

DIGITALIZATION IN FREIGHT TRANSPORT AND QUALITY

M.Sc. Suad Sućeska
SS
Sarajevo
Bosna i Hercegovina

ABSTRACT

Digitalization in the transport sector is very extensive. The article includes: electronic systems, electronic services, electronic devices, Web applications, mobile applications. Some of the products of digitalization are also used in B&H. Their use brings many advantages, some of which are: significant reduction in the duration and costs of business procedures, no paper is used, the duration of stay and the length of heavy transport vehicles columns at border crossings are reduced. Digitalization in the transport sector of B&H contributes to the improvement of overall quality of B&H.

Keywords: digitalization, electronic systems, electronic service, freight transport, quality.

1. INTRODUCTION

The process of digitalization is present in all activities, including the activity of freight transport. Digitalization in freight transport brings many advantages which brings digitalization in other businesses, but also some what are characteristic only for this business. All these advantages are the reason for digitalization of freight transport.

2. DIGITALIZATION IN FREIGHT TRANSPORT

Digitalization in freight transport industry includes: electronic systems, electronic services, electronic devices, Web applications, mobile applications, and more. Usage of digitalization in the freight transport industry brings several advantages. Some of the advantages of using digitalization are: constant access (24/7), reduces duration of work procedures, reduces the costs of providing services, does not use paper. The data are more net and clearer than those on paper forms.

Digitalization of freight transport brings advantages specific to this business only: much faster customs control and smaller queues of vehicles at border crossings; shorter time and lower costs of delivering goods; reduction of air pollution. For example, in 2020. heavy transport vehicles in the EU produced as much as 24% of GHG gases.

Digitalization of freight transport contributes to the overall quality. [15,16,17]

3. ELECTRONIC SYSTEMS IN FREIGHT TRANSPORT

Digitalization of freight transport in B&H includes the following electronic systems: ITS and NCTS. It should be emphasized that their introduction into usage in Bosnia and Herzegovina is making very slowly. [1,2]

3.1. ITS

Intelligent Transport Systems (ITS) is a very complex type of digitalization that is characteristic for transport business. This system contains several services related to transport and traffic management. ITS uses modern ICT technologies that provide a lot of information about the state of traffic on the roads, such as: weather conditions; traffic density; online cameras; notifications about accidents, stoppages and route changes. [3]



Figure 1. Traffic management and control center

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One of the ITS services is eCall. The eCall service enables automatic and manual calling of the emergency services on number 112 in the event of a traffic accident. [19] This service is mandatory for EU member states. Currently it is not used in B&H.

Advanced ICT technologies of ITS enable collection and storage of various traffic data, as well as access to this data. This information is important for transport companies, truck and bus drivers, and other road users. [4]

Besides of obtaining real-time traffic information, ITS also enables remote traffic management. Remote traffic management is performed from traffic management and control centers, Figure 1. This improves traffic efficiency, ensures safety, and reduces fuel consumption, congestion, duration and transport costs.

ITS continues to develop. Currently, it is working on the introduction of C-ITS (Cooperative-ITS), which enables the automatic exchange of data between vehicles, with the road infrastructure and with other traffic participants using wireless communication technologies. [5,6]

3.2. NCTS

NCTS (New Computerized Transit System) is the computerized transit system of the EU, where its usage is mandatory. The use of NCTS brings many advantages, which are reflected in the reduction of costs and duration of customs procedures. It is currently used in 36 countries. [7]

NCTS simplifies customs procedures, reduces their duration and processing costs, as well as the length of truck queues at border crossings. NCTS has been introducing in B&H since 2016., when was planned its first start of usage. Since then, its introduction has been postponed several times. [1] On the 01.08.2022. began the testing phase of NCTS in B&H, which is still going on. [7] The use of the system NCTS in B&H will modernize customs procedures and raise them to the levels of those used in the EU. [8]

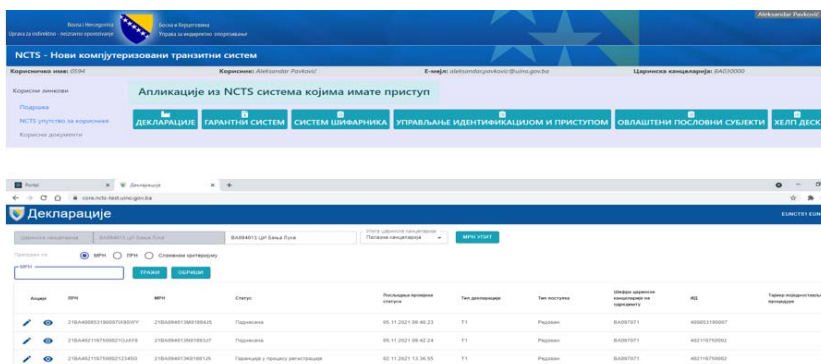


Figure 2 Web page of electronic system NCTS

4. ELECTRONIC SERVICES IN FREIGHT TRANSPORT

The following electronic services are important for freight transport in Bosnia and Herzegovina: eTIR, EPD. IRU's eCMR is also much used in the world, but this service is not included because it is not used in Bosnia and Herzegovina.

