



Economic Commission for Europe**Inland Transport Committee****Working Party on Intermodal Transport and Logistics****Sixty-sixth session**

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Item 5 (a) (iv) of the provisional agenda

Policies and measures in support of intermodal transport:**Measures to promote efficiency of intermodal transport and****bottlenecks in intermodal transport services at the pan-European level.****Handbook on automation in freight intermodal transport and logistics****Annotated outline of the handbook on automation in freight intermodal transport and logistics****Note by the secretariat****I. Introduction**

1. At its sixty-fifth session, the Working Party on Intermodal Transport and Logistics (WP.24) agreed to start a process for elaborating a handbook on automation in freight intermodal transport and logistics (handbook). It requested the secretariat and interested country representatives to elaborate an annotated outline for the handbook.
2. Further to the request, the secretariat prepared this document in collaboration with the Chair, Vice-Chair and Germany. It provides a draft outline for the handbook.
3. WP.24 is requested to consider this draft outline, and adjust it as deemed necessary for the elaboration of the handbook for the sixty-seventh session.

II. Draft Outline**A. The Scope of the handbook**

This handbook is designed for all stakeholders aiming to adapt at least some level of automation in freight transport and logistic, including but not limited to national Governments, enterprises from various sectors as well as cargo terminal operators.

In this chapter, this handbook will provide an overview of the adaptation and application of digitalisation and automation in freight transport and logistics. The different levels of automation will be discussed here (i.e., ranging from no automation, that is where all functions are summed by manually operated equipment, to high-level of automation, where terminals and transport are fully autonomous and be capable of responding dynamically to demand from users). Similarly, the definition of digitalisation and automation in the context of intermodal freight transport will be discussed. This will be followed by discussion on how automation can help freight transport and logistics to transform.



It is worth noting that digitalisation and automation in the freight transport and logistic chain involve multiple stakeholders at different levels. It cannot only be implemented at an individual enterprise level. Concerted efforts from all sectoral, cross-sectoral, as well as cross-national level parties are required to realise the full potential of the technologies (i.e. ensuring at least some level of interoperability through an open system). The sub-chapters under this topic are provided below.

- Digitalisation and automation for modal shift;
- Digitalisation and automation to facilitate access to intermodal services;
- Cargo (and processes) tracking technology.

B. Business case of digitalisation and automation of freight transport and logistics

1. Benefits from digitalisation and automation

This chapter will discuss the benefits brought about by digitalisation and automation, and it is divided into the following sub-chapters:

- Improving operating efficiency;
- Reducing manual efforts, hardship, and unappealing jobs;
- More efficient use of resources.

2. Challenges of digitalisation and automation

This chapter will discuss the challenges to adopt and fully realise the benefits of digitalisation and automation. It is divided into the following sub-chapters:

- High initial set up costs (capital investment as barrier to entry);
- Liability and cybersecurity;
- Interoperability.

3. Cost-benefit analysis: the breakeven point

This chapter will include a qualitative cost-benefit analysis to establish a business case for the relevant stakeholders. Ultimately the adaptation of digitalisation and automation will involve capital investment and such investment would only payoff when certain economies of scale are achieved.

C. The role of governments in digitalization and automation

This chapter will discuss the role of the governments in facilitating digitalisation and automation in freight transport and logistics. In particular, the following sub-topics will be discussed.

1. Provision of institutional / legislative framework and inter-operability standards

With the advent of new technologies, government intervention and regulations are required to ensure safe, secure, and efficient operations in the freight transport and logistics industry. This includes setting institutional / legislative framework for, *inter alia*, interoperability standards, cybersecurity, and data protection in the industry to ensure seamless communication and coordination between various systems and stakeholders.

2. Human-centric approach

It is also important for the government to define the role of human during the process of automation and digitalisation (i.e. the principle of “human-in-charge”). This also includes responsibilities for upskilling and provide re-training for existing workforce, shifting their role from manual labour-intensive work into operators of the automated systems.

3. *Inclusiveness and SME friendliness*

Automation and digitalisation may require significant infrastructure investment, such as smart ports, intelligent transport systems and communication networks. This scale of investment may become prohibitive for small and medium enterprises. The government plays a pivotal role in planning, funding, and implementing such infrastructure projects. By investing in the necessary infrastructure, the government could reduce the barriers to entry into automation and digitalisation, and thereby improving competitiveness in the freight transport and logistics sector.

It is also important for the government to ensure automation and digitalisation do not lead to unfair advantages for certain companies or hinder competition. Appropriate policies should be put in place to encourage interoperability and data sharing, enabling different stakeholders to collaborate and compete on a level playing field.

4. *Cybersecurity*

The arrival of automation and digitalisation introduce new risks, in particular cybersecurity threats. It is important for the government to establish legislative framework and guidelines on best practices to mitigate these risks, ensuring that the technologies and practices adopted in the industry meet the necessary safety and security standards.

D. Examples of digitalisation and automation

This chapter will discuss the various enabling technologies for digitalisation and automation of intermodal freight transport and logistics, and how it could improve efficiency and its effects on the reduction of energy consumption, greenhouse gas emissions, etc. Member States are invited to make contribution to case studies related to the technologies below in the Annex.

Solutions for arranging/optimizing automated intermodal transport:

- Data and information exchange and management platform;
- Infrastructure for digitalisation (5G standard);
- Digital twins.

Solutions at terminals:

- Automated system for entry to/ exit from terminals;
- Automated cranes and vehicles within terminals;
- Automated slot management for trucks and trains.

Solutions for railways carriers:

- Automated inspection, maintenance of rail infrastructure and risk assessment systems;
- Digital automation coupling process;
- Automated locomotives.

Logistics solutions:

- Paperless tracking;
- Electronic records replacing transport documents;
- Digital/ electronic seal.

[*Note: Additional technologies may be added as appropriate. At the same time, this handbook is not to address autonomous driving of road vehicles.*]

E. Recommendations – Focus on Success Factors

This chapter will provide recommendations for various stakeholders in the intermodal freight transport and logistics sector and provide good practice for adoption and implementation of digitalisation and automation.

1. Recommendations for terminal operators;
2. Recommendations for railway carriers;
3. Recommendations for governments;
4. Recommendations for training centres.

F. Annex – Case studies of successful applications of digitalisation and automation in freight transport and logistics

Case studies will be included to demonstrate the successful applications of digitalisation and automation in freight transport and logistics, including its effects on the reduction of energy consumption, greenhouse gas emissions etc. where applicable.
