGER TRANSPORTATION**
- Multimodal transport
- Additional services for passengers
- Customer experience management

**INFRASTRUCTURE OPERATOR**
- Construction and reconstruction
- Diagnostic
- Current maintenance and repair

**MULTIMODAL FREIGHT TRANSPORTATION**
- Interaction with clients, Freight Transport Electronic Trading Platform
- Trusted environment with market participants
- Unmanned technologies

**TRANSPORTATION PROCESS MANAGEMENT**
- Transportation planning
- Transportation management

**DIGITAL CORPORATE CULTURE**

**TRACTION ROLLING STOCK**
- Digital depot
- Trusted locomotive environment
- Automated train driver

**NON-PRODUCTION PROCESSES**
- Digital accounting
- Digital HR
- Digital long term development program
- Cyber security

**TRANSPORT AND LOGISTICS HUBS**
- Transportation and logistics hubs management
- Robotic complexes

**STRATEGIC DOCUMENTS**

**OPTIMIZATION OF PROCESSES AND REGULATORY FRAMEWORKS**

**IN REALIZATION:**
- **PROJECTS**
  - 48
- **INITIATIVES**
  - 7
# DIGITAL TRANSFORMATION OF RUSSIAN RAILWAYS 2022

## ECONOMIC EFFECT OF DIGITAL TRANSFORMATION

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-2021</td>
<td>8.2 bil.rub</td>
<td>users of ‘Personal account of train driver’</td>
</tr>
<tr>
<td>OUTLOOK 2022</td>
<td>11.1 bil.rub</td>
<td>items of specialized rolling stock equipped with Internet of things detectors</td>
</tr>
</tbody>
</table>

## Outlook 2022

- **90%** consignors interact with RZD electronically
- **73%** tickets on long-distance trains issued
- **11.2 mil** legally relevant electronic documents (24 thsd. counterparts)

## Freight Transportation

- **106 000** users of ‘Personal account of train driver’
- **4280** items of specialized rolling stock equipped with Internet of things detectors
- **> 5000** sets of equipment for predictive analysis of wagons technical condition

## New Digital Services

- **FREIGHT TRANSPORTATION SMART-CONTRACTS MONITORING SERVICE**: Coverage – Whole Network. +9 NEW CLIENTS
- **PAPERLESS TRANSIT CONTAINER TRANSPORTATION (INTERTRAN)**: Vladivostok – Moscow, Saint Petersburg – Vladivostok, Vietnam-Vladivostok – Moscow
- **NEW DIGITAL SERVICES IN PERSONAL ACCOUNT OF THE RZD CLIENT FOR FREIGHT TRANSPORTATION**
- **WORKS ON CREATION OF THE DIGITAL TWIN FOR THE INFRASTRUCTURE COMPLEX**
- **INTEGRATION OF AUTOMATED SYSTEM “FOREIGN PROJECTS OF THE RZD HOLDING”: PROJECT ANALYSES AND MAP VISUALIZATION**
ELECTRONIC TRADING PLATFORM “FREIGHT TRANSPORTATION”: RESULTS OF 9 MONTHS 2022

Products and functionality (transportation completion)

<table>
<thead>
<tr>
<th>Service providers</th>
<th>January 2022</th>
<th>September 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling stock operators</td>
<td>125</td>
<td>141</td>
</tr>
<tr>
<td>Terminal and warehouse operators</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Railway carriers</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Stevedoring companies</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sectoral security</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

Customer registration (legal entities)

<table>
<thead>
<tr>
<th></th>
<th>January 2022</th>
<th>September 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 936</td>
<td>8 767</td>
<td></td>
</tr>
</tbody>
</table>

Structure of transported goods in September

<table>
<thead>
<tr>
<th>Construction cargoes</th>
<th>Empty</th>
<th>Coal</th>
<th>Scrap of ferrous metals</th>
<th>Industrial raw materials</th>
<th>Wood cargoes</th>
<th>Ferrous metals</th>
<th>Fertilizers</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13.2%</td>
<td>8.9%</td>
<td>6.4%</td>
<td>4.7%</td>
<td>1.7%</td>
<td>0.9%</td>
<td>9.0%</td>
<td>34.8%</td>
</tr>
</tbody>
</table>

12 918 wagons in September 2022 (transportation completion)

Additional online features

- attracting customers/search for suppliers
- transportation planning and organization
- 5-day period payments organization
- online payment by invoice or from advance payment
- conducting contractual work
- electronic document flow
- automatic generation of accounting documents
- claim work
- online monitoring of order execution
- cloud software as a service
**RUSSIAN RAILWAYS SYSTEM OF THE UNIFIED COMMUNICATIONS**

**Implemented solution**

<table>
<thead>
<tr>
<th>Virtual Conferencing:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual meeting rooms</td>
</tr>
<tr>
<td>Joint work with documents</td>
</tr>
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<td>Single corporate administration etc.</td>
</tr>
</tbody>
</table>

**Solutions under development**

| Remote personnel training |
| System of remote video inventorying |
| Remote health control |
| Technological operations intellectual video surveillance |
| Face-recognition system |

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**Implemented features**

- Video and Audio conferences
- Polling and Voting
- Demonstration of documents, presentations, video, desktop
- Events Planning
- Files exchange and storage
- Waiting Room
- «White Board»
- Recording and protocoling of events
### ARTIFICIAL INTELLIGENCE ON RAILWAY TRANSPORT

<table>
<thead>
<tr>
<th>No</th>
<th>Solution</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The concept of the use of artificial intelligence in JSC “Russian Railways” has been approved</td>
<td>• Systematic work has been built on the use of AI technologies in railway transport</td>
</tr>
<tr>
<td>2</td>
<td>Intelligent processing of measurement results obtained from technical means of commercial inspection (TMCI)</td>
<td>• First stage: the use at 33 points of TMCI resulted in a cost reduction of 60 million rubles per year</td>
</tr>
<tr>
<td>3</td>
<td>Natural dialogue system - automatic selection of answers to a user's question</td>
<td>• Reducing the processing time of requests from users of information resources by 3-5 times</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2022 - processing 40% of requests without human participation, or with minimal participation, in 2023 - 50%</td>
</tr>
<tr>
<td>4</td>
<td>Machine vision (shunting locomotives, unmanned “Lastochka” trains) – tests have been carried out</td>
<td>Expected effects:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• growth of the stations capacity in the future up to 20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• transition to a three-minute inter-train interval at the Moscow Central Circle and an increase in passenger traffic by 200 thousand passengers per day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• saving operating costs by reducing the personnel of locomotive crews and improving the EMUs reliability</td>
</tr>
<tr>
<td>5</td>
<td>Intelligent assistant maneuvering dispatcher (prototype) – tested</td>
<td>• Expected effect: reduction of average downtime of transit trains with sorting at stations by 20%</td>
</tr>
</tbody>
</table>

* + 6 SOLUTIONS IN THE AREAS OF INFRASTRUCTURE, TRAFFIC, PERSONNEL MANAGEMENT AND INTERACTION WITH PASSENGERS ARE BEING DEVELOPED*
THANK YOU FOR YOUR ATTENTION!