DIGITAL TOOLS

TO SUPPORT BORDER CROSSING AND SMOOTH OPERATIONS
1. THE ROLE OF DIGITAL SOLUTIONS

Focus on digital tools, e-interoperability is a trend originating from growth of container transportation by rail.

Transportation of containers is sensitive to both time and cost, and electronic data interchange, as well as internal digital solutions, may result in reducing both costs and time of shipment.

**KEY DRAWBACKS OF RAIL TRANSPORTATION (OPEN QUESTION)**

- Impossibility to assure last mile delivery: 2
- Impossibility to track the cargo: 2
- Complicity of customs procedures and unpredictable actions of customs authorities: 4
- Impossibility to predict transportation time: 4
- Low quality of infrastructure: 5
- Duration of documentations preparations: 6
- Long time / impossibility to predict time of border passage: 7
- Problems related to tariff system: 10

IEC / CCTT / UIC SURVEY, 2019

7 – NUMBER OF RESPONDENTS

REFER TO E-INTEROPERABILITY AND DIGITAL SOLUTIONS
2. What are digital solutions?

01 Internal solutions
Digital tools applied within railway company, usually aimed at:
• automation;
• decrease of human factor impact;
• use of data-driven analytics.

02 Integrative solutions
Digital tools applied within between different railways or with third parties aimed at:
• pre-informing and interchange of information;
• acceleration of procedures;
• time economy.
3. ROLE OF DIGITAL AND DATA-DRIVEN SOLUTIONS.
SMART SOLUTIONS CHART*

TRAFFIC OPERATIONS
- Automation of terminals
- Automated traffic management systems
- Estimated time of arrival
- Interoperability
- E-interoperability

BORDER CROSSING
- Bogies change at one side
- Combined (joint) control procedures
- E-data interchange between railways and border agencies
- E-seals with customs information
- Non-intrusive inspections
- Non-stop border crossing
- Standard time targets
- Simultaneous scheduled transshipment
- Use of combined rail consignment as customs documents

INTERMODALITY AND CUSTOMER RELATIONS
- Electronic sales
- Single window
- Tracking applications

MAINTENANCE, SAFETY, SECURITY
- Predictive maintenance
- On the go data on cargo state (containers)
- Drones
- Energy-efficient LED systems
- Energy recovery and resource reuse
- Drone surveillance
- Fuel cell and hydrogen trains
- Battery trains
- Hybrid trains
- Transportation modeling

ROLLING STOCK
- Automation of train driving
- Fuel cells and hydrogen trains
- Battery trains
- Hybrid trains
- Transportation modeling

MULTI-USE TOOLS AND TECHNOLOGIES
- Data integration
- AI and machine learning
- Blockchain
- GIS
- Transportation modeling

DECISION-MAKING TOOLS
- National
- International
- Institutional
- Mixed

APPLICABILITY

IDEALIZED TYPES OF SOLUTIONS
- Recommended for use during COVID-19 pandemic and at recovery phase
- Solutions aimed at environmental sustainability

* UNESCAP – OSJD VIRTUAL MEETING, APRIL 2020
4. Key principle of E-interoperability: from documents to data interchange

Documents to data
E-interoperability supposes both data and e-documents interchange, but key idea is to shift from documents (both paper and electronic) to data.

Data integration
E-interoperability supposes data integration to form credible digital ecosystem, that allows switching many processes to digital (including contract performance, payments, etc.).

Data interchange principles
E-interoperability does not necessarily suppose changing local systems. It is focused on creating Application Programming Interfaces (APIs) to connect different systems based on uniform protocols for data interchange.
Digital ecosystem is based not on paper documents flows, but on e-data flows only, where data are accessible for all participants, but are verified and cannot be changed without consequences.

- Use of e-data instead of paper documents or scanned documents (=> no need to unify documentary forms = no need to have separate customs and transportation documents)
- All participants can be informed on the freight flows in advance and during transportation process
- Accessible verified information which would be enough to assure faster payments between the participants of transportation process
- Easier integration for different countries, as no language problem is applicable for data
6. MEASURING THE E-INTEROPERABILITY

CASES FROM UIC STUDY EURASIAN CORRIDORS: DEVELOPMENT POTENTIAL

**ACCELERATION OF BORDER CROSSING PROCEDURES**

<table>
<thead>
<tr>
<th>Year</th>
<th>Thousand TEUs (loaded)</th>
<th>2018</th>
<th>2030</th>
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**100 % USE OF CIM / SMGS CONSIGNMENT (ELECTRONIC)**

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**ACCELERATION OF BORDER CROSSING PROCEDURES**

- **x3,2**: Thousand TEUs (loaded)
- **247**: Acceleration of the Trans-Siberian Railway (7 days)
- **528**: Acceleration of all border crossings to 3 hrs
- **73**: 100 % use of CIM/SMGS (electronic)

**COMPREHENSIVE E-INTEROPERABILITY RESULTING IN PRICE REDUCTION**

- **x5,3**: Trade growth input
- **1835**: Price reduction by 20 % (excl. China)
- **632**: 42.4%
- **84**: 5.6%
- **247**: 16.5%
- **528**: 35.4%
7. Choice of digital tools and digital transformation of railways

Repeating the experience of largest railway companies with complicated digital systems is not compulsory.

01. The first and compulsory step is an audit of internal and external elements of rail digital systems and the state of their integration.

02. Definition of key priorities for digitalization and/or integration (for external links) based on (1) modelling of economic and operational impact and (2) assessment of external context.

03. Elaboration of architecture: business processes and IT – one does not work without another one. Necessary internal projects are born at this stage.

04. Elaboration of integration architecture: internal and/or external.

05. Link to necessary documentary (or legal) framework.
8. **INTERNATIONAL ACTIVITIES.**

What can be done in international collaboration (e.g. by a dedicated digital freight consortium, with participation of UIC).

1. to propose practical and simply applicable documents and guidelines by types of rail business

2. to consider necessary IRS and to develop them from practical experience

3. to support further harmonization of legal framework

4. to evaluate the economic impact of different (a) digital solutions; (b) inter-system integration solutions; (c) use of specific technologies

5. to propose new financing tools for implementation of digital solutions

6. to establish training courses on rail digital transformation and digital interchange
THANK YOU FOR ATTENTION!

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