4.1. eTIR

The TIR system facilitates and accelerates the transport of goods through several countries using shortened customs procedures. [9] B&H used TIR when it was part of the SFRY. However, the official start of using TIR as a service of the state B&H dates from 01.09.1993.. The electronic version of TIR, eTIR, brings many advantages characteristic for electronic services used in the transport industry. From 25.05.2021. eTIR can be used by all member states, which currently are 78. [10] eTIR contains 3 applications that enable the exchange of data with the IRU: TIR carriers (EPD), TIR national associations (AskTIRWeb), and customs (RTS). [11]

4.2. TIR-EPD

TIR-EPD (Electronic Pre Declaration) as an electronic sub-service of eTIR enables transport companies to send electronic customs transit pre-declaration data to the customs of the transit countries. To use the EPD, user has to have valid TIR carnet.

The great advantage of the EPD is that it enables the exchange of information about a certain transport much before arrival at the border crossing, thus achieving simplification, greater speed and safety of the procedure at border crossings.

TIR-EPD is one of the few electronic transport services used in Bosnia and Herzegovina. It is much used in the world, and its use is mandatory in several countries and organizations of countries: European Union (since 2009.), Eurasian Customs Union (since 2012.), Ukraine (since 2013.), Iran (since 2014.). Currently, EPD is used by 42 countries. [12]

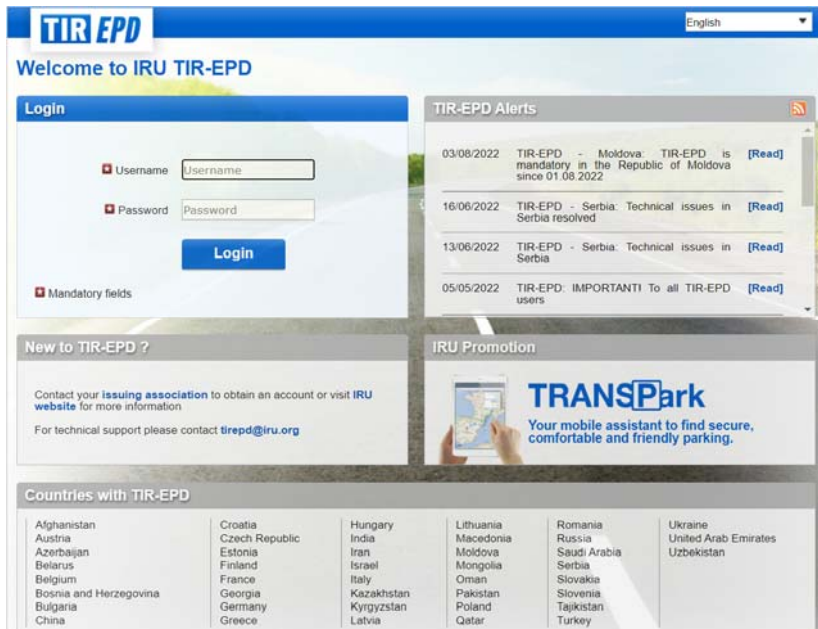


Figure 3 Home (Login) page of the Web application TIR-EPD. [12]

5. ELECTRONIC DEVICES IN FREIGHT TRANSPORT

Digitalization of transport industry also includes special hardware (HW), such as currently actual smart tachograph v2. [18]

5.1. The smart tachograph v2

The smart tachograph v2 has many advantages over the previous version of the smart tachograph v1. That is why the EU has introduced regulations that require the gradual replacement of tachographs in transport vehicles, which should be implemented by 01.07.2026.. [13]

The many advantages brought by usage of the smart tachograph v2 are enough reason that heavy vehicles for the transport of people and freight to be equipped with this device even before the prescribed deadlines for its mandatory use.



Figure 4 The Smart tachograph v2

Some of the advanced features of the smart tachograph version 2 are the use of GNSS (Global Navigation Satellite System) and two-way ITS communication.

6. WEB AND MOBILE APPLICATIONS IN THE FREIGHT TRANSPORT

In the freight transport are used many Web and mobile applications, which can also use transport companies from B&H.

6.1. Web applications

Web maps have put out of use paper maps in traffic. The most famous of the Web maps is Google Maps, whose Web address is: <https://www.google.com/maps> .

The EU uses CARE (Community Database for Road Accident Data) to work with traffic accident data. CARE contains detailed data on traffic accidents in EU in which there are fatalities or injuries.

The EU Transport Community (TC) launched the Web platform WBRSO (Western Balkans Road Safety Observatory) for the countries of the Western Balkans (WB). The WBRSO is intended to enable the exchange of information, strategies, action plans, initiatives on road safety, and the collection of timely, objective and reliable information that contributes to reducing the number of victims in traffic accidents in the Western Balkans. [14]

With the introduction of CO₂ tolls, the EU also introduced appropriate Web applications for working with CO₂ tolls. One of them is 'BMAP toll simulator (CO₂)'. Web address of this Web application is: <https://axxes.fr/fr/simulateur-de-reseaux-taxes-bmap/> .

One of the data required in documents for the toll registration process is the CO₂ class of the vehicle: 'CO₂ class'. Web application 'CO₂ class check' can be used to determine the vehicle's CO₂ class. Web address of this Web application is:

<https://www.dkv-mobility.com/en/toll/co2-class-calculator/> .

6.2. Mobile applications

For smartphones there are also various mobile maps. Besides visual map data, they also provide corresponding voice messages, which is very useful for drivers. Some of the mobile applications that display maps are: Google Maps, Waze.

Mobile application 'Truck Parking Europe' can be used to provide information of parking rest areas for heavy vehicles in the EU. The application is made for smartphones with Android and iOS operating systems, and can be downloaded from the Google Play Store or the Apple App Store.

The mobile application Toll4Europe can be used to determine CO₂ tolls on highway sections in EU. This application can also be downloaded from the Google Play Store

7. CONCLUSION

Digitalization in the transport industry brings many advantages. It contributes to the improvement of the quality of the transport industry, but also and of the overall quality in the country. The importance of the digitalization of freight transport is illustrated by the fact that some electronic services and systems are mandatory in some countries. Electronic maps, in the form of various Web and mobile applications, have made a particularly big contribution to digitalization.

Digitalization of freight transport industry in Bosnia and Herzegovina has been taking place with great delay. The biggest reason for this is the slow and long procedures for the adoption of various laws. Electronic systems and services currently used in Bosnia and Herzegovina are: eTIR, EPD, NCTS (in the testing phase), and ITS.

8. REFERENCES

- [1] <https://ba.ekapija.com/news/1361189/na-carinu-bez-papira-privreda-ce-jos-cekati-primjena-novog-kompjuterizovanog-prevoznog>
- [2] Poslovne novosti (2021a). "Carina bez papira" tek od naredne godine. Poslovne novosti 29.07.2021., pp.4.
- [3] <https://www.its-platform.eu/>
- [4] <https://napcore.eu/>
- [5] <https://intercor-project.eu/wp-content/uploads/sites/15/2017/03/Factsheet-C-ITS-Corridor-English-November-2016.pdf>
- [6] https://transport.ec.europa.eu/transport-themes/smart-mobility/cooperative-connected-and-automated-mobility-ccam_en
- [7] UIO, 2025. NCTS. UIO. Available at: <https://www.uino.gov.ba/portal/bs/e-usluge/ncts/>
- [8] Jure, B., 2011.: NCTS New Computerised Transit System. Available at: <https://slideplayer.com/slide/13985326/>
- [9] IRU, 2017. Computerised TIR data exchange between Customs, IRU and Assoc, Version 3, pp.5. IRU. Available at: <https://www.iru.org/sites/default/files/2017-02/en-computerised-tir-data-exchange.pdf>
- [10] IRU, 2020. eTIR The United Nations global border crossing facilitation solution. Available at: <https://etir.org/united-nations-global-border-crossing-facilitation-solution>
- [11] IRU, 2021. TIR. The future of TIR is digital. IRU. Available at: <https://www.iru.org/what-we-do/facilitating-trade-and-transit/tir/future-tir-digital>
- [12] IRU, 2025. TIR-EPD. IRU. Available at: <https://tirepd.iru.org/tirepd/public/login>
- [13] https://dtc.jrc.ec.europa.eu/dtc_smart_tachograph.php.html
- [14] <https://www.transport-community.org/wbrso/>
- [15] Kuznetsova, G.V.; Podbiralina, G.V.; 15.11.2022.: Transport Digitalization. Available at: https://doi.org/10.1007/978-3-031-16598-6_25
- [16] Vasilenko, Marina; Kuzina, Elena; and others; 19.03.2021.: Digital technologies in quality and efficiency management of transport service. Available at: <https://doi.org/10.1051/e3sconf/20212441104>
- [17] Korchagina, Elena; Desfontaines, Larisa; and others; 13.08.2022.: Digitalization of Transport Communications as a Tool for Improving the Quality of Life. Available at: https://link.springer.com/chapter/10.1007/978-3-031-14985-6_2
- [18] BAS ISO 16844 (parts 1-7).
- [19] BAS CEN/TR 17249-1:2021.